Me 'n' Mine™

VII

Answer Book

Pullout Worksheets

Mathematics

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CONTENTS

Solutions to

PULLOUT WORKSHEETS
AND
PRACTICE PAPERS

Chapter 1

INTEGERS

WORKSHEET–1

1. (A) $(-21) + (-29) = -21 - 29$
$= -(21 + 29)$
$= -(50) = -50.$

2. (C) Let us take all the options one by one.

(A) $175 \div (-175) = \dfrac{175}{-175} = -\dfrac{175}{175}$
$= -1.$

(B) $(-16) \times 10 = -(16 \times 10) = -(160)$
$= -160.$

(C) $(-70) \div (-10) = \dfrac{-70}{-10} = \dfrac{70}{10} = 7.$

3. (B) Clearly, second term
$=$ First term $- 3$
$= 10 - 3 = 7$

Also, third term $=$ Second term $- 3$
$= 7 - 3 = 4$

Similarly, fourth term $=$ Third term $- 3$
$= 4 - 3 = 1$

and fifth term $=$ Fourth term $- 3$
$= 1 - 3 = -2.$

4. (B) $(-3) + 7 - (19) = -3 + 7 - 19$
$= 7 - 3 - 19$
$= 7 - (3 + 19) = 7 - 22$
$= -15$

$15 - 8 + (-9) = 15 - 8 - 9$
$= 15 - (8 + 9)$
$= 15 - 17 = -2$

Clearly, -15 is less than -2

so, $(-3) + 7 - (19)$ is less than $15 - 8 + (-9)$

$\therefore\ (-3) + 7 - (19) \boxed{<} 15 - 8 + (-9).$

5. (C) When two negative integers are added, we always get a negative integer, *e.g.*,

$(-7) + (-13) = -7 - 13 = -(7 + 13)$
$= -20$
$=$ a negative integer.

6. (A) On a number line when we add a positive integer, we always move to the right.

7. (B) Let the additive inverse of -6 is a, then

$-6 + a = 0 \quad \therefore \quad a = 6.$

8. (D) $7 + 3 = 10 \neq -10.$

9. (A) Let us take option (A).

$-3 \times 1 = -(3 \times 1) = -(3) = -3$

$1 \times (-3) = -(1 \times 3) = -(3) = -3$

Hence, $-3 \times 1 = -3 = 1 \times (-3)$ is correct.

10. (C) Let the blank space be filled by a, then

$a \times (-9) = -72 \quad \Rightarrow \quad -9a = -72$

$\Rightarrow \quad a = \dfrac{-72}{-9} = \dfrac{72}{9} \quad \Rightarrow \quad a = 8.$

11. (B) If in a fraction, 0 is at the place of denominator, then the fraction is not defined.

$\therefore\ a \div 0 = \dfrac{a}{0}$ is not defined.

12. (B) $a \div 48 = -1$ or $\dfrac{a}{48} = -1$

or $a = -1 \times 48$ or $a = -48.$

13. (A) $(-41) \div [(-40) + (-1)]$

$= -41 \div [-40 - 1) = \dfrac{-41}{-41} = 1.$

14. (D) The additive identity of every integer is 0.

15. (B) As the additive identity of every integer is zero, the additive identity of – 23 is 0.

16. (C) Let us take option (C).

$$\begin{aligned}\text{LHS} &= (-12) + 2 + 10 = -12 + (2 + 10)\\ &= -12 + 12 = 0\\ \text{RHS} &= 12 + (-2) + (-10) = 12 - 2 - 10\\ &= 12 - (2 + 10) = 12 - 12 = 0\end{aligned}$$

Clearly, LHS = RHS.

17. (D)
$$\begin{aligned}-212 + 99 - 87 &= 99 - 87 - 212\\ &= 99 - (87 + 212)\\ &= 99 - 299\\ &= -200.\end{aligned}$$

18. (D) Let us take option (D).

$$\begin{aligned}[(-16) \div 4] \div (-2) &= \left[\frac{-16}{4}\right] \div (-2)\\ &= [-4] \div (-2)\\ &= \frac{-4}{-2} = 2.\end{aligned}$$

which is greater than zero.

Hence, [(– 16) ÷ 4] ÷ (– 2) < 0 is incorrect.

19. (D) Since the multiplicative identity of any integer is 1, therefore, the multiplicative identity of 7 is 1.

20. (C) We know that addition is commutative for integers, so $a + b = b + a$ is true for any integers a and b.

WORKSHEET–2

1. (*i*) $40 \div -1 = \dfrac{40}{-1} = -40.$

(*ii*) $-37 \div (-1) = \dfrac{\frac{-37}{1}}{-1} = 37.$

2. (*i*)
$$\begin{aligned}(-20) \div (-10) &= \frac{-20}{-10}\\ &= \frac{20}{10} = 2. \left(\because \frac{-a}{-b} = \frac{a}{b}\right)\end{aligned}$$

(*ii*)
$$\begin{aligned}(-15) \div (-3) &= \frac{-15}{-3}\\ &= \frac{15}{3} = 5. \left(\because \frac{-a}{-b} = \frac{a}{b}\right)\end{aligned}$$

3. All integers between – 2 and 2 are – 1, 0 and 1.

4. The successor of – 380 = – 380 + 1
= – 379

The predecessor of – 380 = – 380 – 1
= – 381.

5. In this case, the negative integer must be less than – 10. Suppose this is – 16.

Now,

$$\begin{aligned}-16 + \text{Positive integer} &= -10\\ \therefore \quad \text{Positive integer} &= -10 - (-16)\\ &= -10 + 16\\ &= +6.\end{aligned}$$

Hence, the required pair is – 16 and 6.

6. (*i*) First integer = – 27

Second integer = – 54

Second integer – First integer
= – 54 – (– 27)
= – 54 + 27 = – 27.

(*ii*) First integer = 12

Second integer = – 7

Second integer – First integer
= – 7 – (12)
= – 7 – 12 = – 19.

7. (*i*) (– 14) × (– 11) × 10

Since the number of negative integers in the product is even (here 2), therefore, their product must be positive.

$\therefore \quad (-14) \times (-11) \times 10 = 14 \times 11 \times 10$

$= 154 \times 10$

$(\because\ 14 \times 11 = 154)$

$= 1540.$

(*ii*) $(-4) \times (-5) \times (-2) \times (-1)$

Since the number of negative integers is even (here 4), so their product must be positive.

$\therefore\ (-4) \times (-5) \times (-2) \times (-1)$

$= 4 \times 5 \times 2 \times 1$

$= 4 \times 5 \times 2 \quad (\because\ 2 \times 1 = 2)$

$= 4 \times 10 \quad (\because\ 5 \times 2 = 10)$

$= 40.$

8. $(-2-5) \times (-6) = (-7) \times (-6)$

$= 7 \times 6 = 42$

$[\because\ (-a) \times (-b) = a \times b]$

$(-2) - 5 \times (-6) = -2 - [5 \times (-6)]$

$= -2 - [-5 \times 6]$

$[\because\ a \times (-b) = -a \times b]$

$= -2 - (-30)$

$= -2 + 30$

$[\because\ a - (-b) = a + b]$

$= 28$

Clearly, $42 > 28$

Therefore, $(-2-5) \times (-6)$ is greater.

9. (*i*) $20 \times 12 + 20 \times (-4) = 20 \times (12-4)$

LHS $= 20 \times 12 + 20 \times (-4)$

$= 20 \times 12 - 20 \times 4$

$[\because\ a \times (-b) = -a \times b]$

$= 20 \times (12-4)$

$[\because\ a \times b - a \times c = a \times (b-c)]$

= RHS. **Hence proved.**

(*ii*) $14 \times 10 + 14 \times (-20) = 14 \times (10-20)$

LHS $= 14 \times 10 + 14 \times (-20)$

$= 14 \times 10 - 14 \times 20$

$[\because\ a \times (-b) = -a \times b]$

$= 14 \times (10-20)$

$[\because\ a \times b - a \times c = a \times (b-c]$

= RHS. **Hence proved.**

10. (*i*) $400 + (-31) + (-71)$

$= 400 - 31 - 71$

$= 400 - (31 + 71)$

$= 400 - 102 = 298.$

(*ii*) $937 + (-37) + 100 + (-200) + 300$

$= 937 - 37 + 100 - 200 + 300$

$= 937 + 100 + 300 - 37 - 200$

$= (937 + 100 + 300) - (37 + 200)$

$= 1337 - 237 = 1100.$

WORKSHEET–3

1. $\frac{1}{12} \times (-9) = -\frac{9}{12} = -\frac{3}{4}.$

2. (*i*) $35 \div (-5) = \frac{35}{-5} = -\frac{35}{5} = -7.$

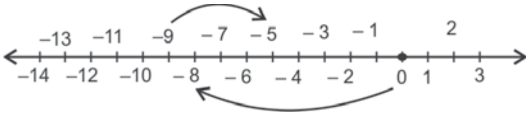
(*ii*) $0 \times (-2) = 0.$

(*iii*) $-275 + x = 1 \Rightarrow x = 1 + 275 = 276.$

(*iv*) $(-59) + 1 = -59 + 1 = -58.$

3. – 8 on the number line = 8 steps towards the left of 0.

+ 3 on the number line = 3 steps towards the right of 0.



$\therefore\ -8 + 3$ = 8 steps towards the left of 0 and then 3 steps towards the right

$= -5.$

4. The sign of the product depends only on the number of negative numbers.

(*i*) There is even number of negative integers, so the product must be positive.

(*ii*) There is odd number of negative integers, so the product must be negative.

5. There are seven days in a week.

Temperature after the 1st day

$= 42\ °C - 2\ °C = 40\ °C$

Temperature after the 2nd day

$$= 40\ ^\circ\text{C} - 2\ ^\circ\text{C} = 38\ ^\circ\text{C}$$

Temperature after the 3rd day

$$= 38\ ^\circ\text{C} - 2\ ^\circ\text{C} = 36\ ^\circ\text{C}$$

Temperature after the 4th day

$$= 36\ ^\circ\text{C} - 2\ ^\circ\text{C} = 34\ ^\circ\text{C}$$

Temperature after the 5th day

$$= 34\ ^\circ\text{C} - 2\ ^\circ\text{C} = 32\ ^\circ\text{C}$$

Temperature after the 6th day

$$= 32\ ^\circ\text{C} - 2\ ^\circ\text{C} = 30\ ^\circ\text{C}$$

Temperature after the 7th day

$$= 30\ ^\circ\text{C} - 2\ ^\circ\text{C} = 28\ ^\circ\text{C}$$

Thus, the temperature after the whole week is 28 °C.

6. (*i*) $120 - (-80) = 120 + 80$ $[\because -(-a) = a]$
$= 200.$

(*ii*) $0 - (-50) = 0 + 50 = 50.$

7. $a \div (b + c) \neq (a \div b) + (a \div c)$

Let us take LHS of this inequality.

LHS $= a \div (b + c)$

Substituting $a = 15$, $b = -3$ and $c = 1$, we get

LHS $= 15 \div (-3 + 1) = 15 \div (-2)$

$$= \frac{15}{-2} = -\frac{15}{2}$$

On the same way,

RHS $= (a \div b) + (a \div c)$

$= [15 \div (-3)] + (15 \div 1)$

$$= \left(\frac{15}{-3}\right) + \left(\frac{15}{1}\right) = -5 + 15 = 10.$$

Clearly, LHS $\neq$ RHS

i.e., $a \div (b + c) \neq (a \div b) + (a \div c)$.

8. $a \div b = -4$

or $\dfrac{a}{b} = -4$ or $a = -4 \times b$

If $b = 1$, then $a = -4 \times 1 = -4$

If $b = 2$, then $a = -4 \times 2 = -8$

If $b = 3$, then $a = -4 \times 3 = -12$

Thus, three pairs of integers (a, b) are $(-4, 1)$, $(-8, 2)$ and $(-12, 3)$.

9. $18 \times (-16) + 2 \times (-16) = (-16) \times (18 + 2)$

Let us take left hand side.

LHS $= 18 \times (-16) + 2 \times (-16)$

$= (18 + 2) \times (-16)$

$[\because a \times c + b \times c = (a + b) \times c]$

$= (-16) \times (18 + 2)$

[Commutativity]

which is RHS.

Let us take right hand side.

RHS $= (-16) \times (18 + 2)$

$= (-16) \times 18 + (-16) \times 2$

[Distributivity]

$= 18 \times (-16) + 2 \times (-16)$

[Commutativity]

which is LHS. **Hence proved.**

10. (*i*) $[124 \times (-2)] \times (-5)$

$= 124 \times [(-2) \times (-5)]$

(Associativity)

$= 124 \times [2 \times 5]$

$[\because (-a) \times (-b) = a \times b]$

$= 124 \times 10 = 1240.$

(*ii*) $[(-1) \times \{217 \times (-20)\}] \times 5$

$= [\{(-1) \times 217\} \times (-20)] \times 5$

(Associativity)

$= \{(-217) \times (-20)\} \times 5$

$= (-217) \times \{(-20) \times 5)\}$

(Associativity)

$= (-217) \times (-20 \times 5)$

$= (-217) \times (-100)$

$= 217 \times 100 = 21700.$

$[\because (-a) \times (-b) = a \times b]$

WORKSHEET – 4

1. (*i*) $\frac{-88}{-8} = \frac{88}{8} = 11.$

(*ii*) $\frac{-25}{5} = -\frac{25}{5} = -5.$

2. Let three negative integers be – 2, – 3 and – 4.

Their product $= (-2) \times (-3) \times (-4)$

$= (-2) \times [(-3) \times (-4)]$

$= (-2) \times [3 \times 4]$

$[\because (-a) \times (-b) = a \times b]$

$= (-2) \times 12$

$[\because (-a) \times b = -(a \times b)]$

$= -(24) = -24.$

= Negative integer.

Hence, the product of three negative integer and is a negative integer.

3. Let the other number be *a*.

$\therefore \quad 60 \times a = -180$

Dividing both sides by 60, we get

$$a = \frac{-180}{60} = -\frac{180}{60}$$

or $\quad a = -3.$

4. Let the number be *b*.

According to the question, $\frac{b}{3} = 14$

Multiplying both sides by 3, we get

$b = 3 \times 14 \quad$ or $\quad b = 42$

5. (*i*) $34 \times (-1) = -(34 \times 1)$

$[\because a \times (-b) = -(a \times b)]$

$= -34. \qquad [\because a \times 1 = a]$

(*ii*) $(-12) \times (-1) = 12 \times 1$

$[\because (-a) \times (-b) = a \times b]$

$= 12. \qquad [\because a \times 1 = a]$

6. (*i*) $(-55) \div 11 = \frac{-55}{11} = -\frac{55}{11} = -5.$

(*ii*) $\frac{-77}{7} = -\frac{77}{7} = -11.$

7. 1 hour = 60 minutes

2 hours = 2 × 60 minutes

= 120 minutes.

$\because$ In 1 minute the elevator covers a depth of 6 metres

$\therefore$ In 2 hours the elevator will cover a depth of 6 × 120 metres

i.e., 720 metres.

Thus, the elevator will be 720 metres below the initial position.

8. (*i*) $\frac{-2}{5} \times 25 \times (-1) = \frac{2}{5} \times 25 \times 1$

$[\because -a \times b \times (-c) = a \times b \times c]$

$= \frac{2}{5} \times (25 \times 1) = \frac{2}{5} \times 25$

$[\because a \times 1 = a]$

$= 2 \times \frac{25}{5} = 2 \times 5 = 10.$

(*ii*) $\frac{3}{2} \times (-4) \times (-1) = \frac{3}{2} \times 4 \times 1$

$= \frac{3}{2} \times 4 = 3 \times \frac{4}{2}$

$= 3 \times 2 = 6.$

9. (*i*) $-800000 \div (-200)$

$$= \frac{-800000}{-200} = \frac{800000}{200} \left[\because \frac{-a}{-b} = \frac{a}{b}\right]$$

$= \frac{8000}{2} = 4000.$

(*ii*) $343 \div (-49) = \frac{343}{-49} = \frac{343}{49}$

$$\left[\because \frac{a}{-b} = -\frac{a}{b}\right]$$

$= -\frac{49}{7} = -7.$

10. (*i*) $-4 \times 16 \times 25 \times 3$

$= 16 \times (-4) \times 25 \times 3$

(Commutativity)

= 16 × [(– 4) × 25 × 3]
= 16 × [{(– 4) × 25} × 3]
= 16 × [(– 100) × 3]
= [16 × (– 100)] × 3
(Associativity)
= – 1600 × 3 = – 4800.

(*ii*) 4 + (– 8) + 6 + (– 2)
= [4 + (– 8) + 6] + (– 2)
= [{4 + (– 8)} + 6] + (– 2)
= [(– 4) + 6] + (– 2)
= (– 4) + [6 + (– 2)]
(Associativity)
= – 4 + 4 = 0.

11. (*i*) – 66 – (– 22) = – 66 + 22 = – 44.

(*ii*) 100 – (– 42 + 39)
= 100 – (– 42) – (+ 39)
= 100 + 42 – 39
= 142 – 39 = 103.

WORKSHEET – 5

1. Let one of the two integers be 4. Then according to the question,

4 + another integer = – 20

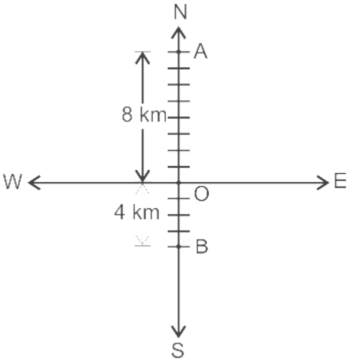
∴ Another integer = – 20 – 4 = – 24

Hence, the required pair is – 24, 4.

2. Let your home be at O. You was at A. Now, you are at B.

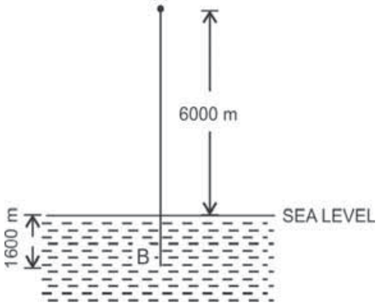
AO = 8 km, OB = 4 km

You travelled from A to B via O.



∴ Required distance travelled by you
= AO + OB = 8 km + 4 km.
= 12 km.

3. Let the position of bird be at A and the position of fish at B. AB is a vertical straight line.



Now, required distance
= AB
= 6000 m + 1600 m = 7600 m.

4. $a \div b = -3$ or $\frac{a}{b} = -3$

or $a = -3b$

[Multiplying both sides by *b*]

If $b = 1$, then $a = -3(1) = -3$

∴ $(a, b) = (-3, 1)$.

5. 423 × (– 63) – [63 × (– 423)]
= 423 × (– 63) – [(– 423) × 63]
(Commutativity)
= – (423 × 63) – [– (423 × 63)]
= – (423 × 63) + (423 × 63)
[∵ $-a-(-a) = -a+a$]
= 0.

6. (*i*) [4 × (– 112)] × 5
= [– (4 × 112)] × 5
[∵ $a \times (-b) = -(a \times b)$]
= [– (448)] × 5 = (– 448) × 5
= – (448 × 5) = – 2240.

(*ii*) 19 + (– 13 + 3) = 19 + (– 10)
= 19 – 10 = 9.

7. (*i*) 25 × 7 × 4 × 3 = 25 × 4 × 7 × 3
= (25 × 4) × (7 × 3)
= 100 × 21 = 2100.

(*ii*) $(-15) + 24 + 5 + (-4)$

$= (-15) + 5 + 24 + (-4)$

$= (-15 + 5) + (24 - 4)$

$= -10 + 20 = 10.$

8. (*i*) Additive inverse of 15 = – 15.

(*ii*) Additive inverse of – 23 = 23.

(*iii*) Additive inverse of 0 = 0.

9. (*i*) $20 \times [5 \times (-16)] = (20 \times 5) \times (-16)$

LHS $= 20 \times [5 \times (-16)] = 20 \times [-80]$

$= -(20 \times 80) = -1600$

RHS $= (20 \times 5) \times (-16) = 100 \times (-16)$

$= -(100 \times 16) = -1600.$

So, $20 \times [5 \times (-16)] = (20 \times 5) \times (-16).$

(*ii*) $18 \times [100 + (-5)] = 18 \times 100 + 18 \times (-5)$

Here $18 \times [100 + (-5)]$

$= 18 \times [100 - 5]$

$= 18 \times 95 = 1710$

And $18 \times 100 + 18 \times (-5)$

$= (18 \times 100) - (18 \times 5)$

$= 1800 - 90 = 1710.$

So, $18 \times [100 + (-5)] = 18 \times 100 + 18 \times (-5).$

10. (*i*) $80 \times [5 \times (-36)] = (80 \times 5) \times (-36)$

Let us take left hand side (LHS).

LHS $= 80 \times [5 \times (-36)]$

$= (80 \times 5) \times (-36)$

[Associativity for multiplication]

= RHS **Hence proved.**

(*ii*) $-4 \times 16 \times 25 \times 3 = \{(-4) \times 25\} \times (16 \times 3)$

Let us take left hand side (LHS).

LHS $= -4 \times 16 \times 25 \times 3$

$= -4 \times (16 \times 25) \times 3$

$= -4 \times (25 \times 16) \times 3$

[Commutativity of multiplication]

$= -4 \times 25 \times 16 \times 3$

$= \{(-4) \times 25\} \times (16 \times 3)$

= RHS. **Hence proved.**

WORKSHEET – 6

1. Let the one negative integer be –10.

Then, – 10 – (Other negative integer)

= 18

∴ Other negative integer

$= -10 - 18 = -28$

Hence the integers are – 10 and – 28.

2. (*i*) The additive inverse of – 13 = 13.

(*ii*) The additive inverse of 22 = – 22.

3. Ascending order is

– 33, – 10, – 7, – 5, – 3, 0, 4, 6, 11, 19.

4. The product of $(-5) \times (6) \times (-7) \times (-20)$ has an odd number of negative integers, so its value must be negative.

∴ $(-5) \times (6) \times (-7) \times (-20)$

$= -5 \times 6 \times 7 \times 20$

$= -(5 \times 20) \times (6 \times 7)$

$= -100 \times 42 = -4200.$

5. – 4, – 3, – 2, – 1 and 0.

6. (*i*) $[13 \times 19] \times (-3) = 13 \times [19 \times (-3)]$

(Associativity of multiplication)

Thus, the blank space is filled with 19.

(*ii*) $(-10) \times 9 \times (-10) \times 1$

$= -10 \times 9 \times [(-10) \times 1]$

$= -10 \times 9 \times (-10)$

$[\because (-a) \times 1 = -a]$

$= -10 \times [9 \times (-10)]$

$= -10 \times [-(9 \times 10)]$

$= -10 \times (-90)$

Thus, the blank space is filled with –90.

7. $30125 \times 99 - (-30125)$

$= 30125 \times 99 + 30125$

$[\because -(-a) = a]$

$= 30125 \times 99 + 30125 \times 1$

$[\because a = a \times 1]$

$= 30125 \times (99 + 1)$

$= 30125 \times 100 = 3012500.$

8. The difference of – 19 and – 43

$= -19 - (-43) = -19 + 43 = 24$

Now, required value $= -63 + 24$

$= -39.$

9. To find balance finally, we add the deposits and subtract the withdrawals.

∴ So, Anita's balance

= ₹ 3148 + ₹ 1500 – ₹ 2100 + ₹ 2000 – ₹ 1550

= ₹ (3148 + 1500 + 2000) – ₹ (2100 + 1550)

= ₹ 6648 – ₹ 3650 = ₹ 2, 998.

10. (*i*) $(-5) + (-3) + 2$

$= -5 - 3 + 2 = -(5 + 3) + 2$

$= -8 + 2 = -6.$

(*ii*) $(-613) + (-111) + (-500)$

$= -613 - 111 - 500$

$= -(613 + 111 + 500)$

$= -(1224) = -1224.$

WORKSHEET – 7

1. Difference of 0 and –10 = 0 – (– 10) = 10

Sum of 0 and –10 = 0 + (– 10) = – 10

Thus, the required pair is (0, – 10).

2. (*i*) $7009 \div (-7009) = \dfrac{7009}{-7009}$

$$= -\left(\frac{7009}{7009}\right) \qquad \left[\because \frac{a}{-b} = -\left(\frac{a}{b}\right)\right]$$

$= -1.$

(*ii*) $(-808) \times [110 + (-33)]$

$= -808 \times [110 - 33]$

$= -808 \times 77 = -62216.$

3. The temperature of water will be 20 °C after a change of 20 °C – 80 °C = – 60 °C

∵ Time taken in the change of – 4 °C = 10 minutes

∴ Time taken in the change of – 1°C

$= \dfrac{10}{4}$ minutes

∴ Time taken in the change of – 60 °C

$= \dfrac{10}{4} \times 60$ minutes = 150 minutes.

4. We know that the product of a positive integer with the negative integer is negative. So, the required number will be positive. As twice of the required number is 150, the number will be the half of 150.

So, the required number $= \dfrac{150}{2} = 75.$

5. Required time in hours

$$= \frac{\text{Capacity of the tank}}{\text{Quantity of water reduced per hour}}$$

$$= \frac{2000 \text{ litres}}{4 \text{ litres}} = 500.$$

6. (*i*) $336 \times (-2) \times (-5)$

$= 336 \times [(-2) \times (-5)]$

$= 336 \times (2 \times 5)$ $[\because (-a) \times (-b) = a \times b]$

$= 336 \times 10$

$= 3360.$

(*ii*) $114 \times 0 \times (-2) = 114 \times [0 \times (-2)]$

$= 114 \times 0$ [∵ 0 × Any integer = 0]

$= 0.$

7. (*i*) $738 + (-99) + 100 - (-400)$

$= 738 - 99 + 100 + 400$

$= (738 + 100 + 400) - 99$

$= 1238 - 99 = 1139.$

(*ii*) $76 \times (-18) + 76 \times 18$

$= 76 \times (-18 + 18)$

$= 76 \times 0$

$= 0.$ $[\because a \times 0 = 0]$

8. (*i*) $(-100 + 7) - 63 = -100 + 7 - 63$

$= 7 - (100 + 63)$

$= 7 - 163 = -156.$

(*ii*) $-666 - (-222) = -666 + 222$

$[\because\ -a - (-b) = -a + b]$

$= -444.$

9. (*i*) $(-4) \times (-5) \times (-2) \times (-1)$

Here the number of negative integers is even.

$\therefore\ (-4) \times (-5) \times (-2) \times (-1)$

$= 4 \times 5 \times 2 \times 1 = 40.$

(*ii*) $2 \times (-5) \times (-7) \times 4$

Here the number of negative integers is even.

$\therefore\ 2 \times (-5) \times (-7) \times 4$

$= 2 \times 5 \times 7 \times 4$

$= (2 \times 5) \times (7 \times 4)$

$= 10 \times 28 = 280.$

(*iii*) $(-4) \times (-11) \times 10$

Here the number of negative integers is even.

$\therefore\ (-4) \times (-11) \times 10 = 4 \times 11 \times 10 = 440.$

10. (*i*) Rise in the temperature

$= 6\ °C - (-3\ °C)$

$= 6\ °C + 3\ °C$

$= 9\ °C.$

(*ii*) The temperature at the end of the afternoon $= 5\ °C - 7\ °C$

$= -2\ °C.$

WORKSHEET – 8

1. $(-20) \times (-2) \times (-5) \times (6)$

$= 40 \times (-30)$

$= -1200.$

2. Let the three integers be $-2, -3, -4$.

According to question,

$= (-2) \times (-3) \times (-4)$

$= -24$

The sign of the product of three integers is minus.

3. Let the larger and smaller integers be x and y.

According to question,

$x + y = -52$

$x + (-5) = -52$

$x - 5 = -52$

$\therefore\ x = -52 + 5$

$\therefore\ x = -47$

$\therefore$ Smaller integer $= -47.$

4. Let the pair of integers be x and y

According to question

$x + y = -13 \quad \ldots(i)$

$x - y = 3 \quad \ldots(ii)$

Adding (*i*) and (*ii*), We get

$2x = -10\ \therefore\ x = -5$

$-5 + y = -13 \quad [\because \text{ From } (i)]$

$y = -13 + 5$

$y = -8$

$\therefore$ Pair of integers $= -5$ and -8.

5. (*i*) $(-7) \times 12$ —— $12 \times (-7)$

$= -84 \underline{=} -84.$

(*ii*) $(7 - 8) \times (-10)$ —— $(8 - 7) \times (-0)$

$= (-1) \times (-10)$ —— $(-1) \times (-0)$

$= 10 \underline{>} 0.$

6. *Try yourself.*

7. (*i*) $4 \times [(-6) + x] = 4 \times (-6) + 4 \times 10$

$= 4 \times [-6 + x] = 4 \times (-6 + 10)$

$= 4 \times [-6 + x] = 4 \times (4)$

$= 4 \times [-6 + x] = 16 = -6 + x = 4$

$= x = 10.$

(*ii*) $(-36) \times [5 + (-4)]$

$= (-36) \times x + (-36) \times (-4)$

$\Rightarrow\ (-36) \times [5 - 4] = -36 \times \{x + (-4)\}$

$\Rightarrow\ -36 \times 1 = -36 \times (x - 4)$

$\Rightarrow\ -36 = -36(x - 4)$

$\Rightarrow\ 1 = x - 4$

$\therefore\ x = 5.$

8. Profit on a sketch = ₹ 1

Loss on a erasers = 40 paise

According to question,

The grocer sold 40 sketch pens.

Profit = 40 rupees

and given that she loss erasers neither profit nor loss.

So, she sold the erasers = $\dfrac{₹40}{40 \text{ paise}}$

$$= \frac{40}{\frac{40}{100}} = \frac{40}{1} \times \frac{100}{40}$$

= 100 erasers.

9. (*i*) [2163 × (–3) + 2163 × (103)]

= [2163 (–3 + (103))]

= [2163 × (–3 + 103)]

= [2163 × (100)]

= 216300.

(*ii*) 51067 × 99 – (– 51067)

= 51067 × (99 – (–1))

= 51067 × (99 + 1)

= 51067 × 100

= 5106700.

10. (*i*) 9 + (15 – 7 – 5) + 6

= 9 + (15 – 12) + 6

= 9 + 3 + 6 = 18.

(*ii*) 25 – 12 ÷ 6 – 3 × 8

= 25 – 2 – 3 × 8

= 25 – 2 – 24

= 25 – 26 = – 1.

(*iii*) 9 + {6 + 5 × 3 – (9 + 3 – 8 × 2)}

= 9 + {6 + 5 × 3 – (9 + 3 – 16)}

= 9 + {6 + 15 – (12 – 16)}

= 9 + {6 + 15 – (–4)}

= 9 + {6 + 15 + 4} = 9 + 6 + 15 + 4

= 34.

(*iv*) 8 + [6 – 3 – {5 + (2 – 8 + 2)}]

= 8 + [6 – 3 – {5 + (2 – 4)}]

= 8 + [6 – 3 – {5 – 2}]

= 8 + [6 – 3 – 3] = 8 + [6 – 6]

= 8 + 0 = 8.

❏❏

Chapter

2 FRACTIONS

WORKSHEET–9

1. (A) In $\frac{4}{5}$, numerator < denominator.

$\therefore$ $\frac{4}{5}$ is the proper fraction.

2. (B) $4 - \frac{7}{8} = \frac{4 \times 8 - 7}{8} = \frac{32 - 7}{8} = \frac{25}{8}$

$= 3\frac{1}{8}$.

3. (C) $2\frac{1}{2} + 3\frac{2}{3} = \frac{4+1}{2} + \frac{9+2}{3} = \frac{5}{2} + \frac{11}{3}$

$= \frac{5 \times 3}{2 \times 3} + \frac{11 \times 2}{3 \times 2}$

[$\because$ LCM of 2 and 3 = 2 × 3 = 6]

$= \frac{15}{6} + \frac{22}{6} = \frac{37}{6} = 6\frac{1}{6}$.

4. (A) $3 \times \frac{4}{7} = a$

$\Rightarrow a = 3 \times \frac{4}{7} \quad \Rightarrow a = \frac{3 \times 4}{7}$

$\Rightarrow a = \frac{12}{7} \quad \Rightarrow a = 1\frac{5}{7}$.

5. (D) $\frac{3}{4}$ of 16 $= \frac{3}{4} \times 16$

$= \frac{3 \times 16}{4} = \frac{48}{4} = 12$.

6. (B) $\frac{1}{4} + \frac{1}{4} + \frac{1}{4} = \frac{3}{4}$

$\Rightarrow \quad 3 \times \frac{1}{4} = \frac{3}{4}$.

7. (D) $\frac{1}{3} \times \frac{17}{8} = \frac{1 \times 17}{3 \times 8} = \frac{17}{24}$.

8. (A) $\frac{4}{5}$ of $\frac{5}{21} = \frac{4}{5} \times \frac{5}{21}$

$= \frac{4 \times 5}{5 \times 21} = \frac{4}{21}$.

9. (C) $2\frac{1}{5} \div 1\frac{1}{5} = \frac{10+1}{5} \div \frac{5+1}{5}$

$= \frac{11}{5} \div \frac{6}{5} = \frac{\frac{11}{5}}{\frac{6}{5}}$

$= \frac{11 \times 5}{5 \times 6} = \frac{11}{6} = 1\frac{5}{6}$.

10. (B) $\because$ Reciprocal of a non-zero whole number $= \frac{1}{\text{Whole number}}$

$\therefore$ Reciprocal of $a = \frac{1}{a}$.

11. (A) Reciprocal of $\frac{9}{7} = \frac{1}{\left(\frac{9}{7}\right)} = \frac{7}{9}$.

12. (A) $\frac{4}{5} \div 4 = \frac{4}{5} \times \frac{1}{4} = \frac{4 \times 1}{5 \times 4} = \frac{1}{5}$.

13. (B) $\frac{1}{2}$ is a reciprocal of $\frac{1}{\left(\frac{1}{2}\right)} = 2$.

14. (D) $\because$ $\frac{3}{5} \times \frac{5}{3} = 1$

Therefore, $\frac{3}{5}$ and $\frac{5}{3}$ are reciprocals of each other.

15. (C) Total weight $= 2\frac{1}{2}$ kg $+ 3\frac{1}{5}$ kg

$$= \frac{4+1}{2}\text{ kg} + \frac{15+1}{5}\text{ kg}$$

$$= \frac{5}{2}\text{ kg} + \frac{16}{5}\text{ kg}$$

$$= \frac{5\times 5}{2\times 5}\text{kg} + \frac{16\times 2}{5\times 2}\text{kg}$$

[$\because$ LCM of 2 and 5 = 2 × 5 = 10]

$$= \frac{25}{10}\text{kg} + \frac{32}{10}\text{kg}$$

$$= \frac{57}{10}\text{ kg} = 5\frac{7}{10}\text{ kg.}$$

16. (B) The distance covered by scooter in 1 litre of petrol = 40 km

The scooter will cover the distance in $3\frac{3}{4}$ litres of petrol

$$= 40 \times 3\frac{3}{4}\text{ km}$$

$$= 40 \times \frac{15}{4}\text{ km} = \frac{40\times 15}{4}\text{ km}$$

$$= 10 \times 15\text{ km} = 150\text{ km.}$$

WORKSHEET–10

1. (*i*) Reciprocal of 4 $= \frac{1}{4}$.

(*ii*) Reciprocal of $\frac{2}{5} = \frac{1}{\left(\frac{2}{5}\right)} = \frac{5}{2}$.

2. (*i*) $\frac{1}{5} \div \frac{1}{2} = \frac{1}{5} \times \frac{2}{1} = \frac{1\times 2}{5\times 1} = \frac{2}{5}$.

(*ii*) $18 \div \frac{4}{5} = 18 \times \frac{5}{4} = \frac{18\times 5}{4}$

$$= \frac{9\times 5}{2} = \frac{45}{2} = 22\frac{1}{2}.$$

3. Length of each part $= \frac{5}{12}$ m $\div 2$

$$= \frac{5}{12}\text{ m} \times \frac{1}{2}$$

$$= \frac{5\times 1}{12\times 2}\text{ m}$$

$$= \frac{5}{24}\text{ m.}$$

4. (*i*) $\frac{1}{9}$ of $81 = \frac{1}{9} \times 81 = \frac{81}{9} = 9$.

(*ii*) $\frac{1}{4}$ of $\frac{12}{15} = \frac{1}{4} \times \frac{12}{15}$

$$= \frac{1\times 12}{4\times 15} = \frac{3}{15} = \frac{1}{5}.$$

(*iii*) $\frac{7}{8}$ of ₹ 64 = ₹$\left(\frac{7}{8}\times 64\right)$ = ₹ $\frac{7\times 64}{8}$

= ₹ (7 × 8) = ₹ 56.

5. (*i*) $2\frac{1}{3} + 1\frac{1}{2} = \frac{2\times 3+1}{3} + \frac{1\times 2+1}{2}$

$$= \frac{6+1}{3} + \frac{2+1}{2} = \frac{7}{3} + \frac{3}{2}$$

[$\because$ LCM of 2 and 3 = 2 × 3 = 6]

$$\therefore\ 2\frac{1}{3} + 1\frac{1}{2} = \frac{7\times 2}{3\times 2} + \frac{3\times 3}{2\times 3}$$

$$= \frac{14}{6} + \frac{9}{6} = \frac{23}{6} = 3\frac{5}{6}.$$

(*ii*) $1\frac{5}{7} + 2\frac{3}{14} = \frac{7+5}{7} + \frac{28+3}{14}$

$$= \frac{12}{7} + \frac{31}{14}$$

$$= \frac{12\times 2 + 31\times 1}{14}$$

[$\because$ LCM of 7 and 14 = 14]

$$= \frac{24+31}{14} = \frac{55}{14} = 3\frac{13}{14}.$$

6. (*i*) $\frac{9}{8} - \frac{3}{4}$

$$\begin{array}{r|ll} 2 & 4, & 8 \\ \hline 2 & 2, & 4 \\ \hline 2 & 1, & 2 \\ \hline & 1, & 1 \end{array}$$

∴ LCM of 4 and 8 = 2 × 2 × 2 = 8

$$\therefore \frac{9}{8} - \frac{3}{4} = \frac{9 \times 1 - 3 \times 2}{8} = \frac{9 - 6}{8} = \frac{3}{8}.$$

(*ii*) $\frac{1}{2} - \frac{1}{4}$

$$\begin{array}{r|ll} 2 & 2, & 4 \\ \hline 2 & 1, & 2 \\ \hline & 1, & 1 \end{array}$$

∴ LCM of 2 and 4 = 2 × 2 = 4

$$\therefore \frac{1}{2} - \frac{1}{4} = \frac{1 \times 2 - 1 \times 1}{4} = \frac{2 - 1}{4} = \frac{1}{4}.$$

7. (*i*) $1\frac{6}{7} \times 21 = \frac{7 + 6}{7} \times 21 = \frac{13}{7} \times 21$

$$= \frac{13 \times 21}{7} = 13 \times 3 = 39.$$

(*ii*) $1\frac{3}{4} \times \frac{2}{3} \times \frac{4}{28} = \frac{4 + 3}{4} \times \frac{2}{3} \times \frac{4}{28}$

$$= \frac{7}{4} \times \frac{2}{3} \times \frac{4}{28}$$

$$= \frac{7}{4} \times \frac{2}{3} \times \frac{1}{7}$$

$$= \frac{7 \times 2 \times 1}{4 \times 3 \times 7}$$

$$= \frac{2}{4 \times 3} = \frac{1}{2 \times 3} = \frac{1}{6}.$$

8. (*i*) $\frac{4}{15} \times \left(\frac{1}{4} + \frac{5}{6}\right)$

$$\begin{array}{r|ll} 2 & 4, & 6 \\ \hline 2 & 2, & 3 \\ \hline 3 & 1, & 3 \\ \hline & 1, & 1 \end{array}$$

∴ LCM of 4 and 6 = 2 × 2 × 3 = 12

$$\therefore \frac{4}{15} \times \left(\frac{1}{4} + \frac{5}{6}\right) = \frac{4}{15} \times \left(\frac{1 \times 3 + 5 \times 2}{12}\right)$$

$$= \frac{4}{15} \times \left(\frac{3 + 10}{12}\right) = \frac{4}{15} \times \frac{13}{12}$$

$$= \frac{4 \times 13}{15 \times 12} = \frac{13}{15 \times 3} = \frac{13}{45}.$$

(*ii*) $\left(2\frac{4}{5} + 1\frac{3}{10}\right) \times 1\frac{1}{2}$

$$= \left(\frac{10 + 4}{5} + \frac{10 + 3}{10}\right) \times \frac{2 + 1}{2}$$

$$= \left(\frac{14}{5} + \frac{13}{10}\right) \times \frac{3}{2}$$

$$= \left(\frac{14 \times 2 + 13 \times 1}{10}\right) \times \frac{3}{2}$$

$$= \left(\frac{28 + 13}{10}\right) \times \frac{3}{2} = \frac{41}{10} \times \frac{3}{2}$$

$$= \frac{41 \times 3}{10 \times 2} = \frac{123}{20} = 6\frac{3}{20}.$$

WORKSHEET–11

1. (*i*) $\frac{-2}{18} + \frac{-7}{18} = \frac{-2 - 7}{18} = \frac{-9}{18} = -\frac{1}{2}.$

(*ii*) $\frac{11}{25} + \frac{-2}{25} = \frac{11 - 2}{25} = \frac{9}{25}.$

2. The given fractions are:

$$\frac{-6}{11}, \frac{-1}{22}, 1\frac{3}{11}, 2\frac{7}{33}$$

or $\frac{-6}{11}, \frac{-1}{22}, \frac{11 + 3}{11}, \frac{66 + 7}{33}$

or $\frac{-6}{11}, \frac{-1}{22}, \frac{14}{11}, \frac{73}{33}$

$$\begin{array}{r|lll} 2 & 11, & 22, & 33 \\ \hline 3 & 11, & 11, & 33 \\ \hline 11 & 11, & 11, & 11 \\ \hline & 1, & 1, & 1 \end{array}$$

LCM of 11, 22 and 33 = 2 × 3 × 11 = 66

$$\frac{-6}{11} = \frac{-6\times 6}{11\times 6} = \frac{-36}{66}$$

$$\frac{-1}{22} = \frac{-1\times 3}{22\times 3} = \frac{-3}{66}$$

$$\frac{14}{11} = \frac{14\times 6}{11\times 6} = \frac{84}{66}$$

$$\frac{73}{33} = \frac{73\times 2}{33\times 2} = \frac{146}{66}$$

$\because -36 < -3 < 84 < 146$

$$\therefore \quad \frac{-36}{66} < \frac{-3}{66} < \frac{84}{66} < \frac{146}{66}$$

i.e, $\frac{-6}{11} < \frac{-1}{22} < 1\frac{3}{11} < 2\frac{7}{33}$.

3. Perimeter of rectangle

= 2 × (length + breadth)

$$= 2 \times \left(14\frac{1}{2}+10\frac{3}{4}\right) \text{ m}$$

$$= 2 \times \left(\frac{29}{2}+\frac{43}{4}\right) \text{ m} = 2 \times \left(\frac{58+43}{4}\right) \text{ m}$$

$$= 2 \times \frac{101}{4} \text{ m} = \frac{101}{2} \text{ m} = 50\frac{1}{2} \text{ m}.$$

4. (*i*) $20 \times \frac{1}{5} = \frac{20\times 1}{5} = 4.$

(*ii*) $\frac{11}{12} \times 6 = \frac{11\times 6}{12} = \frac{11}{2} = 5\frac{1}{2}.$

5. (*i*) $\frac{-7}{4} + \frac{18}{20} = \frac{-7\times 5+18\times 1}{20}$

$$= \frac{-35+18}{20} = \frac{-17}{20}.$$

(*ii*) $\frac{-5}{7} + \frac{4}{14} = \frac{-5\times 2+4\times 1}{14} = \frac{-10+4}{14}$

$$= \frac{-6}{14} = \frac{-3}{7}.$$

6. (*i*) $\frac{3}{4}$ of $76 = \frac{3}{4}\times 76 = \frac{3\times 76}{4}$

$= 3 \times 19 = 57.$

(*ii*) $\frac{4}{5}$ of $70 = \frac{4}{5}\times 70 = \frac{4\times 70}{5}$

$= 4 \times 14 = 56.$

7. (*i*) $\frac{7}{3}\times 1\frac{1}{3} = \frac{7}{3}\times\frac{3+1}{3} = \frac{7}{3}\times\frac{4}{3}$

$$= \frac{7\times 4}{3\times 3} = \frac{28}{9} = 3\frac{1}{9}.$$

(*ii*) $\frac{3}{8}\times\frac{8}{9} = \frac{3\times 8}{8\times 9} = \frac{3}{9} = \frac{1}{3}.$

8. (*i*) $\left(\frac{-7}{8}\right) + \frac{1}{6} + \frac{1}{4}$

$$\begin{array}{r|l} 2 & 4,\ 6,\ 8 \\ \hline 2 & 2,\ 3,\ 4 \\ \hline 2 & 1,\ 3,\ 2 \\ \hline 3 & 1,\ 3,\ 1 \\ \hline & 1,\ 1,\ 1 \end{array}$$

So, LCM of 4, 6 and 8 = 2 × 2 × 2 × 3
= 24

Now, $\left(\frac{-7}{8}\right) + \frac{1}{6} + \frac{1}{4}$

$$= \frac{-7\times 3+1\times 4+1\times 6}{24}$$

$$= \frac{-21+4+6}{24} = \frac{-11}{24}.$$

(*ii*) $\frac{1}{3} + \frac{-3}{4} + \frac{5}{8}$

$$\begin{array}{r|l} 2 & 3,\ 4,\ 8 \\ \hline 2 & 3,\ 2,\ 4 \\ \hline 2 & 3,\ 1,\ 2 \\ \hline 3 & 3,\ 1,\ 1 \\ \hline & 1,\ 1,\ 1 \end{array}$$

So, LCM of 3, 4 and 8 = 2 × 2 × 2 × 3
= 24

Now, $\frac{1}{3} + \frac{-3}{4} + \frac{5}{8}$

$$= \frac{1 \times 8 - 3 \times 6 + 5 \times 3}{24}$$

$$= \frac{8 - 18 + 15}{24} = \frac{5}{24}.$$

9. (*i*) $\frac{9}{10} - \frac{4}{5}$

LCM of 5 and 10 = 10

$$\therefore \frac{9}{10} - \frac{4}{5} = \frac{9 \times 1 - 4 \times 2}{10} = \frac{9-8}{10} = \frac{1}{10}.$$

(*ii*) $-\frac{7}{18} - \frac{2}{9}$

LCM of 18 and 9 = 18

$$\therefore \frac{-7}{18} - \frac{2}{9} = \frac{-7-4}{18} = \frac{-11}{18}.$$

WORKSHEET–12

1. (*i*) $\frac{2}{5} \times \frac{10}{18} = \frac{2}{18} \times \frac{10}{5} = \frac{1}{9} \times 2 = \frac{2}{9}$

Here $2 < 9$

i.e., numerator < denominator

So, $\frac{2}{9}$ is less than 1.

(*ii*) $\frac{7}{3} \div \frac{6}{12} = \frac{7}{3} \times \frac{12}{6} = \frac{7}{3} \times 2 = \frac{14}{3}$

Here $14 > 3$

i.e., numerator > denominator

So, $\frac{14}{3}$ is greater than 1.

2. $\frac{2}{3}$ of 2 hours $= \frac{2}{3} \times 2 = \frac{4}{3}$ hours

$\because$ 1 hour = 60 minutes

= 60 × 60 seconds

($\because$ 1 minute = 60 seconds)

$\therefore$ $\frac{4}{3}$ hours $= \frac{4}{3} \times 60 \times 60$ seconds

= 4 × 20 × 60 seconds

= 4800 seconds.

3. $\because$ In 1 hour Akshit reads $= \frac{1}{3}$ part

$\therefore$ In $2\frac{1}{8}$ hour he will read $= \frac{1}{3} \times 2\frac{1}{8}$

$$= \frac{1}{3} \times \frac{17}{8} = \frac{17}{24} \text{ part.}$$

So, Akshit read $\frac{17}{24}$ part of the book.

4. (*i*) Reciprocal of $\frac{3}{5} = \frac{1}{\left(\frac{3}{5}\right)} = \frac{5}{3}.$

(*ii*) Reciprocal of $\frac{12}{11} = \frac{1}{\left(\frac{12}{11}\right)} = \frac{11}{12}.$

5. First we have to find LCM of 3, 9 and 12

2	3, 9, 12
2	3, 9, 6
3	3, 9, 3
3	1, 3, 1
	1, 1, 1

$\therefore$ LCM = 2 × 2 × 3 × 3 = 36.

Now, $\frac{1}{3} = \frac{1}{3} \times \frac{12}{12} = \frac{12}{36}$ $\left(\because \frac{36}{3} = 12\right)$

$\frac{4}{9} = \frac{4}{9} \times \frac{4}{4} = \frac{16}{36}$ $\left(\because \frac{36}{9} = 4\right)$

and $\frac{5}{12} = \frac{5}{12} \times \frac{3}{3} = \frac{15}{36}$ $\left(\because \frac{36}{12} = 3\right)$

$\because$ $16 > 15 > 12$

$\therefore$ $\frac{16}{36} > \frac{15}{36} > \frac{12}{36}$

So, $\frac{4}{9}, \frac{5}{12}, \frac{1}{3}$ is the descending order.

6. Length of main strip = 6 cm

Length of smaller strip = $\frac{3}{2}$ cm

Number of strips

$$= \frac{\text{Length of main strip}}{\text{Length of smaller strip}}$$

$$= \frac{6}{\left(\frac{3}{2}\right)} = 6 \times \frac{2}{3} = 2 \times 2$$

= 4 strips.

7. (*i*) No.

Example:- $\frac{4}{7}$ is a proper fraction

Reciprocal of $\frac{4}{7}$ is $\frac{7}{4}$ or $1\frac{3}{4}$

Clearly, $1\frac{3}{4}$ is not a proper fraction.

(*ii*) No.

Example:- $\frac{11}{5}$ is an improper fraction

Reciprocal of $\frac{11}{5}$ is $\frac{5}{11}$.

Clearly, $\frac{5}{11}$ is not an improper fraction.

8. (*i*) $\frac{8}{9} \div \frac{4}{15} = \frac{8}{9} \times \frac{15}{4} = \frac{8}{4} \times \frac{15}{9}$

$$= \frac{2}{1} \times \frac{5}{3} = \frac{2 \times 5}{1 \times 3} = \frac{10}{3}$$

$$= 3\frac{1}{3}.$$

(*ii*) $3\frac{1}{4} \div 1\frac{1}{6} = \frac{3 \times 4 + 1}{4} \div \frac{1 \times 6 + 1}{6}$

$$= \frac{13}{4} \div \frac{7}{6} = \frac{13}{4} \times \frac{6}{7}$$

$$= \frac{13}{7} \times \frac{6}{4} = \frac{13}{7} \times \frac{3}{2}$$

$$= \frac{13 \times 3}{7 \times 2} = \frac{39}{14} = 2\frac{11}{14}.$$

9. (*i*) $\frac{4}{7}$ of $21 = \frac{4}{7} \times 21 = \frac{4}{7} \times \frac{21}{1}$

$$= \frac{4}{1} \times \frac{21}{7} = \frac{4}{1} \times 3 = \frac{4 \times 3}{1}$$

$$= \frac{12}{1} = 12.$$

(*ii*) $14 \div \frac{7}{5} = \frac{14}{1} \times \frac{5}{7} = \frac{14}{7} \times \frac{5}{1}$

$$= \frac{2}{1} \times \frac{5}{1} = \frac{2 \times 5}{1 \times 1} = \frac{10}{1}$$

= 10.

(*iii*) $14\frac{1}{5} \div 12\frac{2}{25}$

$$= \frac{14 \times 5 + 1}{5} \div \frac{12 \times 25 + 2}{25} = \frac{71}{5} \div \frac{302}{25}$$

$$= \frac{71}{5} \times \frac{25}{302} = \frac{71}{302} \times \frac{25}{5}$$

$$= \frac{71}{302} \times \frac{5}{1} = \frac{71 \times 5}{302} = \frac{355}{302} = 1\frac{53}{302}.$$

10. (*i*) $\frac{3}{7}$ of $\frac{1}{6} = \frac{3}{7} \times \frac{1}{6} = \frac{1}{14}$

$\frac{3}{5}$ of $\frac{2}{3} = \frac{3}{5} \times \frac{2}{3} = \frac{2}{5}$

LCM of 14 and 5 = 14 × 5 = 70

Now, $\frac{1}{14} = \frac{1 \times 5}{14 \times 5} = \frac{5}{70}$ $\left(\because \frac{70}{14} = 5\right)$

and $\frac{2}{5} = \frac{2 \times 14}{5 \times 14} = \frac{28}{70}$ $\left(\because \frac{70}{5} = 14\right)$

$\because$ 28 > 5 $\therefore$ $\frac{28}{70} > \frac{5}{70}$

So, $\frac{3}{5}$ of $\frac{2}{3}$ is greater.

(*ii*) $\frac{1}{2}$ of $\frac{8}{9} = \frac{1}{2} \times \frac{8}{9} = \frac{4}{9}$

$\frac{4}{5}$ of $\frac{10}{11} = \frac{4}{5} \times \frac{10}{11} = \frac{8}{11}$

LCM of 9 and 11 = 9 × 11 = 99

Now, $\frac{4}{9} = \frac{4}{9} \times \frac{11}{11} = \frac{44}{99}$

$\left(\because \frac{99}{9} = 11\right)$

and $\frac{8}{11} = \frac{8}{11} \times \frac{9}{9} = \frac{72}{99}$

$\left(\because \frac{99}{11} = 9\right)$

$\because \quad 72 > 44$

$\therefore \quad \frac{72}{99} > \frac{44}{99}$

So, $\frac{4}{5}$ of $\frac{10}{11}$ is greater.

WORKSHEET–13

1. ∵ Cost of $\frac{1}{4}$ litre = ₹ 20

∴ Cost of 1 litre = $\frac{\text{₹}\,20}{\frac{1}{4}}$ = ₹ (20 × 4)

= ₹ 80

∴ Cost of $5\frac{1}{2}$ litres = ₹ 80 × $5\frac{1}{2}$

= ₹ 80 × $\frac{11}{2}$

= ₹ 440.

2. Weight of apples = $3\frac{1}{2}$ kg

$= \frac{3 \times 2 + 1}{2}$ kg

$= \frac{7}{2}$ kg

Weight of oranges = $6\frac{3}{4}$ kg

$= \frac{6 \times 4 + 3}{4}$ kg

$= \frac{27}{4}$ kg

LCM of 2 and 4 = 4

Total weight of fruits

= weight of apples + weight of oranges

$= \frac{7}{2}$ kg + $\frac{27}{4}$ kg

$= \frac{14 + 27}{4}$ kg $= \frac{41}{4}$ kg $= 10\frac{1}{4}$ kg.

3. $2\frac{1}{3} = \frac{2 \times 3 + 1}{3} = \frac{7}{3}$

$$\begin{array}{r|l} 2 & 3,\ 6,\ 12 \\ \hline 2 & 3,\ 3,\ 6 \\ \hline 3 & 3,\ 3,\ 3 \\ \hline & 1,\ 1,\ 1 \end{array}$$

$1\frac{1}{6} = \frac{1 \times 6 + 1}{6} = \frac{7}{6}$

$3\frac{11}{12} = \frac{3 \times 12 + 11}{12} = \frac{47}{12}$

$1\frac{5}{6} = \frac{1 \times 6 + 5}{6} = \frac{11}{6}$

∴ LCM of 3, 6 and 12 = 2 × 2 × 3 = 12

Now, $2\frac{1}{3} + 1\frac{1}{6} + 3\frac{11}{12} - 1\frac{5}{6}$

$= \frac{7}{3} + \frac{7}{6} + \frac{47}{12} - \frac{11}{6}$

$= \frac{7 \times 4 + 7 \times 2 + 47 \times 1 - 11 \times 2}{12}$

$= \frac{28 + 14 + 47 - 22}{12} = \frac{67}{12} = 5\frac{7}{12}.$

4. Here, $5\frac{1}{6} = \frac{5 \times 6 + 1}{6} = \frac{30 + 1}{6} = \frac{31}{6}$

Now, $\quad 5\frac{1}{6} \div \frac{9}{2} = \frac{31}{6} \div \frac{9}{2}$

$= \frac{31}{6} \times \frac{2}{9} = \frac{31 \times 2}{6 \times 9}$

$$= \frac{31}{3 \times 9} = \frac{31}{27}$$

$$= 1\frac{4}{27}.$$

5.

$$\begin{array}{r|rrr} 2 & 8, & 16, & 24 \\ \hline 2 & 4, & 8, & 12 \\ \hline 2 & 2, & 4, & 6 \\ \hline 2 & 1, & 2, & 3 \\ \hline 3 & 1, & 1, & 3 \\ \hline & 1, & 1, & 1 \end{array}$$

$\therefore$ LCM of 8, 16 and 24

$$= 2 \times 2 \times 2 \times 2 \times 3 = 48$$

$$\therefore \quad \frac{1}{8} = \frac{1 \times 6}{8 \times 6} = \frac{6}{48}$$

$$\frac{5}{16} = \frac{5 \times 3}{16 \times 3} = \frac{15}{48}$$

and $\frac{7}{24} = \frac{7 \times 2}{24 \times 2} = \frac{14}{48}$

$\because$ 6, 14, 15 are in ascending order

$\therefore$ $\frac{6}{48}, \frac{14}{48}, \frac{15}{48}$ are in ascending order

$\therefore$ $\frac{1}{8}, \frac{7}{24}, \frac{5}{16}$ are in ascending order.

6. (*i*) $15\frac{1}{2} \times 6\frac{1}{5} \times 1\frac{1}{10}$

$$= \frac{15 \times 2 + 1}{2} \times \frac{6 \times 5 + 1}{5} \times \frac{1 \times 10 + 1}{10}$$

$$= \frac{30 + 1}{2} \times \frac{30 + 1}{5} \times \frac{10 + 1}{10}$$

$$= \frac{31}{2} \times \frac{31}{5} \times \frac{11}{10}$$

$$= \frac{31 \times 31 \times 11}{2 \times 5 \times 10} = \frac{10571}{100} = 105\frac{71}{100}.$$

(*ii*) $\frac{2}{3}$ of $\frac{3}{4}$ of $26 = \frac{2}{3} \times \frac{3}{4} \times 26$

$$= \frac{2 \times 3 \times 26}{3 \times 4} = \frac{2 \times 26}{4}$$

$$= \frac{52}{4} = 13.$$

7. (*i*) $\frac{3}{5} \times \square = \frac{27}{40}$

Let $\square = a$

Then $\frac{3}{5} \times a = \frac{27}{40}$

$$\Rightarrow \quad a = \frac{27}{40} \times \frac{5}{3} = \frac{27 \times 5}{40 \times 3} = \frac{9}{8}$$

$$\Rightarrow \quad a = 1\frac{1}{8} \quad \therefore \quad \square = 1\frac{1}{8}.$$

(*ii*) $\frac{4}{5} + \square = \frac{12}{10}$

Let $\square = b$

Then $\frac{4}{5} + b = \frac{12}{10}$

$$\Rightarrow \quad b = \frac{12}{10} - \frac{4}{5} = \frac{12 \times 1 - 4 \times 2}{10}$$

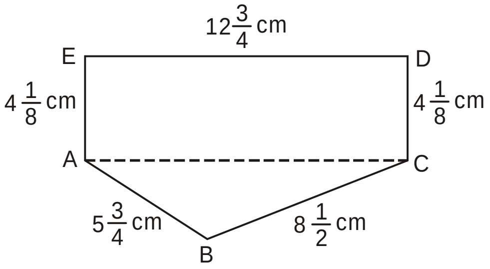
$$\Rightarrow \quad b = \frac{12 - 8}{10} = \frac{4}{10} = \frac{2}{5}$$

$$\therefore \quad \square = \frac{2}{5}.$$

8. AB $= 5\frac{3}{4}$ cm $= \frac{5 \times 4 + 3}{4}$ cm $= \frac{23}{4}$ cm

BC $= 8\frac{1}{2}$ cm $= \frac{8 \times 2 + 1}{2}$ cm $= \frac{17}{2}$ cm

CD $= 4\frac{1}{8}$ cm $= \frac{4 \times 8 + 1}{8}$ cm $= \frac{33}{8}$ cm



$$DE = 12\frac{3}{4}\text{ cm} = \frac{12\times4+3}{4} = \frac{51}{4}\text{ cm.}$$

$$EA = CD = \frac{33}{8}\text{ cm}$$

Now, perimeter of figure ABCDE

$$= AB + BC + CD + DE + EA$$

$$= \left(\frac{23}{4}+\frac{17}{2}+\frac{33}{8}+\frac{51}{4}+\frac{33}{8}\right)\text{ cm}$$

LCM of 2, 4 and 8 = 2 × 2 × 2 = 8

2	2, 4, 8
2	1, 2, 4
2	1, 1, 2
	1, 1, 1

$$= \frac{23\times2+17\times4+33\times1+51\times2+33\times1}{8}\text{ cm}$$

$$= \frac{46+68+33+102+33}{8}\text{ cm}$$

$$= \frac{282}{8}\text{ cm} = 35\frac{2}{4}\text{ cm } \textit{i.e.},\ 35\frac{1}{2}\text{ cm.}$$

9. 2 dozen = 2 × 12 = 24

$\frac{1}{3}$ of the oranges = $\frac{1}{3}$ × 24 = 8 oranges

$\frac{1}{4}$ of the total oranges = $\frac{1}{4}$ × 24

= 6 oranges

Number of sold oranges = 8 + 6 = 14

Number of left of the oranges = Total number of oranges – Number of sold oranges

= 24 – 14

= 10 oranges.

10. Initially, Shyam has money = ₹ 240.

Money spent by Shyam $\frac{2}{8}$ part.

Money left with Shyam

$$= 1 - \frac{2}{8} = \frac{6}{8} = \frac{3}{4}\text{ part.}$$

Money left with Shyam

$$= \frac{3}{4}\text{ of ₹ } 240$$

$$= ₹\ \frac{3\times240}{4} = ₹\ 180.$$

WORKSHEET–14

1. $1\frac{1}{2} = \frac{1\times2+1}{2} = \frac{3}{2}$

and $8\frac{1}{4} = \frac{8\times4+1}{4} = \frac{33}{4}$

∵ Weight of 1 watermelon

$$= 1\frac{1}{2}\text{ kg} = \frac{3}{2}\text{ kg}$$

∴ Weight of $8\frac{1}{4}$ watermelons

$$= \frac{3}{2}\times 8\frac{1}{4}\text{ kg}$$

$$= \frac{3}{2}\times\frac{33}{4}\text{ kg} = \frac{3\times33}{2\times4}\text{ kg}$$

$$= \frac{99}{8}\text{ kg} = 12\frac{3}{8}\text{ kg.}$$

2. $\frac{3}{5}$ of 30 km = $\frac{3}{5}$ × 30 km = $\frac{3\times30}{5}$ km

$$= \frac{90}{5}\text{ km} = 18\text{ km.}$$

$\frac{2}{8}$ of 40 km = $\frac{2}{8}$ × 40 km = $\frac{2\times40}{8}$ km

$$= \frac{80}{8}\text{ km} = 10\text{ km}$$

Since, 18 km is greater than 10 km

∴ Difference = (18 – 10) km

= 8 km.

3. Side = $4\frac{4}{5}$ cm = $\frac{4\times5+4}{5}$ cm

$$= \frac{20+4}{5}\text{ cm} = \frac{24}{5}\text{ cm}$$

Perimeter = 4 × Side

$$= 4 \times \frac{24}{5} \text{ cm} = \frac{4 \times 24}{5} \text{ cm}$$

$$= \frac{96}{5} \text{cm} = 19\frac{1}{5} \text{ cm}.$$

4. Let the man initially had ₹ a.

Expenditure $= \frac{2}{5}$ of $a = \frac{2}{5} \times a = \frac{2a}{5}$

So, money left with him $= a - \frac{2a}{5} = \frac{3a}{5}$

$$\therefore \frac{3a}{5} = 120 \text{ or } a = \frac{120 \times 5}{3} = 200.$$

Thus, the man initially had ₹ 200.

5. (*i*) $\frac{3}{4}$ of 32 kg $= \frac{3}{4} \times 32$ kg

$$= \frac{3 \times 32}{4} \text{ kg} = 3 \times 8 \text{ kg}$$

= 24 kg.

(*ii*) $\frac{2}{7}$ of 1 week $= \frac{2}{7}$ of 7 days

($\because$ 1 week = 7 days)

$$= \frac{2}{7} \times 7 \text{ days}$$

= 2 days.

(*iii*) $\frac{4}{5}$ of ₹ 120 $= \frac{4}{5} \times$ ₹ 120

$$= \text{₹}\, \frac{4 \times 120}{5} = \text{₹}\, 4 \times 24$$

= ₹ 96.

6. (*i*) $\because \quad 2\frac{1}{3} = \frac{2 \times 3 + 1}{3} = \frac{6+1}{3} = \frac{7}{3}$

$$\therefore \; 8 \div 2\frac{1}{3} = 8 \div \frac{7}{3} = 8 \times \frac{3}{7} = \frac{8 \times 3}{7}$$

$$= \frac{24}{7} = 3\frac{3}{7}.$$

(*ii*) $8\frac{1}{4} = \frac{8 \times 4 + 1}{4} = \frac{32+1}{4} = \frac{33}{4}$

$$1\frac{5}{6} = \frac{1 \times 6 + 5}{6} = \frac{6+5}{6} = \frac{11}{6}$$

Now, $8\frac{1}{4} \div 1\frac{5}{6} = \frac{33}{4} \div \frac{11}{6}$

$$= \frac{33}{4} \times \frac{6}{11} = \frac{33 \times 6}{4 \times 11}$$

$$= \frac{3 \times 3}{2} = \frac{9}{2} = 4\frac{1}{2}.$$

7. (*i*) $\frac{4}{18} = \frac{2}{9}$; $\frac{35}{20} = \frac{7}{4}$

Now, $\frac{4}{18} \times \frac{35}{20} \times \frac{9}{14} = \frac{2}{9} \times \frac{7}{4} \times \frac{9}{14}$

$$= \frac{2 \times 7 \times 9}{9 \times 4 \times 14} = \frac{1}{4}.$$

(*ii*) $9\frac{2}{3} = \frac{9 \times 3 + 2}{3} = \frac{29}{3}$;

$$1\frac{1}{29} = \frac{1 \times 29 + 1}{29} = \frac{30}{29}; \; \frac{6}{15} = \frac{2}{5}.$$

$$7\frac{1}{5} = \frac{7 \times 5 + 1}{5} = \frac{36}{5}$$

Now, $9\frac{2}{3} \times 1\frac{1}{29} \times \frac{6}{15} \times 7\frac{1}{5}$

$$= \frac{29}{3} \times \frac{30}{29} \times \frac{2}{5} \times \frac{36}{5}$$

$$= \frac{29 \times 30 \times 2 \times 36}{3 \times 29 \times 5 \times 5}$$

$$= \frac{29}{29} \times \frac{30}{5 \times 5} \times \frac{36}{3} \times 2$$

$$= 1 \times \frac{6}{5} \times 12 \times 2$$

$$= \frac{6 \times 12 \times 2}{5} = \frac{144}{5} = 28\frac{4}{5}.$$

8. (*i*) $2\frac{3}{4} = \frac{2 \times 4 + 3}{4} = \frac{11}{4}$;

$$1\frac{1}{3} = \frac{1\times 3+1}{3} = \frac{4}{3}$$

Now, $\left(2\frac{3}{4}-1\frac{1}{3}\right) \times \frac{3}{4} = \left(\frac{11}{4}-\frac{4}{3}\right) \times \frac{3}{4}$

$$= \left(\frac{11\times 3-4\times 4}{12}\right)\times\frac{3}{4}$$

$$= \left(\frac{33-16}{12}\right) \times \frac{3}{4} = \frac{17\times 3}{12\times 4} = \frac{51}{48}$$

$$= \frac{17}{16} = 1\frac{1}{16}.$$

(*ii*) $3\frac{1}{4} = \frac{3\times 4+1}{4} = \frac{13}{4}$

$2\frac{1}{3} = \frac{2\times 3+1}{3} = \frac{7}{3}$

$1\frac{1}{4} = \frac{1\times 4+1}{4} = \frac{5}{4}$

Now, $3\frac{1}{4} \times 2\frac{1}{3} - 1\frac{1}{4} \times \frac{1}{5}$

$$= \frac{13}{4} \times \frac{7}{3} - \frac{5}{4} \times \frac{1}{5}$$

$$= \left(\frac{13}{4}\times\frac{7}{3}\right) - \left(\frac{5}{4}\times\frac{1}{5}\right)$$

$$= \frac{13\times 7}{4\times 3} - \frac{5\times 1}{4\times 5} = \frac{91}{12} - \frac{1}{4}$$

$$= \frac{91\times 1-1\times 3}{12} = \frac{91-3}{12}$$

$$= \frac{88}{12} = \frac{22}{3} = 7\frac{1}{3}.$$

9. (*i*) Length of rectangle $= l = 4$ cm

Breadth of rectangle $= b = 1\frac{1}{2}$ cm

$= \frac{1\times 2+1}{2}$ cm

$= \frac{3}{2}$ cm

Area of rectangle $= l \times b$

$= 4 \text{ cm} \times \frac{3}{2} \text{ cm}$

$= \frac{4\times 3}{2} \text{ cm}^2$

$= 2 \times 3 \text{ cm}^2$

$= 6 \text{ cm}^2$.

(*ii*) Length of rectangle $= l = 9\frac{3}{4}$ cm

$= \frac{9\times 4+3}{4}$ cm

$= \frac{39}{4}$ cm

Breadth of rectangle $= b = 4\frac{1}{2}$ cm

$= \frac{4\times 2+1}{2}$ cm

$= \frac{9}{2}$ cm

Area of rectangle $= l \times b$

$$= \frac{39}{4} \text{ cm} \times \frac{9}{2} \text{ cm} = \frac{39\times 9}{4\times 2} \text{ cm}^2$$

$$= \frac{351}{8} \text{cm}^2 = 43\frac{7}{8} \text{ cm}^2.$$

WORKSHEET–15

1. (*i*) $8 \times \frac{7}{2} = \frac{8}{2} \times 7 = 4 \times 7 = 28.$

(*ii*) $40 \times \frac{5}{8} = \frac{40}{8} \times 5 = 5 \times 5 = 25.$

2. 1 hour = 60 minutes

= 60 × 60 seconds

$\frac{5}{8}$ of 3 hours $= \frac{5}{8} \times 3$ hours

$= \frac{5}{8} \times 3 \times 60 \times 60$ seconds

$= (5 \times 3 \times 60) \times \frac{60}{8}$ seconds

$= 900 \times \dfrac{15}{2}$ seconds

$= \dfrac{900}{2} \times 15$ seconds

$= 450 \times 15$ seconds

$= 6750$ seconds.

3. Length of ribbon $= 27\dfrac{1}{2}$ m

$= \dfrac{27 \times 2 + 1}{2}$ m

$= \dfrac{55}{2}$ m

Length of 1 piece $= 2\dfrac{3}{4}$ m $= \dfrac{2 \times 4 + 3}{4}$ m

$= \dfrac{11}{4}$ m

Number of pieces

$$= \frac{\text{Length of ribbon}}{\text{Length of 1 piece}}$$

$$= \frac{\frac{55}{2}}{\frac{11}{4}} = \frac{55}{2} \times \frac{4}{11}$$

$$= \frac{55}{11} \times \frac{4}{2}$$

$= 5 \times 2 = 10$ pieces.

4. $2\dfrac{2}{3} = \dfrac{2 \times 3 + 2}{3} = \dfrac{8}{3}$

Marks got by Bulbul $= 2\dfrac{2}{3}$ of mark got by Kanika $= \dfrac{8}{3} \times 75$

$= 8 \times \dfrac{75}{3} = 8 \times 25$

$= 200$ marks.

5. First find LCM of 8, 9, 16 and 36

2	8,	9,	16,	36
2	4,	9,	8,	18
2	2,	9,	4,	9
2	1,	9,	2,	9
3	1,	9,	1,	9
3	1,	3,	1,	3
	1,	1,	1,	1

∴ LCM of 8, 9, 16 and 36

$= 2 \times 2 \times 2 \times 2 \times 3 \times 3 = 144.$

We have,

$\dfrac{2}{9} = \dfrac{2 \times 16}{9 \times 16} = \dfrac{32}{144}$ [∵ 144 ÷ 9 = 16]

$\dfrac{1}{8} = \dfrac{1 \times 18}{8 \times 18} = \dfrac{18}{144}$ [∵ 144 ÷ 8 = 18]

$\dfrac{5}{16} = \dfrac{5 \times 9}{16 \times 9} = \dfrac{45}{144}$ [∵ 144 ÷ 16 = 9]

$\dfrac{7}{36} = \dfrac{7 \times 4}{36 \times 4} = \dfrac{28}{144}$ [∵ 144 ÷ 36 = 4]

We know that

$18 < 28 < 32 < 45$

$\therefore \quad \dfrac{18}{144} < \dfrac{28}{144} < \dfrac{32}{144} < \dfrac{45}{144}$

$\Rightarrow \quad \dfrac{1}{8} < \dfrac{7}{36} < \dfrac{2}{9} < \dfrac{5}{16}.$

6. Number of rotten apples

$= \dfrac{3}{10} \times 1500$

$= 3 \times 150 = 450.$

Number of riped apples $= \dfrac{1}{3} \times 1500$

$= 500.$

7. (*i*) $\dfrac{5}{7} \div \dfrac{15}{14} = \dfrac{5}{7} \times \dfrac{14}{15} = \dfrac{5}{15} \times \dfrac{14}{7}$

$= \dfrac{1}{3} \times 2 = \dfrac{2}{3}.$

(*ii*) $6\frac{2}{5} \div \frac{9}{7} = \frac{6\times5+2}{5} \div \frac{9}{7} = \frac{32}{5} \div \frac{9}{7}$

$= \frac{32}{5} \times \frac{7}{9} = \frac{32\times7}{5\times9} = \frac{224}{45}$

$= 4\frac{44}{45}$.

8. (*i*) $2\frac{6}{13} = \frac{2\times13+6}{13} = \frac{32}{13}$;

$1\frac{1}{26} = \frac{1\times26+1}{26} = \frac{27}{26}$

Now, $2\frac{6}{13} \div 1\frac{1}{26} = \frac{32}{13} \div \frac{27}{26}$

$= \frac{32}{13} \times \frac{26}{27}$

$= \frac{64}{27} = 2\frac{10}{27}$.

(*ii*) $4\frac{3}{7} = \frac{4\times7+3}{7} = \frac{31}{7}$;

$1\frac{1}{7} = \frac{1\times7+1}{7} = \frac{8}{7}$

Now, $4\frac{3}{7} \div 1\frac{1}{7} = \frac{31}{7} \div \frac{8}{7} = \frac{31}{7} \times \frac{7}{8}$

$= \frac{31}{8} \times \frac{7}{7} = \frac{31}{8} \times 1$

$= \frac{31}{8} = 3\frac{7}{8}$.

9. (*i*) $22\frac{1}{5} = \frac{22\times5+1}{5} = \frac{110+1}{5} = \frac{111}{5}$

$2\frac{1}{5} = \frac{2\times5+1}{5} = \frac{10+1}{5} = \frac{11}{5}$

Now, $22\frac{1}{5} - 2\frac{1}{5} = \frac{111}{5} - \frac{11}{5} = \frac{111-11}{5}$

$= \frac{100}{5} = 20$.

(*ii*) $7 - \frac{1}{8} = \frac{7\times8-1}{8} = \frac{56-1}{8}$

$= \frac{55}{8} = 6\frac{7}{8}$.

10. Total number of students = 50

(*i*) Number of students like playing cricket

$= \frac{1}{5}$ of $50 = \frac{1}{5} \times 50 = 10$.

(*ii*) Number of students like playing football

$= \frac{2}{5}$ of 50

$= \frac{2}{5} \times 50 = 20$

Number of students like playing table-tennis

= 50 – (10 + 20)

= 50 – 30 = 20.

(*iii*) Number of students like playing both cricket and football = 10 + 20 = 30.

WORKSHEET–16

1. False.

Let proper fraction $= \frac{4}{7}$

Reciprocal of $\frac{4}{7} = \frac{7}{4}$ = Improper fraction

Let improper fraction $= \frac{5}{3}$

Reciprocal of $\frac{5}{3} = \frac{3}{5}$ = Proper fraction

2. Perimeter of a square $= 6\frac{1}{2}$ m (Given)

According to formula,
Perimeter of square = 4 × side

$6\frac{1}{2}$ m = 4 × side

$\frac{13}{2}$ m = 4 × side

$\therefore$ Side $= \frac{13}{2} \times \frac{1}{4}$

$$\text{Side} = \frac{13}{8} = 1\frac{5}{8}.$$

3. $\frac{2}{7}$ of $\frac{3}{8}$ or $\frac{3}{5}$ of $\frac{5}{4}$

$\frac{2}{7} \times \frac{3}{8}$ or $\frac{3}{5} \times \frac{5}{4}$

$\frac{3}{28}$ or $\frac{3}{4}$

$\frac{3}{5}$ of $\frac{5}{4}$ is greater.

4. $\text{Area} = \frac{4}{9}\,\text{cm}^2$

$\text{Length} = \frac{2}{3}\,\text{m}$

We know that

Area of square = side × side

$$= \frac{2}{3} \times \frac{2}{3} = \frac{4}{9}\,\text{cm}^2$$

Square, both length and breadth of the rectangle are equal to $\frac{2}{3}$ cm.

5. Total number of students like study

English = $\frac{1}{5}$ of total students

$$= \frac{1}{5} \times 35 = 7 \text{ students}$$

= Total number of students like to study in science = $\frac{2}{5}$ of total students

$$= \frac{2}{5} \times 35 = 14 \text{ students.}$$

The number of students like to study in Mathematics

= Total number of students – (Student like to English + Student like to mathematics)

= 35 – (7 + 14)

= 35 – 21 = 14 students.

6. Total weights of aircraft voyager = 800 kg

Total fuel it does carry = $3\frac{1}{2}$ times of total weights

$$= 3\frac{1}{2} \times 800 \text{ kg}$$

$$= \frac{7}{2} \times 800 = 2800 \text{ kg.}$$

7. *Try yourself*

8. $3\frac{2}{3} - \left[4 + \left\{2\frac{1}{2} - \left(2 \text{ of } 1\frac{1}{3} \div 1\frac{1}{9} + 1\right)\right\}\right]$

$$= \frac{11}{3} - \left[4 + \left\{\frac{5}{2} - \left(2 \times \frac{4}{3} \div \frac{10}{9} + 1\right)\right\}\right]$$

$$= \frac{11}{3} - \left[4 + \left\{\frac{5}{2} - \left(\frac{8}{3} \times \frac{9}{10} + 1\right)\right\}\right]$$

$$= \frac{11}{3} - \left[4 + \left\{\frac{5}{2} - \left(\frac{12}{5} + 1\right)\right\}\right]$$

$$= \frac{11}{3} - \left[4 + \left\{\frac{5}{2} - \left(\frac{12 + 5}{5}\right)\right\}\right]$$

$$= \frac{11}{3} - \left[4 + \left\{\frac{5}{2} - \frac{17}{5}\right\}\right]$$

$$= \frac{11}{3} - \left[4 + \left\{\frac{25 - 34}{10}\right\}\right] = \frac{11}{3} - \left[4 - \frac{9}{10}\right]$$

$$= \frac{11}{3} - \left[\frac{40 - 9}{10}\right] = \frac{11}{3} - \left[\frac{31}{10}\right]$$

$$= \frac{11}{3} - \frac{31}{10} = \frac{110 - 93}{30} = \frac{17}{30}.$$

9. (*i*) $\frac{1}{5}$ of $20 = \frac{1}{5} \times \frac{20}{1} = 4$

(*ii*) $\frac{2}{3}$ of 18

$$\frac{2}{3} \times \frac{18}{1} = 2 \times 6 = 12.$$

(*iii*) $\frac{1}{2}$ of $\frac{8}{9} = \frac{1}{2} \times \frac{8}{9} = \frac{4}{9}$

(*iv*) $\frac{2}{3}$ of year (∵ 1 year = 12 months)

$\frac{2}{3} \times \frac{12}{1}$ = 8 months.

(*v*) $\frac{3}{5}$ of a meter

$= \frac{3}{5} \times 100$ (∵ 1 m = 100 cm)

= 60 cm

(*vi*) $\frac{3}{5}$ of a minute

$= \frac{3}{5} \times 60$ (∵ 1 minute = 60 seconds)

= 36 seconds.

❑❑

Chapter

3 DECIMALS

WORKSHEET–17

1. (B) $\because$ 0.33 > 0.30 > 0.03

$\therefore$ 3.33 > 3.30 > 3.03

$\therefore$ 3.33 is the greatest.

2. (A) 6 paise = ₹ $\frac{6}{100}$ = ₹ 0.06

6 rupees and 6 paise = ₹ 6 + ₹ 0.06

= ₹ 6.06.

3. (A)

$$\begin{array}{r} 2.38 \\ +\ 3.46 \\ \hline 5.84 \end{array}$$

4. (D)

$$\begin{array}{r} ₹\ 26.00 \\ -₹\ 18.40 \\ \hline ₹\ 7.6\ 0 \end{array}$$

5. (C) $\frac{7.0683}{100} = \frac{007.0683}{100} = 0.070683.$

6. (B) $\frac{7.75}{2.5} = \frac{7.75 \times 100}{2.5 \times 100} = \frac{775}{250} = \frac{31}{10} = 3.1.$

7. (A)

$$\begin{array}{r} 8.000 \\ -3.187 \\ \hline 4.813 \end{array}$$

8. (D) Perimeter = 3.1 cm + 3.03 cm + 4.2 cm

= (3.1 + 3.03 + 4.2) cm

= 10.33 cm.

9. (A) $4.08 \times 100 = \frac{408}{100} \times 100 = 408.$

10. (C)

$$\begin{array}{r} 101.2\text{ km} \\ -88.0\text{ km} \\ \hline 13.2\text{ km} \end{array}$$

11. (B) $\because$ 1 m = 100 cm

$\therefore$ 0.02 m = 0.02 × 100 cm

$= \frac{2}{100} \times 100$ cm = 2 cm.

12. (B) $11.6 \times 0.07 = \frac{116}{10} \times \frac{7}{100} = \frac{812}{1000}$

= 0.812.

13. (C) $46 \div 0.04 = 46 \div \frac{4}{100} = 46 \times \frac{100}{4}$

$= \frac{46}{2} \times \frac{100}{2} = 23 \times 50$

= 1150.

14. (D) $31.01 \div 0.07 = \frac{3101}{100} \div \frac{7}{100}$

$= \frac{3101}{100} \times \frac{100}{7} = \frac{3101}{7}$

= 443.

15. (A)

$$\begin{array}{r} 89.08 \\ -\ 69.09 \\ \hline 19.99 \end{array}$$

16. (A) $a \times b = 0.72 \times 3.03$

$= \frac{72}{100} \times \frac{303}{100} = \frac{72 \times 303}{10000}$

$= \frac{21816}{10000} = 2.1816.$

17. (A) $\because$ 1 km = 1000 m = 1000 × 1000 mm

= 1000000 mm

$\therefore$ 1 mm = $\frac{1}{1000000}$ km

$\therefore$ 420 mm = $\frac{420}{1000000}$ km

$= \frac{0000420}{1000000}$

= 0.000420 km

= 0.00042 km.

18. (D)

$$\begin{array}{r} 31.46 \\ +\ 26.67 \\ \hline 58.13 \end{array}$$

19. (C) 4 kg 200 g = 4 kg + 200 g

$= 4 \text{ kg} + \frac{200}{1000} \text{ kg}$

= 4 kg + 0.2 kg = 4.2 kg.

7 kg 900 g = 7 kg + 900 g

$= 7 \text{ kg} + \frac{900}{1000} \text{ kg}$

= 7 kg + 0.9 kg = 7.9 kg.

$$\therefore \quad \begin{array}{r} 4.2 \text{ kg} \\ +\ 7.9 \text{ kg} \\ \hline 12.1 \text{ kg} \end{array}$$

Now 12.1 kg = 12 kg + 0.1 kg

= 12 kg + 0.1 × 1000 g

= 12 kg + 100 g

= 12 kg 100 g.

20. (B) Area of rectangle

= Length × breadth

$= 5.3 \times 3.7 = \frac{53}{10} \times \frac{37}{10}$

$= \frac{53 \times 37}{100} = \frac{1961}{100}$

$= 19.61 \text{ cm}^2$.

21. (C) Perimeter of equilateral triangle

= 3 × Side

$= 3 \times 2.09 = 3 \times \frac{209}{100}$

$= \frac{627}{100} = 6.27$ cm.

22. (B) We know that

0.090 > 0.009

∴ 3.090 > 3.009

Also, 0.777 > 0.704 > 0.007

∴ 2.777 > 2.704 > 2.007

Hence 3.090 > 3.009 > 2.777 > 2.704 > 2.007.

23. (A)

$$\begin{array}{r} 0.007 \\ 7.068 \\ +\ 11.898 \\ \hline 18.973 \end{array}$$

WORKSHEET–18

1. 2 dozen = 2 × 12 = 24

∵ Cost of 1 apple = ₹ 2.50

∴ Cost of 24 apples = ₹ 2.50 × 24

$= ₹\ \frac{250 \times 24}{100}$

$= ₹\ \frac{6000}{100} = ₹\ 60.$

2.

$$\begin{array}{r} 85.6 \\ -\ 75.0 \\ \hline 10.6 \end{array}$$

So 75 km is less than 85.6 km by 10.6 km.

3. $0.25 = \frac{250}{1000}$ and $0.025 = \frac{25}{1000}$

∵ 250 > 25

$\therefore \quad \frac{250}{1000} > \frac{25}{1000}$

i.e., 0.25 > 0.025

So 0.25 is greater.

4. Place value of 2 in 0.321 = $\frac{2}{100}$ = 0.02.

5. Distance covered by the car = 14.4 km

Time required to cover this distance

= 1.2 hours

So average distance covered by it in 1 hour

$= \frac{14.4}{1.2} = \frac{144}{12} = 12$ km.

6.

$$\begin{array}{r} 9.000 \\ -\ 4.187 \\ \hline 4.813 \end{array}$$

4.813 must be added to 4.187 to get 9.

7. (*i*) $1.25 \times 20 = \frac{125}{100} \times 20 = \frac{125}{5} = 25.$

(*ii*) $2.75 \times 30 = \frac{275}{100} \times 30 = \frac{275 \times 3}{10}$

$= \frac{825}{10} = 82.5.$

(*iii*) $8.85 \times 40 = \frac{885}{100} \times 40 = \frac{35400}{100} = 354.$

(*iv*) $6.672 \times 300 = \frac{6672}{1000} \times 300$

$= \frac{6672 \times 3}{10} = \frac{20016}{10}$

$= 2001.6.$

(*v*) $16.17 \times 900 = \frac{1617}{100} \times 900$

$= 1617 \times 9 = 14553.$

(*vi*) $3.01 \times 1100 = \frac{301}{100} \times 1100$

$= 301 \times 11 = 3311.$

8. (*i*) $3.7 \times 3 = \frac{37}{10} \times 3 = \frac{111}{10} = 11.1.$

(*ii*) $4 \times 12.75 = 4 \times \frac{1275}{100} = \frac{5100}{100} = 51.$

(*iii*) $1.2 \times 3.1 = \frac{12}{10} \times \frac{31}{10} = \frac{372}{100} = 3.72.$

9. (*i*) $5.134 \div 1.7$

$= \frac{5134}{1000} \div \frac{17}{10}$

$= \frac{5134}{1000} \times \frac{10}{17}$

$= \frac{5134}{17} \times \frac{1}{100} = \frac{302}{100} = 3.02.$

$$\begin{array}{r} 302 \\ 17\overline{)5134} \\ 51 \\ \hline 34 \\ 34 \\ \hline 0 \end{array}$$

(*ii*) $2.73 \div 1.3 = \frac{273}{100} \div \frac{13}{10} = \frac{273}{100} \times \frac{10}{13}$

$= \frac{273}{13} \times \frac{1}{10} = \frac{21}{10} = 2.1.$

10. (*i*) $0.2 \times 10 = \frac{2}{10} \times 10 = 2.$

(*ii*) $4.4 \times 10 = \frac{44}{10} \times 10 = 44.$

(*iii*) $3.225 \times 10 = \frac{3225}{1000} \times 10 = \frac{3225}{100}$

$= 32.25.$

(*iv*) $0.14 \times 100 = \frac{14}{100} \times 100 = 14.$

(*v*) $3.75 \times 100 = \frac{375}{100} \times 100 = 375.$

(*vi*) $8.14 \times 100 = \frac{814}{100} \times 100 = 814.$

(*vii*) $1.52 \times 1000 = \frac{152}{100} \times 1000$

$= 152 \times 10 = 1520.$

(*viii*) $8.88 \times 1000 = \frac{888}{100} \times 1000$

$= 888 \times 10 = 8880.$

11 . (*i*) $328.9 \div 10 = \frac{3289}{10} \times \frac{1}{10} = \frac{3289}{100}$

$= 32.89.$

(*ii*) $728.56 \div 10 = \frac{72856}{100} \times \frac{1}{10}$

$= \frac{72856}{1000} = 72.856.$

(*iii*) $0.018 \div 10 = \frac{18}{1000} \times \frac{1}{10} = \frac{18}{10000}$

$= 0.0018.$

(*iv*) $0.9257 \div 100 = \frac{9257}{10000} \times \frac{1}{100}$

$= \frac{9257}{1000000} = 0.009257.$

(*v*) $1.735 \div 100 = \frac{1735}{1000} \times \frac{1}{100}$

$= \frac{1735}{100000} = 0.01735.$

(*vi*) $0.02 \div 100 = \frac{2}{100} \times \frac{1}{100} = \frac{2}{10000}$

$= 0.0002.$

(*vii*) $20.2 \div 1000 = \frac{202}{10} \times \frac{1}{1000}$

$= \frac{202}{10000} = 0.0202.$

(*viii*) $2.625 \div 1000 = \frac{2625}{1000} \times \frac{1}{1000}$

$= \frac{2625}{1000000} = 0.002625$

WORKSHEET–19

1. $\because$ 1 m = 100 cm

$\therefore$ 75 m = 75 × 100 = 7500 cm.

2. (*i*) $0.062 \times 10 = \frac{62}{1000} \times 10 = \frac{62}{100}$

$= 0.62.$

(*ii*) $73.525 \times 100 = \frac{73525}{1000} \times 100$

$= \frac{73525}{10} = 7352.5.$

(*iii*) $14.71 \times 1000 = \frac{1471}{100} \times 1000$

$= 1471 \times 10 = 14710.$

(*iv*) $0.924 \times 100 = \frac{924}{1000} \times 100 = \frac{924}{10}$

$= 92.4.$

3. (*i*) $0.04 \div 100 = \frac{4}{100} \times \frac{1}{100} = \frac{4}{10000}$

$= 0.0004.$

(*ii*) $4.47 \div 100 = \frac{447}{100} \times \frac{1}{100} = \frac{447}{10000}$

$= 0.0447.$

(*iii*) $11.5 \div 10 = \frac{115}{10} \times \frac{1}{10} = \frac{115}{100}$

$= 1.15.$

(*iv*) $0.046 \div 1000 = \frac{46}{1000} \times \frac{1}{1000}$

$= \frac{46}{1000000} = 0.000046.$

4. (*i*) $\because$ ₹ 1 = 100 paise

$\therefore$ ₹ 7.25 = 7.25 × 100 = 725 paise.

(*ii*) $\because$ 1 km = 1000 m

$\therefore$ 55 km = 55 × 1000

= 55000 metres.

5.
$$\begin{array}{r} 7.25 \\ +\ 3.15 \\ \hline 10.40 \end{array}$$

Perimeter of rectangle

= 2 × (length + breadth)

= 2 × (7.25 + 3.15)

= 2 × 10.40 = 20.8 cm.

6. $0.02 = \frac{2}{100}$; $0.2 = \frac{2}{10} = \frac{20}{100}$

$\because$ $20 > 2$ $\therefore$ $\frac{20}{100} > \frac{2}{100}$

$\therefore$ $0.2 > 0.02$

Now, $0.2 - 0.02 = \frac{20}{100} - \frac{2}{100} = \frac{18}{100}$

$= 0.18$

So, 0.2 is greater than 0.02 by 0.18.

7. $7.25 \div 0.5 = \frac{725}{100} \div \frac{5}{10} = \frac{725}{100} \times \frac{10}{5}$

$= \frac{725}{5} \times \frac{10}{100} = \frac{145}{10} = 14.5.$

8. Diameter of a circle = 2 × Radius

= 2 × 3.25

$= 2 \times \frac{325}{100} = \frac{650}{100}$

= 6.5 m.

9. $17.75 \times 2.5 = \frac{1775}{100} \times \frac{25}{10} = \frac{44375}{1000}$

$= 44.375.$

10. (*i*) $3 \times 7.42 = 3 \times \frac{742}{100} = \frac{2226}{100} = 22.26.$

(*ii*) $1.575 \times 8 = \frac{1575}{1000} \times 8 = \frac{12600}{1000}$

$= 12.6.$

(*iii*) $8.17 \times 300 = \frac{817}{100} \times 300 = 817 \times 3$

$= 2451.$

(*iv*) $7.17 \times 600 = \frac{717}{100} \times 600 = 717 \times 6$

$= 4302.$

11. (*i*) $1.8 \div 0.06 = \frac{18}{10} \div \frac{6}{100} = \frac{18}{10} \times \frac{100}{6}$

$= \frac{18}{6} \times \frac{100}{10} = 3 \times 10$

$= 30.$

(*ii*) $57 \div 0.3 = 57 \div \frac{3}{10} = 57 \times \frac{10}{3}$

$= \frac{57}{3} \times 10$

$= 19 \times 10 = 190.$

(*iii*) $11.84 \div 0.4 = \frac{1184}{100} \div \frac{4}{10}$

$= \frac{1184}{100} \times \frac{10}{4} = \frac{1184}{4} \times \frac{10}{100}$

$= \frac{296}{10} = 29.6.$

(*iv*) $6.6 \div 0.11 = \frac{66}{10} \div \frac{11}{100}$

$= \frac{66}{10} \times \frac{100}{11}$

$= \frac{66}{11} \times \frac{100}{10} = 6 \times 10$

$= 60.$

WORKSHEET–20

1. Required number $= \frac{1.4}{0.014} = \frac{1.400}{0.014}$

$= \frac{1400}{14} = 100.$

2. $\frac{25 \text{ paise}}{₹\ 1} = \frac{25 \text{ paise}}{100 \text{ paise}} = \frac{1}{4} = 0.25$

So 25 paise is 0.25 part of a rupee.

3. $0.99 = \frac{99}{100}$; $0.09 = \frac{9}{100}$; $0.90 = \frac{90}{100}$

$\because \quad 99 > 90 > 9$

$\therefore \ \frac{99}{100} > \frac{90}{100} > \frac{9}{100}$

or $0.99 > 0.90 > 0.09$

i.e., 0.99 is the greatest.

4. $9.487 \div 3.58 = \frac{9487}{1000} \div \frac{358}{100}$

$= \frac{9487}{1000} \times \frac{100}{358}$

$= \frac{9487}{358} \times \frac{100}{1000}$

$= \frac{26.5}{10} = 2.65.$

5. (*i*) $8.08 \times 1000 = \frac{808}{100} \times 1000$

$= 808 \times 10 = 8080.$

(*ii*) $0.96 \div 100 = \frac{96}{100} \times \frac{1}{100}$

$= \frac{96}{10000} = 0.0096.$

6. $1.2 \times 1.2 = \frac{12}{10} \times \frac{12}{10} = \frac{12 \times 12}{10 \times 10}$

$= \frac{144}{100} = 1.44.$

7. 3 dozens = 3 × 12 = 36

$\because$ Cost of 1 banana = ₹ 1.25

$\therefore$ Cost of 36 bananas = ₹ 1.25 × 36

$= ₹\ \dfrac{125}{100} \times 36$

$= ₹\ \dfrac{4500}{100} = ₹\ 45.$

8. Quantity of oil for one dish

$= \dfrac{\text{Total quantity of oil}}{\text{No. of dishes}}$

$= \dfrac{3.204}{9} = \dfrac{3204}{1000} \times \dfrac{1}{9}$

$= \dfrac{356}{1000} = 0.356$ litre

$= 0.356 \times 1000$ ml

$= 356$ ml.

9. Total quantity of fruits = 5 kg

Quantity of fruits consumed by parents = 2.5 kg

Quantity of fruits consumed by children = 1.25 kg

So, quantity of fruits consumed by the family = 2.5 + 1.25

= 3.75 kg

$$\begin{array}{r} 2.50 \\ +\ 1.25 \\ \hline 3.75 \end{array}$$

Quantity of remaining fruits

= 5 – 3.75

= 1.25 kg

$$\begin{array}{r} 5.00 \\ -\ 3.75 \\ \hline 1.25 \end{array}$$

10. The perimeter of a triangle is the sum of its sides.

Perimeter of equilateral triangle

= 3 × Length of one side

$= 3 \times 1.5 = 3 \times \dfrac{15}{10} = \dfrac{45}{10}$

= 4.5 cm.

11. Area of square $= \text{Side}^2$

$= (2.5)^2 = 2.5 \times 2.5$

$= \dfrac{25}{10} \times \dfrac{25}{10} = \dfrac{625}{100}$

$= 6.25\ \text{cm}^2.$

12. ∵ Cost of 1 pair of shoes = ₹ 179.50

∴ Cost of 3 pairs of shoes

= ₹ 179.50 × 3

= ₹ 538.50

$$\begin{array}{r} 17950 \\ \times\ 3 \\ \hline 53850 \end{array}$$

∵ Cost of 1 pair of sandals = ₹ 216.25

∴ Cost of 4 pairs of sandals

= ₹ 216.25 × 4

= ₹ 865.00

$$\begin{array}{r} 21625 \\ \times\ 4 \\ \hline 86500 \end{array}$$

Clearly, cost of 4 pairs of sandals is more than the cost of 3 pairs of shoes.

13. (*i*) $\dfrac{7.75}{0.25} = \dfrac{775}{25} = 31.$

(*ii*) $\dfrac{42.8}{0.02} = \dfrac{42.80}{0.02} = \dfrac{4280}{2} = 2140.$

WORKSHEET–21

1. Thickness = 19.15 mm

$= \dfrac{19.15}{10}$ cm

[∵ 1 cm = 10 mm]

= 1.915 cm.

2. Capacity of 1 bucket = 16.35 litres

$= \dfrac{1635}{100}$ litres

Capacity of 12 buckets

$= \dfrac{1635}{100} \times 12$ litres

$= \dfrac{19620}{100}$ litres

= 196.20 litres.

$$\begin{array}{r} 1635 \\ \times\ 12 \\ \hline 3270 \\ 1635\times \\ \hline 19620 \end{array}$$

3. Monthly expenditure

= 0.75 of 12000

= 0.75 × 12000

$= \dfrac{75}{100} \times 12000 = 75 \times 120$

= ₹ 9000.

$$\begin{array}{r} 120 \\ \times\ 75 \\ \hline 600 \\ 840\times \\ \hline 9000 \end{array}$$

Monthly saving = Salary – Expenditure

= 12000 – 9000 = ₹ 3000

$$\text{Number of months} = \frac{39000}{\text{Monthly saving}}$$

$$= \frac{39000}{3000} = \frac{39}{3}$$

= 13.

4. Other number

$$= \frac{\text{Product}}{\text{One number}}$$

$$= \frac{136.369}{2.65}$$

$$= \frac{136369}{2650} = 51.46.$$

$$\begin{array}{r} 51.46 \\ 2650\overline{)136369} \\ \underline{13250} \\ 3869 \\ \underline{2650} \\ 12190 \\ \underline{10600} \\ 15900 \\ \underline{15900} \\ 0 \end{array}$$

5. Perimeter of a regular polygon

= No. of sides × Length of one side

$\Rightarrow$ 22.5 = No. of sides × 2.5

$$\Rightarrow \text{No. of sides} = \frac{22.5}{2.5} = \frac{225}{25} = 9.$$

6. (*i*) $25.5 \div 5 = \dfrac{255}{10} \div 5$

$$= \frac{255}{10} \times \frac{1}{5} = \frac{255}{5} \times \frac{1}{10}$$

$$= 51 \times \frac{1}{10} = 5.1.$$

(*ii*) $126.35 \div 7 = \dfrac{12635}{100} \div 7$

$$= \frac{12635}{7} \times \frac{1}{100}$$

$$= \frac{1805}{100}$$

= 18.05.

$$\begin{array}{r} 1805 \\ 7\overline{)12635} \\ \underline{7} \\ 56 \\ \underline{56} \\ 35 \\ \underline{35} \\ 0 \end{array}$$

7. (*i*) 6 km = 6 × 1000 m = 6000 m.

(*ii*) $700 \text{ m} = \dfrac{700}{1000} \text{ km} = \dfrac{7}{10} \text{ km}$

= 0.7 km.

(*iii*) $17956 \text{ g} = \dfrac{17956}{1000} \text{ kg} = 17.956 \text{ kg}.$

8. (*i*) $37.17 \div 7 = \dfrac{3717}{100} \div 7$

$$= \frac{3717}{100} \times \frac{1}{7}$$

$$= \frac{3717}{7} \times \frac{1}{100}$$

$$= \frac{531}{100} = 5.31.$$

$$\begin{array}{r} 531 \\ 7\overline{)3717} \\ \underline{35} \\ 21 \\ \underline{21} \\ 7 \\ \underline{7} \\ 0 \end{array}$$

(*ii*) 15.064 ÷ 28

$$= \frac{15064}{1000} \div 28$$

$$= \frac{15064}{1000} \times \frac{1}{28}$$

$$= \frac{15064}{28} \times \frac{1}{1000} = \frac{538}{1000}$$

= 0.538.

$$\begin{array}{r} 538 \\ 28\overline{)15064} \\ \underline{140} \\ 106 \\ \underline{84} \\ 224 \\ \underline{224} \\ 0 \end{array}$$

9. (*i*) $5.78 \times 3 = \dfrac{578}{100} \times 3$

$$= \frac{578 \times 3}{100} = \frac{1734}{100} = 17.34.$$

(*ii*) $7.248 \times 0.19 = \dfrac{7248}{1000} \times \dfrac{19}{100}$

$$= \frac{7248 \times 19}{100000}$$

$$= \frac{137712}{100000}$$

= 1.37712.

$$\begin{array}{r} 7248 \\ \underline{\times\ 19} \\ 65232 \\ \underline{7248\ \times} \\ 137712 \end{array}$$

(*iii*) $7.248 \times 400 = \dfrac{7248}{1000} \times 400$

$$= \frac{7248}{10} \times 4$$

$$= \frac{7248 \times 4}{10} = \frac{28992}{10}$$

= 2899.2.

$$\begin{array}{r} 7248 \\ \underline{\times\ 4} \\ 28992 \end{array}$$

WORKSHEET–22

1. (*i*) Place value of 6 in 8.36 = 0.06.

(*ii*) Place value of 4 in 12.294 = 0.004.

2. Length of each piece

$$= \frac{\text{Length of ribbon}}{\text{Number of pieces}}$$

$$= \frac{19.63}{13} = \frac{1963}{100} \times \frac{1}{13}$$

$$= \frac{1963}{13} \times \frac{1}{100} = \frac{151}{100} = 1.51 \text{ m.}$$

$$\begin{array}{r} 151 \\ 13\overline{)1963} \\ \underline{13} \\ 66 \\ \underline{65} \\ 13 \\ \underline{13} \\ 0 \end{array}$$

3. Area of rectangle

$$= \text{Length} \times \text{Breadth}$$

$$= 12.5 \times 8.3$$

$$= \frac{125}{10} \times \frac{83}{10}$$

$$= \frac{10375}{100} = 103.75 \text{ cm}^2.$$

$$\begin{array}{r} 125 \\ \underline{\times\ 83} \\ 375 \\ \underline{1000\times} \\ 10375 \end{array}$$

4. Sum of costs of 1 toy and 1 box

= ₹ 106.35 + ₹ 18.65

= ₹ 125

$$\begin{array}{r} 106.35 \\ \underline{+\ 18.65} \\ 125.00 \end{array}$$

No. of pairs of toys and boxes

$$= \frac{\text{₹ } 1000}{\text{₹ } 125} = \frac{1000}{125} = 8$$

So, 8 toys and 8 colour boxes can be bought.

5. Sum of given numbers

= 15.29 + 11.729

= 27.019

$$\begin{array}{r} 15.290 \\ \underline{+\ 11.729} \\ 27.019 \end{array}$$

Difference of given numbers

= 15.29 – 11.729

= 3.561

$$\begin{array}{r} 15.290 \\ \underline{-\ 11.729} \\ 3.561 \end{array}$$

∴ Required difference

= 27.019 – 3.561

= 23.458.

$$\begin{array}{r} 27.019 \\ \underline{-\ 3.561} \\ 23.458 \end{array}$$

6. Difference of 7.124 and 5.62

= 7.124 – 5.62

= 1.504

$$\begin{array}{r} 7.124 \\ \underline{-\ 5.620} \\ 1.504 \end{array}$$

Required value

= 10 – 1.504

= 10.000 – 1.504

= 8.496.

$$\begin{array}{r} 10.000 \\ \underline{-\ 1.504} \\ 8.496 \end{array}$$

7. (*i*) $1.79 = \frac{179}{100}$; $1.9 = \frac{190}{100}$

As 190 > 179, 1.9 is greater than 1.79.

(*ii*) $1.05 = \frac{105}{100}$; $1.50 = \frac{150}{100}$

As 150 > 105, 1.50 is greater than 1.05.

(*iii*) $0.8 = \frac{80}{100}$; $0.88 = \frac{88}{100}$

As 88 > 80, 0.88 is greater than 0.8.

(*iv*) $3.33 = \frac{333}{100}$; $3.30 = \frac{330}{100}$

As 333 > 330, 3.33 is greater than 3.30.

8. (*i*) 7 m = $\frac{7}{1000}$ km = 0.007 km.

(*ii*) 9 m = 9 × 100 cm = 900 cm.

(*iii*) 7.3 km = 7.3 × 1000 m = 7300 m.

(*iv*) 0.055 kg = 0.055 × 1000 g = 55 g.

(*v*) 6 kg 5 g = 6 × 1000 g + 5 g

= 6000 g + 5 g = 6005 g.

(*vi*) 3 m 55 cm = 3 × 100 cm + 55 cm

= 300 cm + 55 cm

= 355 cm.

(*vii*) ₹ 9.25 = 9.25 × 100 paise

= 925 paise.

(*viii*) 5580 paise = ₹ $\frac{5580}{100}$ = ₹ 55.8.

9. (*i*) $0.018 \div 0.13 = \dfrac{0.018}{0.13}$

$= \dfrac{0.018}{0.130}$

$= \dfrac{18}{130}$

$= 0.13846.$

0.138461
130)180
130
500
390
1100
1040
600
520
800
780
200
130
70

(*ii*) $13.455 \div 4.1$

$= \dfrac{13.455}{4.1}$

$= \dfrac{13.455}{4.100}$

$= \dfrac{13455}{4100}$

$= 3.2817$

3.2817
4100)13455
12300
11550
8200
33500
32800
7000
4100
29000
28700
300

(*iii*) $441.709 \div 18$

$= \dfrac{441.709}{18}$

$= \dfrac{441.709}{18.000}$

$= \dfrac{441709}{18000}$

$= 24.539388$

$= 24.53939.$

24.539388
18000)441709
36000
81709
72000
97090
90000
70900
54000
169000
162000
70000
54000
160000
144000
160000
144000
16000

(*iv*) $1.001 \div 7 = \dfrac{1.001}{7} = \dfrac{1001}{1000} \times \dfrac{1}{7}$

$= \dfrac{1001}{7} \times \dfrac{1}{1000} = \dfrac{143}{1000}$

$= 0.143.$

WORKSHEET–23

1. $7.232 = \dfrac{7232}{1000}$; $7.322 = \dfrac{7322}{1000}$

$\because 7322 > 7232 \quad \therefore \dfrac{7322}{1000} > \dfrac{7232}{1000}$

So 7.322 is greater.

2. ∵ Cost of 6 pens = ₹ 18.36

∴ Cost of 1 pen = ₹ $\dfrac{18.36}{6}$

∴ Cost of 10 pens = ₹ $\dfrac{18.36}{6} \times 10$

= ₹ $\dfrac{1836}{600} \times 10$

= ₹ $\dfrac{1836}{6} \times \dfrac{1}{10}$

= ₹ $\dfrac{306}{10}$ = ₹ 30.60.

3. 2 weeks = 2 × 7 = 14 days

∵ No. of pages typed in 1 day = 10.50

∴ No. of pages typed in 14 days

$= 10.50 \times 14$

$= \dfrac{1050 \times 14}{100}$

$= \dfrac{14700}{100} = 147.$

$$\begin{array}{r} 1050 \\ \times 14 \\ \hline 4200 \\ 1050\times \\ \hline 14700 \end{array}$$

4. Average of 1.3, 3.2, 4.5 and 5.8

$= \dfrac{1.3 + 3.2 + 4.5 + 5.8}{4}$

$= \dfrac{14.8}{4} = \dfrac{148}{4} \times \dfrac{1}{10}$

$= \dfrac{37}{10} = 3.7.$

5. Let a would be added

$\therefore a + 1.35 = 3$

$\Rightarrow \quad a = 3 - 1.35$ (Transposing)

$\Rightarrow \quad a = 3.00 - 1.35$

$= 1.65.$

$$\begin{array}{r} 3.00 \\ -\ 1.35 \\ \hline 1.65 \end{array}$$

6. $\because$ 1 year = 12 months

$\therefore$ 2 years = 2 × 12 = 24 months

$\because$ Weight of rice consumed in 1 month = 12.5 kg

$\therefore$ Weight of rice consumed in 24 months = 12.5 × 24 kg

$$= \frac{125 \times 24}{10} \text{ kg}$$

$$= \frac{3000}{10} \text{ kg} = 300 \text{ kg.}$$

$$\begin{array}{r} 125 \\ \times\ 24 \\ \hline 500 \\ 250\times \\ \hline 3000 \end{array}$$

7. (*i*) $2.02 \times 1000 = \frac{202}{100} \times 1000$

$= 202 \times 10 = 2020.$

(*ii*) $0.52 \div 100 = \frac{52}{100} \times \frac{1}{100}$

$= \frac{52}{10000} = \frac{00052}{10000}$

$= 0.0052.$

8. $\because$ Price of 1 kg of wheat = ₹ 12

$\therefore$ Price of 43.7 kg of wheat

= ₹ 12 × 43.7

$= ₹\ \frac{12 \times 437}{10}$

$= ₹\ \frac{5244}{10}$

= ₹ 524.4.

$$\begin{array}{r} 437 \\ \times 12 \\ \hline 874 \\ 437\times \\ \hline 5244 \end{array}$$

Amount of money spent for each person $= ₹\ \frac{524.4}{152}$

$= ₹\ \frac{5244}{152} \times \frac{1}{10}$

$= ₹\ \frac{34.5}{10}$

= ₹3.45.

$$\begin{array}{r} 34.5 \\ 152\overline{)5244} \\ 456 \\ \hline 684 \\ 608 \\ \hline 760 \\ 760 \\ \hline 0 \end{array}$$

9. 175 km is less than 385.6 km by the difference of them.

$\therefore$ Required value

= 385.6 – 175

= 385.6 – 175.0 = 210.6 km.

$$\begin{array}{r} 385.6 \\ -175.0 \\ \hline 210.6 \end{array}$$

10. (*i*) $185.5 \div 5 = \frac{185.5}{5} = \frac{1855}{50}$

$= \frac{371}{10}$ [Dividing by 5]

$= 37.1.$

(*ii*) $186.55 \div 7 = \frac{186.55}{7}$

$= \frac{18655}{100} \times \frac{1}{7}$

$= \frac{18655}{7} \times \frac{1}{100}$

$= \frac{2665}{100} = 26.65.$

$$\begin{array}{r} 2665 \\ 7\overline{)18655} \\ 14 \\ \hline 46 \\ 42 \\ \hline 45 \\ 42 \\ \hline 35 \\ 35 \\ \hline 0 \end{array}$$

11. (*i*) $11 \text{ cm} = \frac{11}{100} \text{ m} = 0.11 \text{ m.}$

(*ii*) 63 kg = 63 × 1000 g = 63000 g.

12. Total weight bought by Varsha

= 7 kg 300 g + 2 kg 500 g

= 7000 g + 300 g + 2000 g + 500 g

($\because$ 1 kg = 1000 g)

= 9800 g

$$\begin{array}{r} 7000 \\ 300 \\ 2000 \\ +\ 500 \\ \hline 9800 \end{array}$$

Total weight bought by Reema

= 5 kg 800 g + 3 kg 100 g

= 5000 g + 800 g + 3000 g + 100 g = 8900 g

$$\begin{array}{r} 5000 \\ 800 \\ 3000 \\ +\ 100 \\ \hline 8900 \end{array}$$

$\because$ 9800 > 8900

$\therefore$ Varsha bought more rice and wheat altogether.

WORKSHEET–24

1. $\because$ 1 litre = 1000 mL

$\therefore$ 5 mL = $\frac{5}{1000}$ litre = 0.005 litre.

2. $\because$ 1 km = 1000 m

and 1000 m = 1000 × 100 cm

1000 m = 100000 cm

$\therefore$ 16 cm = $\frac{16}{100000}$ cm

= 0.00016 km

3. $\because$ 5 paise = ₹$\frac{5}{100}$

5 paise = ₹ 0.5

$\therefore$ 6 rupees 5 paise = 6 + 0.5 = ₹ 6.05.

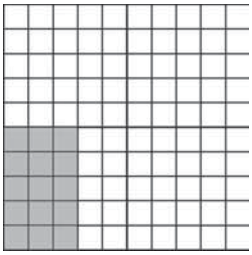
4. Total = 100

Shaded Part = 15

3 horizontal and

5 vertical (Given)

i.e., $\frac{15}{100}$ = 0.15



5. 10 × 10 grid = 100 shaded portion = 42

The number of unshaded portion

$\frac{100-42}{100} = \frac{58}{100}$ = 0.58.

6. 1 dozen pencils = ₹ 18.36 (Given)

$\because$ 1 dozen pencils = 12 pencils

$\therefore$ 1 pencil = $\frac{18.36}{12}$ = 1.53 = ₹ 1.53.

7.
$$\begin{array}{r} 3.00 \\ -1.35 \\ \hline 1.65 \end{array}$$

8. Greatest decimals = 0.9

Smallest decimals = 0.02

Product = 0.9 × 0.02

$= \frac{9}{10} \times \frac{2}{100} = \frac{18}{1000}$ = 0.018.

9. Side of a square = 4.3 cm (Given)

Area of square = side × side

= 4.3 × 4.3

= 18.49 cm^2

Perimeter of square = 4 × side

= 4 × 4.3 = 17.2 cm.

10. Area = 64.32 cm^2 (Given)

Length = 16 cm (Given)

Area of rectangle = length × breadth

64.32 = 16 × breadth

breadth = $\frac{64.32}{16}$

breadth = 4.02 cm

Perimeter of rectangle = 2 (length + breadth)

= 2 (16 + 4.02)

= 2 (20.02) = 40.04 cm.

11. (*i*) 0.5 × 0.55

$\frac{5}{10} \times \frac{55}{100}$

$\frac{275}{1000}$ = 0.275

0.55 ÷ 0.5

$\frac{55}{100} \div \frac{5}{10}$

$\frac{55}{100} \times \frac{10}{5}$

$\frac{11}{10}$ = 1.1

$\therefore$ 0.55 ÷ 0.5 is greater.

(*ii*) 0.01 × 0.001

$\frac{1}{100} \times \frac{1}{1000} = \frac{1}{100000}$

0.00001

0.01 ÷ 0.001

$\frac{1}{100} \div \frac{1}{1000} \Rightarrow \frac{1}{100} \times \frac{1000}{1}$ = 10

0.01 ÷ 0.001 is greater.

❑❑

Chapter

4 DATA HANDLING

WORKSHEET–25

1. (D) Range = greatest observation – smallest observation

$= 8 - 2 = 6.$

2. (C) Mean age (in years)

$$= \frac{11 + 11.5 + 12 + 14 + 12.5}{5} = \frac{61}{5}$$

$= 12.2.$

3. (B) Mean $= \frac{1 + 2 + 3 + 4 + 5 + 6}{6}$

$$= \frac{21}{6} = 3.5.$$

4. (B) Arithmetic mean $= \frac{0 + 1 + 2 + 3 + 4}{5}$

$$= \frac{10}{5} = 2.$$

5. (C)As 6 occurs maximum number of times, 6 is the mode.

6. (B)The ascending order of the data:

2, 3, 4, 5, 7, 8, 9

Since the middle most term is 5, so the median is 5.

7. (A) Since, 4 is used maximum number of times, so 4 is the mode.

Range = 6 – 1 = 5.

8. (C) Mean of 4, 6, 8 and 14

$$= \frac{4 + 6 + 8 + 14}{4} = \frac{32}{4} = 8$$

Mean of 6, 8, 12 and 14

$$= \frac{6 + 8 + 12 + 14}{4} = \frac{40}{4} = 10$$

Now, mean of 8 and 10 $= \frac{8 + 10}{2}$

$$= \frac{18}{2} = 9.$$

9. (B) Hint: {H, T}.

10. (D) Probability of getting a head

$$= \frac{\text{No. of heads}}{\text{No. of all possible outcomes}}$$

$$= \frac{1}{2}.$$

11. (A) There is only one card marked with 3.

$\therefore$ Required probability $= \frac{1}{5}$.

12. (B) Probability of a sure event is always 1.

13. (B) Middle most term = 5th term = 2

$\therefore$ Median = 2.

14. (D) Range = greatest observation – smallest observation

= 12.2 – 0.0 = 12.2 mm.

15. (B) The greatest observation is 142 cm

$\therefore$ Height of the tallest girl = 142 cm.

16. (C) Only 22 repeats in the given data

$\therefore$ Mode = 22 runs.

17. (A) A die has 4 vertical faces and 2 horizontal faces.

18. (B) Mean

$$= \frac{11 + 12 + 13 + 14 + 15 + 16 + 17 + 18}{8}$$

$$= \frac{116}{8} = 14.5.$$

19. (A) A die has no 7 as marked number

$\therefore$ Getting a 7 is an impossible event

$\therefore$ Probability = 0.

WORKSHEET–26

1. Since 2 occurs maximum number of times.

So, the mode is 2.

2. Greatest observation = 10 years

Smallest observation = 5 years

$\because$ Range = 10 – 5 = 5 years.

3. (*i*) Number of marbles marked 3 = 1

Probability of drawing a marble marked 3 = $\frac{1}{6}$.

(*ii*) Number of marbles marked 6 = 1

Probability of drawing a marble marked 6 = $\frac{1}{6}$.

4. (*i*) Amit is the heaviest.

Ramu is the lightest.

(*ii*) Sum of the weights = 77 + 58 + 62 + 81 + 73

= 351 kg.

Mean of the weights

$$= \frac{\text{Sum of the weights}}{\text{Number of students}}$$

$$= \frac{351}{5} = 70.2 \text{ kg.}$$

5. Arrange the given data in ascending order.

25, 30, 30, 30, 40, 45, 50, 55, 60, 60

(*i*) Since 30 occurs maximum number of times

So, 30 runs is the mode.

(*ii*) Number of observations, n = 10

Since n is even

$$\therefore \text{ Median} = \frac{1}{2}\left[\left(\frac{n}{2}\right)\text{th observation} + \left(\frac{n}{2}+1\right)\text{th observation}\right]$$

$$= \frac{1}{2}[\text{5th observation} + \text{6th observation}]$$

$$= \frac{1}{2}[40 + 45] = \frac{1}{2} \times 85 = 42.5 \text{ runs.}$$

6. (*i*) If H represent a head and T a tail, then the sample space is given by:

S = {H, T}

Now, probability of getting a head = $\frac{1}{2}$.

(*ii*) When a die is thrown once, the sample space is given by:

S = {1, 2, 3, 4, 5, 6}

Now probability of getting '2' = $\frac{1}{6}$.

(*iii*) Probability of choosing a girl

$$= \frac{\text{Number of girls}}{\text{Sum of boys and girls}}$$

$$= \frac{2}{4+2} = \frac{2}{6} = \frac{1}{3}.$$

7. (*i*) Number of outcomes

= Number of letters in the word 'SPINNING'

= 8.

(*ii*) A letter who occurs maximum number of times, has the highest probability.

As, 'N' occurs maximum number of times, *i.e.*, 3 times, 'N' has highest probability.

$\therefore$ P(N) = $\frac{3}{8}$.

(*iii*) Probability for letter 'I'

$$= \frac{\text{Number of times occurring 'I'}}{\text{Number of outcomes}}$$

$$= \frac{2}{8} = \frac{1}{4}. \qquad \text{[Using part (}i\text{)]}$$

8. First arrange the given data in descending order as given below:

21, 19, 17, 14, 13, 13, 13, 11

(*i*) Range = Greatest observation − smallest observation

= 21 − 11 = 10.

(*ii*) Sum of the observations

= 21 + 19 + 17 + 14 + 13 + 13 + 13 + 11

= 121

Number of the observations = 8

$$\text{Mean} = \frac{\text{Sum of the observations}}{\text{No. of the observations}}$$

$$= \frac{121}{8} = 15.125.$$

(*iii*) Number of observations, *n* = 8 which is even

∴ Median

$$= \frac{1}{2}\left[\left(\frac{n}{2}\right)\text{th observatioin} + \left(\frac{n}{2}+1\right)\text{th observation}\right]$$

$$= \frac{1}{2}\left[\left(\frac{8}{2}\right)\text{th observation} + \left(\frac{8}{2}+1\right)\text{th observatiion}\right]$$

$$= \frac{1}{2}[\text{4th observation} + \text{5th observation}]$$

$$= \frac{1}{2}[14 + 13]$$

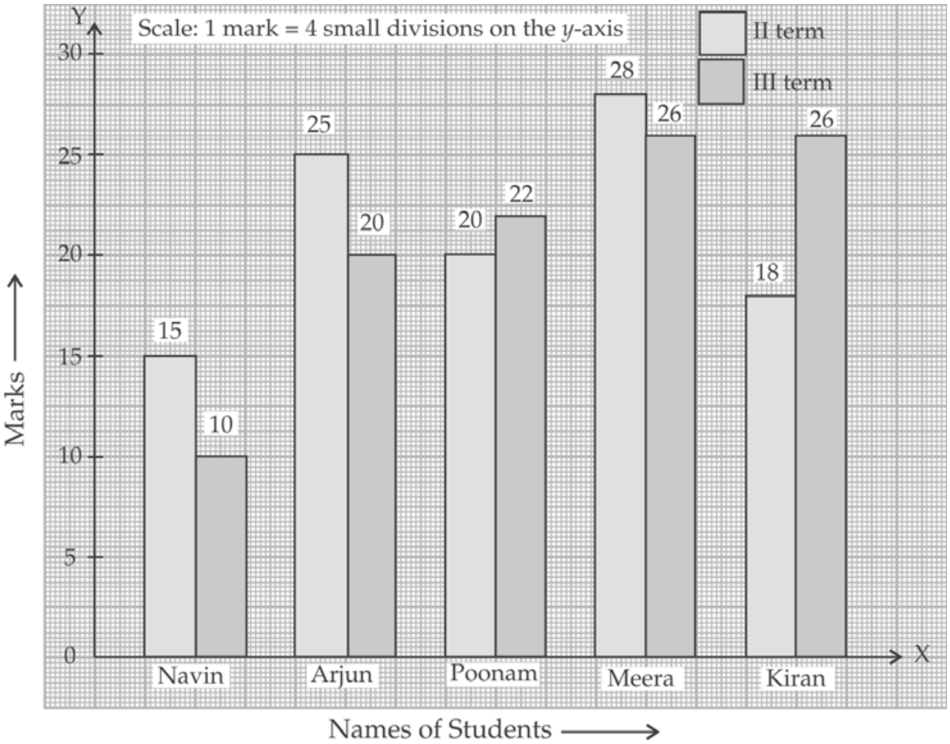
$$= \frac{1}{2} \times 27 = 13.5.$$

(iv) Mode = The observation which occurs maximum number of times = 13.

9. To draw a double bar graph, you have to go to the following steps:

Step I. Draw a pair of perpendicular lines OX and OY on a graph paper.

Step II. Along the horizontal axis (OX), mark the names of students, namely Navin, Anuj, Poonam, Meera and Kiran.



Along the vertical axis (OY), mark the marks obtained by the students.

Step III. Choose a suitable scale to determine the height of bars. Here, take 1 mark = 4 small divisions on the graph.

Step IV. First draw the bars for II term and then for III term for different students.

Bars for II term and III term are shaded separately and their shadings are shown in the top right corner of the graph paper. Write the marks of the every term on the top of corresponding bar.

WORKSHEET–27

1. Arranging the given observations in the ascending order, we have 8 m, 12 m, 14 m, 14 m, 16 m, 20 m, 24 m

n = 7; which is odd

$$\text{Median} = \left(\frac{7+1}{2}\right)\text{th term}$$

$$= \text{4th term} = 14 \text{ m.}$$

2. Let us put the given data in a tabular form:

Numbers	Tally Marks	No.of matches
1	|||	3
2	||||	4
3	|	1
4	||	2

From the table, it is clear that the mode is 2.

3. Mean temperature

$$= \frac{\text{Sum of all observations}}{\text{Number of observations}}$$

$$= \frac{21+23+25+24+22+24+23+25+25+21}{10}$$

$$= \frac{233}{10} = 23.3°\text{C.}$$

4. Total number of members in the group

$$= 7 + 8 + 3 = 18$$

Number of children = 3

Probability of selecting a child

$$= \frac{\text{Number of children}}{\text{Total number of members}}$$

$$= \frac{3}{18} = \frac{1}{6}.$$

5. $\because$ Number of 3's = 1

$\therefore$ Number of favourable outcomes = 1

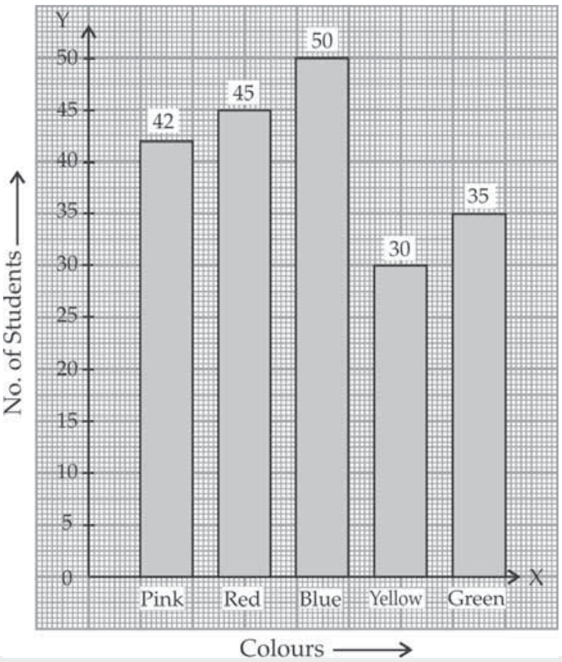
Number of all possible outcomes = 6

$\therefore$ Probability of getting '3' $= \dfrac{1}{6}$.

6. In order to construct a bar graph, you have to go to the following steps:

Step I. Take a graph paper and draw a pair of perpendicular lines OX and OY. Call OX as the horizontal axis and OY as the vertical axis.

Step II. Along OX, mark the names of colours and choose the equal width



of the bars and uniform gap between them.

Along OY, mark the number of students.

Step III. Choose a suitable scale to determine heights of the bars. You can choose

1 big division = 5 students

Step IV. Calculation for heights of various bars:

Height of the bar of pink colour = $\frac{42}{5}$

= 8.4 big divisions

= 8 big divisions and 4 small divisions

Height of the bar of red colour = $\frac{45}{5}$

= 9 big divisions

Height of the bar of blue colour

$= \frac{50}{5} = 10$ big divisions

Height of the bar of yellow colour

$= \frac{30}{5} = 6$ big divisions

Height of the bar of green colour

$= \frac{35}{5} = 7$ big divisions

Step V. Draw the bars with heights obtained in step IV and write the corresponding number of students on the top of each bar.

7. Arranging the given observations in the descending order as follows:

42, 38, 35, 34, 32, 32, 32

As 42 is not as a middle term, the given median is not correct.

Correct median = $\left(\frac{7+1}{2}\right)$th term

= 4th term = 34

Since, 32 has highest frequency, so given mode is correct.

8. Putting the given data in tabular form, we get

Numbers	Tally marks	Frequency
1	𝍸 |||	8
2	𝍸 𝍸 ||||	14
3	𝍸 ||	7
4	𝍸	5
5	|||	3
6	||	2

Mode: The highest frequency is of 2. So, 2 is the mode.

Median: Let us arrange the given data in ascending order.

1, 1, 1, 1, 1, 1, 1, 1, 2, 2, 2, 2, 2, 2, 2, 2, 2, 2, 2, 2, 2, 2, 3, 3, 3, 3, 3, 3, 3, 4, 4, 4, 4, 4, 5, 5, 5, 6, 6.

Number of observations, $n = 39$

n is odd, so, median = $\left(\frac{39+1}{2}\right)$th term

= 20^{th} term

= 2.

9. (*i*) Arranging the given observations in the ascending order, we get

2, 2, 3, 3, 3, 4, 4, 5, 5

Range = greatest observation

– smallest observation

= 5 – 2 = 3

$$\text{Mean} = \frac{\text{Sum of observations}}{\text{Number of observations}}$$

$$= \frac{2+2+3+3+3+4+4+5+5}{9}$$

$$= \frac{31}{9} = 3.44$$

Median = Middle most term

= $\left(\frac{9+1}{2}\right)$th term

= 5th term = 3

Mode = observation that occurs most often

= 3.

(*ii*) Arranging the given observations in the ascending order, we get

10, 10, 11, 11, 12, 12, 15, 15, 15

Range = Greatest observation – smallest observation

= 15 – 10 = 5

$$\text{Mean} = \frac{\text{Sum of observations}}{\text{Number of observations}}$$

$$= \frac{10+10+11+11+12+12+15+15+15}{9}$$

$$= \frac{111}{9} = 12.33$$

Median = Middle most term

$$= \left(\frac{9+1}{2}\right)\text{th observation}$$

= 5th term = 12

Mode = observation that occurs most often

= 15.

WORKSHEET – 28

1. Let us put the given data in tabular form:

Numbers	Tally Marks	Frequency
12	||	2
13	||	2
14	|||	3
16	|	1
19	|	1

The frequency is highest for 14, *i.e.*, 3. So the mode is 14.

2. Total number of cards = 52

Number of aces = 4

Chance of getting an ace

$$= \frac{\text{Number of aces}}{\text{Total number of cards}}$$

$$= \frac{4}{52} = \frac{1}{13}.$$

3. All possible outcomes are: 1, 2, 3, 4, 5 and 6

∴ Number of all possible outcomes = 6

Since favourable outcome is 5

∴ Number of favourable outcomes = 1

Now, chance of getting 5.

$$= \frac{\text{Number of favourable outcomes}}{\text{Number of all possible outcomes}}$$

$$= \frac{1}{6}.$$

4. (*i*) Range = Highest height – lowest height

= 180 cm – 165 cm

= 15 cm.

(*ii*) 9 + 8 + 12 = 29 girls have more than 165 cm of height.

(*iii*) Sum of heights of all girls

$= 9 \times 170 + 8 \times 175 + 11 \times 165 + 12 \times 180$

= 1530 + 1400 + 1815 + 2160

= 6905 cm

Number of girls = 40

$$\text{Mean height} = \frac{\text{Sum of heights of all girls}}{\text{Number of girls}}$$

$$= \frac{6905}{40} = \frac{1381}{8}$$

= 172.625 cm.

5. In order to draw a bar graph, you have to go to the following steps:

Step I. Take a graph paper and draw a pair of perpendicular lines OX and OY. Call OX as the horizontal axis and OY as the vertical axis.

Step II. Along OX, mark the names of the favourite snacks and along OY, mark the number of students.

Step III. Choose a suitable scale to determine height of each bar on the graph paper.

Suppose 1 big division = 10 students

Step IV. Calculation for heights of various bars:

$\because$ 1 big division = 10 students

$\therefore$ 1 small divisions = 1 student

Height of bar for Burger = $\frac{43}{10}$

= 4.3 big divisions

= 4 big divisions and 3 small divisions

Height of bar for Finger chips = $\frac{19}{10}$

= 1.9 big divisions

= 1 big divisions and 9 small divisions

Height of bar for Pizza = $\frac{55}{10}$ = 5.5 big divisions

Height of bar for Sandwich = $\frac{49}{10}$

= 4.9 big divisions

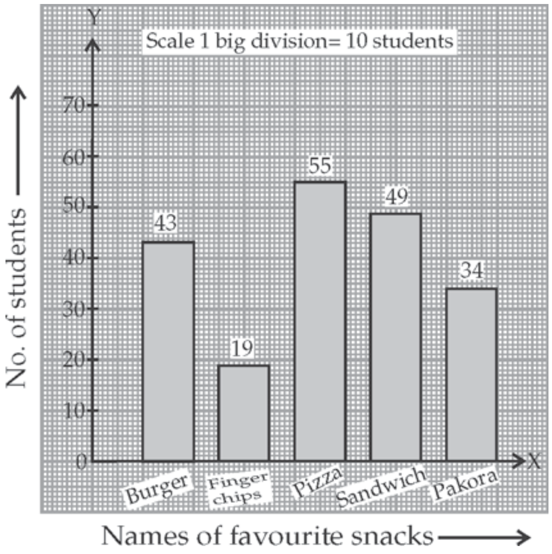
= 4 big divisions and 9 small divisions

Height of bar for Pakora = $\frac{34}{10}$

= 3.4 big divisions

= 3 big divisions and 4 small divisions

Step V. Draw the bars of heights obtained in step IV and of equal width and equal gap between any two consecutive bars.



You can write the number of students on the top of the corresponding bars.

(*i*) As the bar for Pizza is the highest, Pizza is the most preferred snack. As the bar for finger chips is the shortest, Finger chips is the least preferred snack.

(*ii*) There are 5 items (snacks) in all. These are Burger, Finger chips, Pizza, Sandwich and Pakora.

6. Total score = 23 + 60 + 75 + 81 + 55 + 50 + 70 + 45 + 50 + 90 + 0

= 599

Number of members = 11

$$\text{Mean} = \frac{\text{Total score}}{\text{Number of members}}$$

$$= \frac{599}{11}$$

= 54.45 runs (approx.).

Rearrange the observations in ascending order.

0, 23, 45, 50, 50, 55, 60, 70, 75, 81, 90

Number of observations = 11, which is odd.

Middle most term $= \left(\frac{n+1}{2}\right)$th

$= \left(\frac{11+1}{2}\right)$th = 6th = 55

∴ Median = 55 runs.

7. To draw a double bar graph, you have to go to the following steps:

Step I. Draw a pair of perpendicular lines OX and OY on a graph paper.

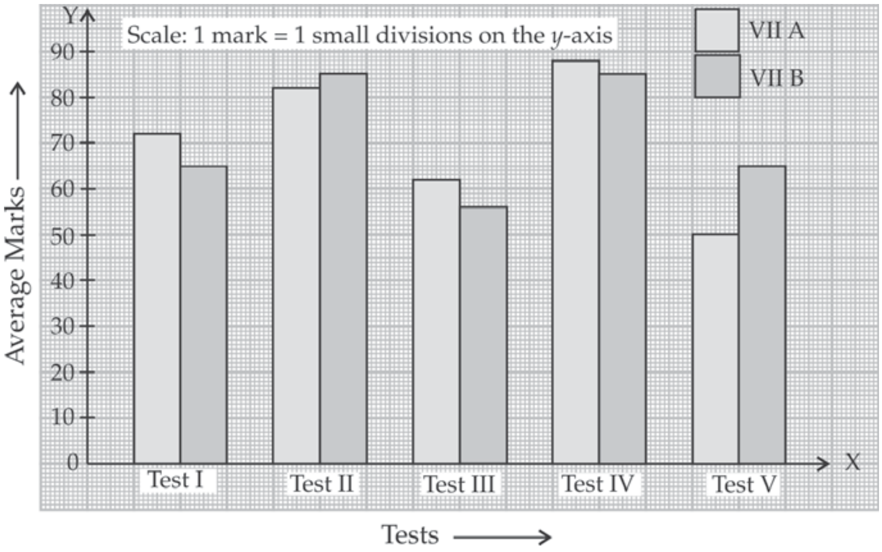
Step II. Along the horizontal axis (OX), mark the test numbers, namely I, II, III, IV and V.

Along the vertical axis (OY), mark the average marks.

Step III. Choose a suitable scale to determine the height of bars. Here, take

1 mark = 1 small division on the graph.

Step IV. First draw the bars for the class VII A and then for VII B taking equal width of the bars and equal gap between any two consecutive bar pairs. Shade the bars of the classes with different types. Show their shadings on the top right corner of the graph paper.



8. To draw a double bar graph, you have to go to the following steps:

Step I. Draw a pair of perpendicular lines OX and OY on a graph paper.

Step II. Along the horizontal axis (OX), mark the years and along the vertical axis (OY), mark the units of books sold of different parts.

Step III. Choose a suitable scale to determine the height of each bar on the graph paper.

Suppose 50 units = 1 big division

Step IV. Calculation for heights of various bars:

50 units = 1 big division

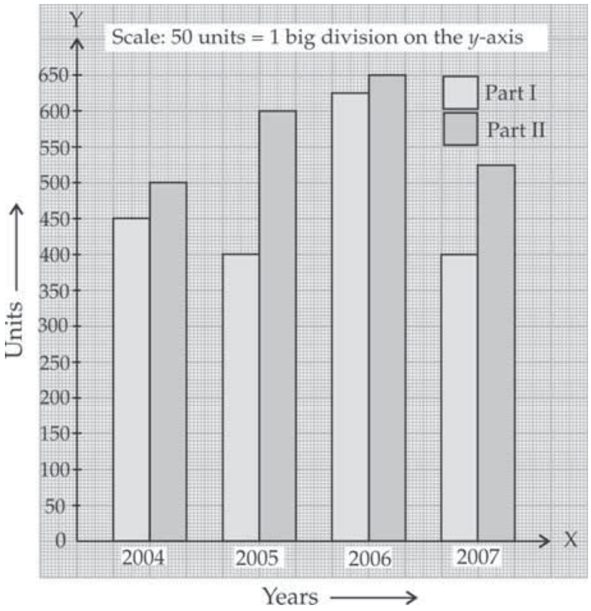
Height of the bar for part I year 2004

$= \frac{450}{50} = 9$ big divisions

Height of the bar for part I year 2005

$= \frac{400}{50} = 8$ big divisions

Height of the bar for part I year 2006



$$= \frac{630}{50} = 12.6 \text{ big divisions}$$

= 12 big divisions and 6 small divisions

Height of the bar for part I year 2007

$$= \frac{400}{50} = 8 \text{ big divisions}$$

Height of the bar for part II year 2004

$$= \frac{500}{50} = 10 \text{ big divisions}$$

Height of the bar for part II year 2005

$$= \frac{600}{50} = 12 \text{ big divisions}$$

Height of the bar for part II year 2006

$$= \frac{650}{50} = 13 \text{ big divisions}$$

Height of the bar for part II year 2007

$$= \frac{530}{50} = 10.6 \text{ big divisions}$$

= 10 big divisions and 6 small divisions.

Step V. First draw the bars for the part I and then for the part II taking equal width of bars and equal gap between any two consecutive combined pairs of the bars. Shade the bars for part I in one way and the bars for part II in the other way. Show their shadings in the top right corner of the graph paper.

WORKSHEET – 29

1. Sum of heights of all students

$= 150 \times 3 + 151 \times 12 + 152 \times 9 + 153 \times 6 + 154 \times 15 + 155 \times 5$

$= 450 + 1812 + 1368 + 918 + 2310 + 775$

= 7633 cm

Number of students $= 3 + 12 + 9 + 6 + 15 + 5$

$= 50$

$$\text{Mean height} = \frac{\text{Sum of heights}}{\text{Number of students}}$$

$$= \frac{7633}{50} = 152.66 \text{ cm.}$$

2. Total number of hours

$$= 3\frac{1}{4} + 2\frac{1}{2} + 2\frac{3}{4}$$

$$= \frac{13}{4} + \frac{5}{2} + \frac{11}{4}$$

$$= \frac{13}{4} + \frac{10}{4} + \frac{11}{4}$$

$$= \frac{34}{4} = \frac{17}{2}$$

Number of days = 3

$$\therefore \quad \text{Mean} = \frac{\frac{17}{2}}{3} = \frac{\frac{17}{2}}{\frac{3}{1}} = \frac{17}{2} \times \frac{1}{3}$$

$$= \frac{17}{6} = 2\frac{5}{6} \text{ hours.}$$

3. In order to draw a double bar graph, you have to go to the following steps:

Step I. Draw a pair of perpendicular lines OX and OY on a graph paper.

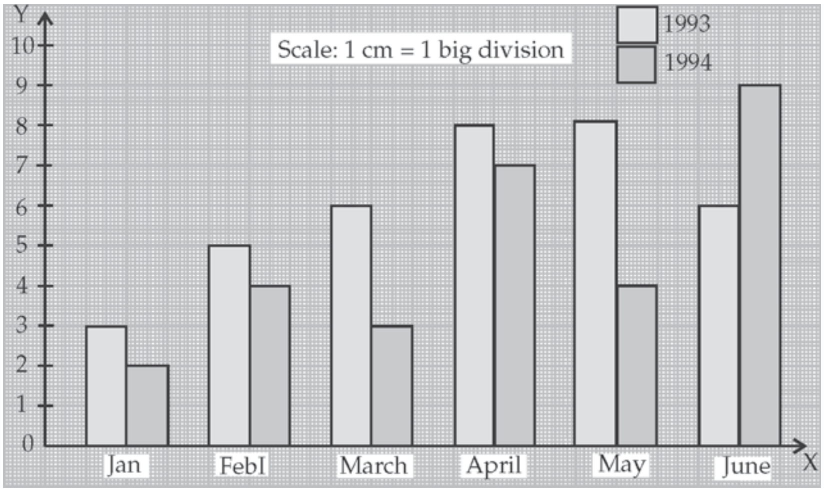
Step II. Along the horizontal axis (OX), mark the given months.

Step III. Along the vertical axis (OY), you have to mark the rainfall in centimetres. For this, choose an appropriate scale keeping in view the maximum and minimum observations (9 cm and 2 cm).

Suppose 1 cm = 1 big division

Step IV. First draw the bars for the year 1993 and then for the year 1994 taking equal width of bars and equal gap between any two consecutive combined pairs of bars.

Step V. Shade the bars of both the years with different colours and show their shadings at the top right corner of the graph paper.



4. (*i*) 1, 7, 13, 19, 25, 13, 13

Let us represent the data in the tabular form:

Numbers	Tally Marks	Frequency
1	|	1
7	|	1
13	|||	3
19	|	1
25	|	1

From the table, the frequency of 13 is the highest, so 13 is the mode.

(*ii*) 4, 6, 8, 4, 10, 4, 6, 12, 6, 10, 6

Let us represent the data in the tabular form:

Numbers	Tally Marks	Frequency
4	|||	3
6	||||	4
8	|	1
10	||	2
12	|	1

From the table the frequency of 6 is the highest.

So, 6 is the mode.

(*iii*) 26, 32, 26, 21, 83, 26, 83, 67, 53, 26, 85.

Let us represent the data in the tabular form:

Numbers	Tally Marks	Frequency
26	||||	4
32	|	1
21	|	1
83	||	2
67	|	1
53	|	1
85	|	1

From the table, frequency of the number 26 is the highest

So, 26 is the mode.

5. (*i*) 2, 3, 5, 7, 9

These numbers are in ascending order.

Number of observations, $n = 5$

Since, 5 is odd

$$\text{So, Median} = \left(\frac{5+1}{2}\right)\text{th observation}$$

$$= \text{3rd observation}$$

$$= 5.$$

(*ii*) 60, 33, 63, 61, 44, 48, 57

Arranging the observations in ascending order, we have

33, 44, 48, 57, 60, 61, 63

Number of observations, $n = 7$

Since 7 is odd

$$\therefore \text{ Median} = \left(\frac{7+1}{2}\right)\text{th observation}$$

$$= \text{4th observation}$$

$$= 57.$$

(*iii*) 13, 22, 25, 8, 11, 19, 17, 31, 16, 10

Arranging the observations in ascending order, we have

8, 10, 11, 13, 16, 17, 19, 22, 25, 31

Number of observations, $n = 10$

Since 10 is even, so median will be the mean of $\left(\frac{n}{2}\right)$th observation and $\left(\frac{n}{2}+1\right)$th observation.

Here $\frac{n}{2} = \frac{10}{2} = 5$ and $\frac{n}{2} + 1 = 5 + 1 = 6$

Now, median

$$= \frac{1}{2}\left[\left(\frac{n}{2}\right)\text{th observation} + \left(\frac{n}{2}+1\right)\text{th observation}\right]$$

$$= \frac{1}{2}[\text{5th observation + 6th observation}]$$

$$= \frac{1}{2}\ [16 + 17] = \frac{1}{2} \times 33 = 16.50.$$

6. (*i*) First 5 natural numbers are:

1, 2, 3, 4 and 5

$$\therefore \text{ Mean} = \frac{1+2+3+4+5}{5} = \frac{15}{5} = 3.$$

(*ii*) First 5 prime numbers are:

2, 3, 5, 7, 11

$$\therefore \text{ Mean} = \frac{2+3+5+7+11}{5}$$

$$= \frac{28}{5} = 5.6.$$

(*iii*) ₹ 8 + ₹ 18 + ₹ 31 + ₹ 43 + ₹ 70

= ₹ (8 + 18 + 31 + 43 + 70)

= ₹ 170

$$\text{Mean} = \frac{₹\ 170}{5} = ₹\ 34.$$

WORKSHEET – 30

1. (*i*) Probability (black queen)

$$= \frac{\text{Number of black queens}}{\text{Total number of cards}} = \frac{2}{52}$$

$$= \frac{1}{26}.$$

(ii) Probability (head)

$$= \frac{\text{Number of favourable outcomes}}{\text{Number of all possible outcomes}}$$

$$= \frac{1}{2}.$$

2. (*i*) Probability (getting 3)

$$= \frac{\text{Number of favourable outcomes}}{\text{Number of all possible outcomes}}$$

$$= \frac{1}{6}.$$

(*ii*) Probability (getting less than 3)

$$= \frac{2}{6} = \frac{1}{3}.$$

(*iii*) Probability (getting an even no.)

$$= \frac{3}{6} = \frac{1}{2}.$$

(*iv*) Probability (getting 5) = $\frac{1}{6}$.

3. Arranging the given salaries in the descending order, we have

₹ 121, ₹ 98, ₹ 89, ₹ 72, ₹ 70, ₹ 70, ₹ 50, ₹ 38

Here, number of terms, $n = 8$, which is even

Middle terms are $\left(\frac{8}{2}\right)$th

$= 4\text{th and } \left(\frac{8}{2}+1\right)\text{th} = 5^{\text{th}}$

Now, median salary

$$= \frac{\text{4th term + 5th term}}{2}$$

$$= ₹\ \frac{72+70}{2} = ₹\ \frac{142}{2} = ₹\ 71.$$

4. (*i*) Let us represent the given data in the ascending order.

3, 3, 3, 3, 5, 7, 7, 8, 9, 9

Looking these numbers., we easily can say that '3' is used maximum number of times.

So, 3 is the mode.

(*ii*) Let us arrange the given data in the ascending order.

10, 11, 13, 17, 18, 19, 20, 23, 25, 29, 29, 29, 29, 30, 35

Looking these numbers, we easily can say that '29' is used maximum number of times.

So, 29 is the mode.

5. Total of multiples of f and x

$= 7 \times 5 + 8 \times 16 + 20 \times 25 + 10 \times 35 + 12 \times 45$

$= 35 + 128 + 500 + 350 + 540$

$= 1553$

Sum of f's $= 7 + 8 + 20 + 10 + 12 = 57$

Now, mean $= \frac{1553}{57} = 27.25$ (approx.).

6. First ten odd natural numbers are:

1, 3, 5, 7, 9, 11, 13, 15, 17, 19

Sum of these numbers

$= 1 + 3 + 5 + 7 + 9 + 11 + 13 + 15 + 17+ 19$

$= 100$

$$\text{Mean} = \frac{\text{Sum of numbers}}{\text{Number of numbers}} = \frac{100}{10}$$

$= 10.$

7. First 7 whole numbers are:

0, 1, 2, 3, 4, 5, 6

Sum of these numbers

$= 0 + 1 + 2 + 3 + 4 + 5 + 6 = 21$

$$\text{Mean} = \frac{\text{Sum of numbers}}{\text{Number of numbers}}$$

$$= \frac{21}{7} = 3.$$

8. Let us arrange the given data in the descending order.

45, 40, 40, 39, 35, 32, 30, 28, 27

Clearly, 45 is the highest observation and 27 is the lowest

∴ Range = 45 – 27 = 18.

9. In order to draw a bar graph, you have to go to the following steps:

Step I. Take a graph paper and draw a pair of perpendicular lines OX and OY on it. Call OX as the horizontal axis and OY as the vertical axis.

Step II. Along OX, mark the names of the brands.

Step III. Along OY, mark the number of units sold by taking an appropriate scale keeping in view the minimum and maximum units sold (150 and 260).

Suppose 20 units = 1 big division

Step IV. Calculations for heights of various bars:

∵ 1 big division = 20 units

∴ 1 small division = $\frac{20}{10}$ = 2 units

∴ Height of bar for L.G. = $\frac{180}{20}$

= 9 big divisions

Height of bar for Samsung = $\frac{200}{20}$

= 10 big divisions

Height of bar for Sony = $\frac{260}{20}$

= 13 big divisions

Height of bar for Videocon = $\frac{150}{20}$

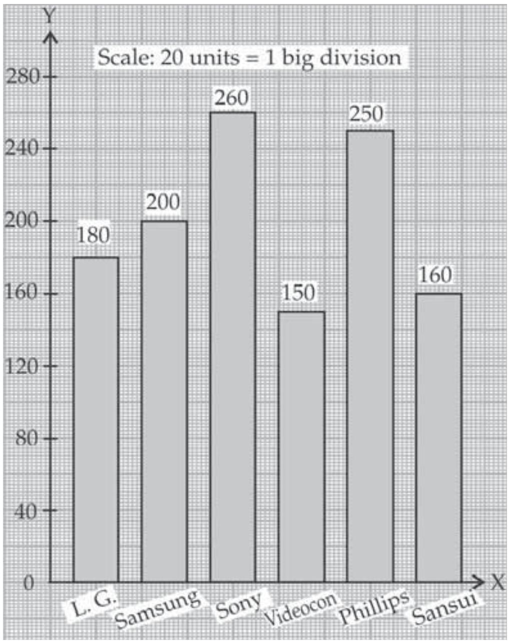
= 7.5 big divisions

= 7 big divisions and 5 small divisions

Height of bar for phillips = $\frac{250}{20}$

= 12.5 big divisioins

= 12 big divisions and 5 small divisions



Height of bar for Sansui = $\frac{160}{20}$

= 8 big divisions

Step V. Draw the bars of heights obtained in step IV and of equal width and equal gap between any two consecutive bars.

You can mention the number of units sold on the top of corresponding bar.

10. (*i*) Height of the bar for more than 80 marks

= Height of the bar for 85 marks

= 3 students

∴ Required number of students = 3

(*ii*) The highest bar corresponds to 75 marks.

So 75 marks were obtained by most number of students

(*iii*) Number of failed students

= Number of students obtaining to 50 marks + Number of students obtaining to 55 marks

= 1 + 1 = 2.

(*iv*) Frequency Table:

Marks (x)	Frequency
50	1
55	1
60	3
65	4
70	3
75	5
80	1
85	3
	21

Total marks obtained by the students

= 50 × 1 + 55 × 1 + 60 × 3 + 65 × 4 + 70 × 3 + 75 × 5 + 80 × 1 + 85 × 3

= 50 + 55 + 180 + 260 + 210 + 375 + 80 + 255

= 1465

Mean

$$= \frac{\text{Total marks obtained by the students}}{\text{Number of students}}$$

$$= \frac{1465}{21} = 69.76 \text{ marks.}$$

WORKSHEET–31

1. Mean temperature

$$= \frac{\text{Sum of observations}}{\text{Number of observations}}$$

$$= \frac{39+37+38+28+30+35+36}{7} = \frac{243}{7}$$

= 34.71°C (approximately).

2. Arranging the given observations in the descending order, we have

63, 61, 60, 51, 48, 44, 33

Number of observations, $n = 7$, which is odd

Here, $\frac{n+1}{2} = \frac{7+1}{2} = 4$

Median = 4th term = 51.

3. Let us arrange the given outcomes in the descending order.

6, 6, 5, 5, 5, 4, 4, 4, 3, 3, 3, 2, 2, 1, 1

(*i*) As 5 occurs 3 times, frequency of 5 is 3.

(*ii*) As 1 occurs 2 times, frequency of 1 is 2.

4. Frequency table:

Score	Tally marks	Frequency
4	||	2
6	卌	5
1	|	1
3	||	2
7	|||	3
9	|||	3
5	||||	4
8	|||	3
10	||	2
2	||	2

Range = Greatest observation – Lowest observation

= 10 – 1

= 9.

5. In order to draw a bar graph, you have to go to the following steps:

Step I. Take a graph paper and draw a pair of perpendicular lines OX and OY. Call OX as the horizontal axis and OY as the vertical axis.

Step II. Along OY mark the observations by taking an appropriate scale keeping in view the minimum and maximum observations (10 and 260).

Suppose 20 = 1 big division

Step III. On OX, you have to draw the bars of equal width.

Let us determine their heights.

Calculation for heights of various bars:

Height of bar for 130 = $\frac{130}{20}$

= 6.5 big divisions.

Height of bar for 40 = $\frac{40}{20}$

= 2 big divisions

Height of bar for 10 = $\frac{10}{20}$

= 0.5 big divisions

Height of bar for 20 = $\frac{20}{20}$

= 1 big divisions

Height of bar for 260 = $\frac{260}{20}$

= 13 big divisions

Height of bar for 110 = $\frac{110}{20}$

= 5.5 big divisions

Height of bar for 30 = $\frac{30}{20}$

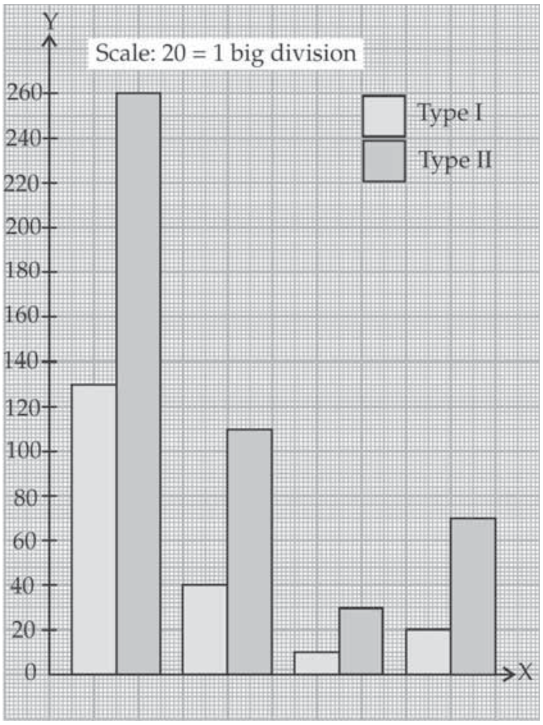
= 1.5 big divisions

Height of bar for 90 = $\frac{90}{20}$

= 4.5 big divisions.

Step IV. Draw the bars along OX using their heights obtained in step III. The gap between any two pairs of consecutive bars should be equal.

Step V. Shade the bars of both the types with different shadings. Their shadings are shown at the top right corner of the graph paper.



6. (*i*) Lata scored the highest marks of 80 in English.

(*ii*) Her lowest score is 30 marks in Science.

(*iii*) 10 marks = 1 unit.

7. Arranging the given observations in the ascending order, we have

1, 2, 3, 4, 4, 4, 5, 5, 5, 5, 6, 6, 7, 7, 8, 8, 9, 10

Since, 5 occurs maximum number of times, so 5 is the mode.

Sum of the observations

= 1 + 2 + 3 + 4 + 4 + 4 + 5 + 5 + 5 + 5 + 6 + 6 + 7 + 7 + 8 + 8 + 9 + 10

= 99

No. of observations = 18

$$\text{Mean} = \frac{\text{Sum of the observations}}{\text{Number of observations}}$$

$$= \frac{99}{18} = \frac{11}{2} = 5.5.$$

8. Let us represent the ages in the ascending order.

25, 27, 28, 32, 36, 38, 40, 41, 54, 57

(*i*) Age of the oldest teacher is 57 years

Age of the youngest teacher is 25 years.

(*ii*) Range = (57 – 25) years = 32 years.

(*iii*) Sum of ages

$$= (25 + 27 + 28 + 32 + 36 + 38 + 40 + 41 + 54 + 57) \text{ years}$$

$$= 378 \text{ years}$$

$$\text{Mean age} = \frac{\text{Sum of ages}}{\text{Number of teachers}}$$

$$= \frac{378}{10} \text{ years} = 37.80 \text{ years.}$$

WORKSHEET–32

1. False.

2. Mean of first five whole numbers are = 0, 1, 2, 3, 4

$$= \frac{0+1+2+3+4}{5}$$

$$= \frac{10}{5} = 2.$$

3. Arrange the data in ascending order 128, 132, 135, 139, 141, 143, 146, 149, 150, 151

We observe that:

The lowest observation = 128

and the highest observation = 151

Range of the data = 151 – 128 = 23.

4.

1	2	3	4	5	6

Probability

$$= \frac{\text{Number of marble drawing with number 4}}{\text{Total marble}}$$

$$= \frac{1}{6}.$$

5. In the given data 19, 25, 23, 20, 9, 20, 15, 10, 5, 16, 25, 20, 24, 12, 20,. The observations 20 occurs a maximum number of times or we can say has maximum frequency so, the mode of the given data is 20.

6. Arranging the data in descending order of its magnitude, we have 46, 36, 35, 25, 24, 18, 17.

Since $n = 7$ (odd)

$$\therefore \text{ Median} = \left(\frac{n+1}{2}\right) \text{th term}$$

$$= \left(\frac{7+1}{2}\right) \text{th} = 4\text{h term} = 25.$$

7. (*i*) The bar graph given information about the marks obtained in different subjects.

(*ii*) Mathematics

(*iii*) Hindi

(*iv*) Average marks

$$= \frac{60+40+90+50+80}{5}$$

$$= \frac{320}{5} = 64.$$

8. Blue balls = 10

Red balls = 15

Total number of balls = 25

(*i*) P(Red ball)

$$= \frac{\text{Possible number of red balls}}{\text{Total possible balls}}$$

$$= \frac{15}{25} = \frac{3}{5} = 0.6.$$

(*ii*) P(Blue balls)

$$= \frac{\text{Possible number of blue balls}}{\text{Total possible balls}}$$

$$= \frac{10}{25} = \frac{2}{5} = 0.4.$$

9. (*i*) Range of the data

= Highest observation – lowest observation

= 200 – 75 = 125.

(*ii*) Average expenditures per day

$$= \frac{\text{Total expenditures}}{\text{Total days}}$$

$$= \frac{150 + 75 + 200 + 175 + 125 + 100 + 150}{7}$$

$$= \frac{975}{7} = 139.3.$$

(*iii*) Maximum expenditures

= Wednesday

(*iv*) Minimum expenditures = Tuesday

(*v*) Average expenditure

$$= \frac{\text{Sum of all}}{7} = \frac{975}{7}$$

= 139.3

Expenditure more than average

= 150, 200, 175, 150 = 4 days.

Chapter

5 SIMPLE EQUATIONS

WORKSHEET–33

1. (A) Nine times $x = 9 \times x = 9x$

$\therefore$ The required form is $9x + 6 = 24$.

2. (B) $\frac{p}{5}$ is the one-fifth of a number p.

So, the statement form of $\frac{p}{5} - 3 = 0$ is given by 'taking away 3 from one-fifth of a number p gives 0'.

3. (C) $\because$ '3 times a' means $3a$

$\therefore$ ' 3 times a is 39 means' $3a = 39$.

4. (A) $x + 5 = 6$

or $x = 6 - 5$

(Transposing 5 to the right)

or $x = 1$.

5. (B) $7p + 8 = 22$

or $7p = 22 - 8$

(Transposing 8 to the right)

or $7p = 14$

or $p = 2$ (Dividing both sides by 7).

6. (A) $5(n - 2) = -4$

or $n - 2 = -\frac{4}{5}$

(Dividing both sides by 5)

or $n = 2 - \frac{4}{5}$

(Transposing -2 to the right)

or $n = \frac{10 - 4}{5} = \frac{6}{5}$.

7. (B) $\frac{5}{2}y = 10$

or $y = 10 \times \frac{2}{5}$

(Multiplying both sides by $\frac{2}{5}$)

or $y = 4$.

8. (D) $x = 1$

or $x - 1 = 1 - 1$

(Subtracting 1 from both the sides)

or $x - 1 = 0$.

9. (A) Let us take option (A).

$6x + 6 = 0$

LHS $= 6x + 6$

$= 6(-1) + 6$

(Substituting $x = -1$)

$= -6 + 6 = 0$

$=$ RHS

Clearly, LHS = RHS, so $x = -1$ is as solution of $6x + 6 = 0$.

10. (B) Let us substitute $y = 6$ in option (B)

$\frac{y}{3} - 1 = 1$ or $\frac{6}{3} - 1 = 1$

or $2 - 1 = 1$

or $1 = 1$ which is true.

So, $y = 6$ is as solution of $\frac{y}{3} - 1 = 1$.

11. (B) Let us substitute $x = -3$ in option (B)

$4x + 3 = -9$

$4 \times (-3) + 3 = -9$

or $-12 + 3 = -9$

or $-9 = -9$

which is true. So, $x = -3$ is the solution of $4x + 3 = -9$.

12. (D) $x - 6$ means 'take away 6 from x'

$\therefore$ $x - 6 = 3$ means 'taking away 6 from x gives 3'.

13. (D) $x - 6 = 1$

or $x = 1 + 6$ (Transposing – 6)

or $x = 7$.

14. (C) $\frac{p}{3} = 5$ or $p = 15$

(Multiplying both sides by 3)

15. (C) $-8 = 6 + 8(x - 2)$

or $-8 - 6 = 8(x - 2)$

or $x - 2 = -\frac{14}{8} = -\frac{7}{4}$

or $x = 2 - \frac{7}{4} = \frac{1}{4}$.

16. (A) On transposing a number, the sign of the number changes from positive to negative and vice-versa.

17. (D) Division by zero is not defined.

18. (A) Let unknown number be x. Then

$\frac{x}{6} - 3 = 4$

or $\frac{x}{6} = 4 + 3 = 7$

or $x = 6 \times 7 = 42$.

19. (C) Let unknown number be x. Then

$\frac{5}{2}x - 7 = 18$

or $\frac{5}{2}x = 18 + 7 = 25$

or $x = 25 \times \frac{2}{5} = \frac{50}{5} = 10$.

20. (C) $\frac{7l}{2} = \frac{2}{7}$

or $l = \frac{2}{7} \times \frac{2}{7}$

(Multiplying both sides by $\frac{2}{7}$)

or $l = \frac{4}{49}$.

WORKSHEET–34

1. (*i*) Three times a number $m = 3 \times m$
$= 3m$

So, 'three times a number m is 20' means

$3m = 20$.

(*ii*) Sum of a and $8 = a + 8$

So, 'sum of a and 8 is 16' means

$a + 8 = 16$.

2. (*i*) The given equation is $2x + 3 = 17$

Here, LHS $= 2x + 3$

and RHS $= 17$

Let us take values of x till the LHS becomes equal to the RHS as given in the following table.

x	LHS	RHS	Relation between LHS and RHS
1	$2 \times 1 + 3 = 5$	17	LHS ≠ RHS
2	$2 \times 2 + 3 = 7$	17	LHS ≠ RHS
4	$2 \times 4 + 3 = 11$	17	LHS ≠ RHS
6	$2 \times 6 + 3 = 15$	17	LHS ≠ RHS
7	$2 \times 7 + 3 = 17$	17	LHS ≠ RHS

Clearly, LHS = RHS for $x = 7$.

So, $x = 7$ is the solution of

$2x + 3 = 17$.

(*ii*) The given equation is $4m - 12 = 4$

Here, LHS $= 4m - 12$

and RHS $= 4$

Let us take the values of m till the LHS becomes equal to the RHS as shown in the following table:

m	LHS	RHS	Relation between LHS and RHS
1	$4 \times 1 - 12 = -8$	4	LHS ≠ RHS
3	$4 \times 3 - 12 = 0$	4	LHS ≠ RHS
4	$4 \times 4 - 12 = 4$	4	LHS = RHS

Clearly, LHS = RHS for $m = 4$

So, $m = 4$ is the solution of

$4m - 12 = 4$.

3. (*i*) $5x = 25$

or $\frac{5x}{5} = \frac{25}{5}$

(Dividing both sides by 5)

or $x = 5$

(*ii*) $2x = 0$

or $\frac{2x}{2} = \frac{0}{2}$

(Dividing both sides by 2)

or $x = 0$

(*iii*) $8x = 72$

or $\frac{8x}{8} = \frac{72}{8}$

(Dividing both sides by 8)

or $x = 9$.

4. (*i*) $\frac{x}{7} = 5$

or $\frac{x}{7} \times 7 = 5 \times 7$

(Multiplying both the sides by 7)

or $x = 35$.

(*ii*) $10 = \frac{x}{4}$ or $\frac{x}{4} = 10$

or $\frac{x}{4} \times 4 = 10 \times 4$

(Multiplying both the sides by 4)

or $x = 40$.

(*iii*) $\frac{x}{-8} = 8$

or $\frac{x}{-8} \times (-8) = 8 \times (-8)$

[Multiplying both the sides by (– 8)]

or $x = -64$.

5. (*i*) The statement form of ‘$x + 7 = 9$’ is ‘sum of x and 7 is 9’.

(*ii*) The statement form of

‘$4m - 7 = 18$’ is

‘if you take away 7 from 4 times m, you get 18’.

(*iii*) The statement form of ‘$\frac{4x}{3} = 10$’ is

‘four-third of x is 10’.

(*iv*) The statement form of

‘$3p - 1$’ = 24’ is

‘if you take away 1 from 3 times p, you get 24’.

6. (*i*) $x - 3 = 2$

Adding 3 to both the sides, we get

$x - 3 + 3 = 2 + 3$

or $x = 5$.

(*ii*) $x + 19 = 20$

Subtracting 19 from both sides, we get

$x + 19 - 19 = 20 - 19$

or $x = 1$.

(*iii*) $x - 3 = -10$

Adding 3 to both sides, we get

$x - 3 + 3 = -10 + 3$

or $x = -7$.

(*iv*) $x - 5 = 5$

Adding 5 to both the sides, we get

$x - 5 + 5 = 5 + 5$

or $x = 10$.

7. (*i*) $x + 7 = 20$

LHS $= x + 7$

$= 13 + 7$ (Substituting $x = 13$)

$= 20 =$ RHS

As LHS = RHS, $x = 13$ is the solution of $x + 7 = 20$.

(*ii*) $x - 5 = 15$

$$\begin{aligned} \text{LHS} &= x - 5 \\ &= 10 - 5 \text{ (Substituting } x = 10) \\ &= 5 \end{aligned}$$

$\because$ LHS $\neq$ RHS

$\therefore$ $x = 10$ is not the solution of $x - 5 = 15$.

(*iii*) $x - 9 = 23$

$$\begin{aligned} \text{LHS} &= x - 9 \\ &= 32 - 9 \text{ (Substituting } x = 32) \\ &= 23 = \text{RHS} \end{aligned}$$

$\because$ LHS = RHS

$\therefore$ $x = 32$ is the solution of $x - 9 = 23$.

(*iv*) $15 - x = -2$

$$\begin{aligned} \text{LHS} &= 15 - x \\ &= 15 - 13 \\ &\qquad \text{(Substituting } x = 13) \\ &= 2 \end{aligned}$$

$\because$ LHS $\neq$ RHS

$\therefore$ $x = 13$ is not the solution of $15\ x = -2$

(*v*) $5x = 25$

$$\begin{aligned} \text{LHS} &= 5x \\ &= 5 \times 0 \text{ (Substituting } x = 0) \\ &= 0 \end{aligned}$$

$\because$ LHS $\neq$ RHS

$\therefore$ $x = 0$ is not the solution of $5x = 25$.

(*vi*) $4\ m - 12 = 4$

$$\begin{aligned} \text{LHS} &= 4\ m - 12 \\ &= 4 \times 4 - 12 \\ &\qquad \text{(Substituting } m = 4) \\ &= 16 - 12 = 4 \\ &= \text{RHS} \end{aligned}$$

$\because$ LHS = RHS

$\therefore$ $m = 4$ is the solution of $4\ m - 12 = 4$.

WORKSHEET–35

1. Let the number be x.

Then $57 - x = 10$

or $x = 57 - 10$

$= 47$.

2. Let the unknown number be a.

So, $15 + a = 45$

Subtracting 15 from both sides, we get

$a = 45 - 15$

or $a = 30$.

3. Let the required three numbers be x, $x + 1$ and $x + 2$. Then

$x + x + 1 + x + 2 = 84$

or $3x + 3 = 84$

or $3x = 84 - 3 = 81$

or $x = \frac{81}{3} = 27$

$\therefore$ $x + 1 = 27 + 1 = 28$

And $x + 2 = 27 + 2 = 29$

Hence the required numbers are 27, 28 and 29.

4. Let the angles be a, $2a$ and $3a$.

Using the angle sum property of a triangle, we get

$a + 2a + 3a = 180°$

or $6a = 180°$

or $a = 30°$

$\therefore$ $2a = 2 \times 30° = 60°$

And $3a = 3 \times 30° = 90°$

Hence, the angles are 30°, 60° and 90°.

5. (*i*) $6x + 6 = 30$

or $6x = 30 - 6$

(Transposing 6 to the right)

or $6x = 24$

or $\frac{6x}{6} = \frac{24}{6}$

(Dividing both sides by 6)

or $x = 4.$

(*ii*) $4m - 4 = 24$

or $4m - 4 + 4 = 24 + 4$

(Adding 4 to both sides)

or $4m = 28$

or $\frac{4m}{4} = \frac{28}{4}$

(Dividing both sides by 4)

or $m = 7$

(*iii*) $5m - 5 = 15$

or $5m - 5 + 5 = 15 + 5$

(Adding 5 to both sides)

or $5m = 20$

or $\frac{5m}{5} = \frac{20}{5}$

(Dividing both sides by 5)

or $m = 4.$

6. (*i*) $\frac{4x}{9} = 20$

Multiplying both sides by 9, we get

$$\frac{4x}{9} \times 9 = 20 \times 9$$

or $4x = 180$

Dividing both sides by 4, we get

$$\frac{4x}{4} = \frac{180}{4} \quad \text{or} \quad x = 45.$$

(*ii*) $\frac{3x}{5} = 3$

Multiplying both sides by $\frac{5}{3}$, we get

$$\frac{3x}{5} \times \frac{5}{3} = 3 \times \frac{5}{3}$$

or $x = 5.$

(*iii*) $\frac{x}{5} = \frac{7}{15}$

Multiplying both sides by 5, we get

$$\frac{x}{5} \times 5 = \frac{7}{15} \times 5$$

or $x = \frac{7}{3}.$

7. (*i*) $6(x + 5) = 18$

Dividing both sides by 6, we get

$$x + 5 = \frac{18}{6} = 3$$

Subtracting 5 from both the sides, we get

$x = 3 - 5$

or $x = -2.$

(*ii*) $3(x - 5) = -21$

Dividing both sides by 3, we get

$$x - 5 = \frac{-21}{3} = -7$$

Adding 5 to both the sides, we get

$x = -7 + 5$

or $x = -2.$

(*iii*) $34 - 5(y - 1) = 4$

Transposing 34 to the right, we get

$-5(y - 1) = 4 - 34 = -30$

Dividing both sides by – 5, we get

$$y - 1 = \frac{-30}{-5} = \frac{30}{5} = 6$$

Adding 1 to both sides, we get

$y = 6 + 1$

or $y = 7.$

WORKSHEET–36

1. Let the one number be x

Then the other number = $9x$

According to the question,

$$x + 9x = 200$$

or $$10x = 200$$

or $$x = \frac{200}{10} = 20$$

$\therefore$ $$9x = 9 \times 20 = 180$$

So the required numbers are 20 and 180.

2. (*i*) $x = 2$ (Given)

Adding 5 to both sides,

$$x + 5 = 2 + 5$$

$$x + 5 = 7.$$

(*ii*) $x = 2$ (Given)

Multiply both sides by 4. $4x = 8$.

Subtract 2 from both sides

$$4x - 2 = 8 - 2$$

$$4x - 2 = 6$$

Thus the two equations are

$x + 5 = 7$ and $4x - 2 = 6$.

3. Let the number be x.

Thrice x means 3 times of x *i.e.*, $3x$ According to the question,

$$40 - 3x = -50$$

or $$-3x = -50 - 40$$

(Transposing 40 to the right)

or $$-3x = -90$$

or $$\frac{-3x}{-3} = \frac{-90}{-3}$$

(Dividing throughout by – 3)

or $$x = \frac{90}{3} = 30$$

Thus, the number is 30.

4. Let the number be y.

5 times of $y = 5 \times y = 5y$

8 times of $y = 8 \times y = 8y$

According to the question,

$$8y - 5y = 60$$

or $$3y = 60$$

or $$\frac{3y}{3} = \frac{60}{3}$$

(Dividing both sides by 3)

or $$y = 20$$

Thus, the required number is 20.

5. (*i*) $$\frac{x}{5} = \frac{1}{2}$$

Multiply both sides by 5.

$$x = \frac{5}{2}.$$

(*ii*) $$-\frac{2}{3}x = 12$$

Multiply both sides by $\frac{-3}{2}$.

$$-\frac{2}{3} \times \left(-\frac{3}{2}\right) x = 12 \times \left(-\frac{3}{2}\right)$$

or $$x = -\frac{36}{2}$$

or $$x = -18.$$

(*iii*) $$\frac{x}{y} = z$$

Multiply both sides by y.

$$x = yz.$$

(*iv*) $$\frac{ax}{b} = c$$

Multiply both sides by $\frac{b}{a}$.

$$\frac{ax}{b} \times \frac{b}{a} = c \times \frac{b}{a}$$

or $$x = \frac{bc}{a}.$$

6. (*i*) Difference of a and 6 is 18

i.e., $a - 6 = 18$.

(*ii*) The number m is 10 more than 19

i.e., $m = 10 + 19$.

(*iii*) Nine times m plus 8 gives you 98

i.e., $9m + 8 = 98$.

(*iv*) One fourth of a number x equals 1

i.e., $\frac{x}{4} = 1$.

7. (*i*) $8(2 - x) = 48$

Divide both sides by 8,

$$2 - x = \frac{48}{8} = 6$$

Multiply both sides by (– 1),

$$x - 2 = -6$$

Add 2 to both sides.

$$x = -6 + 2$$

or $x = -4$.

(*ii*) $80 - 5(y - 1) = 0$

Subtract 80 from both sides.

$$-5(y - 1) = -80$$

Multiply both sides by $\left(-\frac{1}{5}\right)$.

$$y - 1 = 16$$

Add 1 to both sides.

$$y = 17$$

So required solution is $y = 17$.

(*iii*) $28 = 4 + 3(x + 5)$

Subtract 4 from both sides.

$$24 = 3(x + 5)$$

Divide both sides by 3.

$$8 = x + 5$$

Subtract 5 from both sides.

$$3 = x$$

So required solution is $x = 3$.

(*iv*) $0 = 16 + 2(m - 3)$

Subtract 16 from both sides

$$-16 = 2(m - 3)$$

Divide both sides by 2.

$$-8 = m - 3$$

Add 3 to both sides.

$$-5 = m$$

So required solution is $m = -5$.

WORKSHEET–37

1. Let Ritu's age be x years

As Geeta is 8 years older than Ritu,

Geeta’s age = $(x + 8)$ years

∵ Sum of their ages = 26 years

∴ $x + x + 8 = 26$

or $2x + 8 = 26$

or $2x = 26 - 8 = 18$

(Transposing 8)

or $x = 9$

(Dividing throughout by 2)

∴ $x + 8 = 9 + 8 = 17$

Hence, Ritu is of 9 years and Geeta is of 17 years.

2. (*i*) $m - 40 = 6$ or $m = 6 + 40$.

(*ii*) $x - 5 = 23$ or $x = 5 + 23$.

(*iii*) $\frac{x}{4} = 7$.

(*iv*) $\frac{x}{3} - 10 = 30$.

3. (*i*) $8x = 48$

Dividing both sides by 8, we get

$$x = \frac{48}{8} \quad \text{or} \quad x = 6.$$

(*ii*) $7x = 35$

Dividing both sides by 7, we get

$$x = \frac{35}{7} \quad \text{or} \quad x = 5.$$

(*iii*) $5x = 65$

Dividing both sides by 5, we get

$$x = \frac{65}{5} \quad \text{or} \quad x = 13.$$

4. (*i*) $3m + 17 = 32$

or $3m = 32 - 17 = 15$

(Transposing 17 to the right)

or $m = \frac{15}{3}$

(Divding both sides by 3)

or $m = 5.$

(*ii*) $11m + 9 = 42$

or $11m = 42 - 9$

(Transposing 9 to the right)

or $11m = 33$

or $m = \frac{33}{11}$

(Dividing both sides by 11)

or $m = 3.$

(*iii*) $7m + \frac{19}{2} = 13$

or $7m = 13 - \frac{19}{2}$

(Transposing $\frac{19}{2}$ to the right)

$$= \frac{26 - 19}{2} = \frac{7}{2}$$

or $m = \frac{7}{2 \times 7}$

(Dividing both sides by 7)

or $m = \frac{1}{2}.$

5. (*i*) $\frac{8x}{9} = 32$

$\Rightarrow \frac{8x}{9} \times \frac{9}{8} = 32 \times \frac{9}{8}$

(Multiplying both sides by $\frac{9}{8}$)

$\Rightarrow x = 4 \times 9$

$\Rightarrow x = 36.$

(*ii*) $\frac{6x}{5} = 30$

$\Rightarrow \frac{6x}{5} \times \frac{5}{6} = 30 \times \frac{5}{6}$

(Multiplying both sides by $\frac{5}{6}$)

$\Rightarrow x = 5 \times 5$

$\Rightarrow x = 25.$

(*iii*) $\frac{14x}{15} = \frac{7}{30}$

$\Rightarrow \frac{14x}{15} \times \frac{15}{14} = \frac{7}{30} \times \frac{15}{14}$

(Multiplying both sides by $\frac{15}{14}$)

$\Rightarrow x = \frac{7}{14} \times \frac{15}{30} = \frac{1}{2} \times \frac{1}{2}$

$\Rightarrow x = \frac{1}{4}.$

6. (*i*) $6(x + 3) = 48$

or $x + 3 = \frac{48}{6}$

(Dividing both sides by 6)

or $x + 3 = 8$

or $x = 8 - 3$

(Transposing 3 to RHS)

$x = 5.$

(*ii*) $3(x - 8) = -27$

or $x - 8 = \frac{-27}{3} = -9$

(Dividing both sides by 3)

or $x = -9 + 8$

(Transposing – 8 to RHS)

or $x = -1.$

(*iii*) $38 - 6(y - 1) = 8$

or $-6(y - 1) = 8 - 38 = -30$

(Transposing 38 to RHS)

or $y - 1 = \frac{-30}{-6}$

(Dividing both sides by – 6)

or $y - 1 = 5$

or $y = 5 + 1$

(Transposing – 1 to RHS)

or $y = 6.$

7. The number of girls is 60 more than that of the boys.

So, the number of girls is greater.

Let the number of boys = x

Then the number of girls = $60 + x$

∴ Total number of students

$= x + 60 + x$

$= 2x + 60$

But the total number of students

= 1200 (Given)

∴ $2x + 60 = 1200$

or $2x = 1200 - 60$

$= 1140$

(Transposing 60 to RHS)

or $x = \frac{1140}{2} = 570$

(Dividing both sides by 2)

∴ $60 + x = 60 + 570$

$= 630.$

Hence, number of boys = 570

and number of girls = 630.

8. (*i*) $\frac{ax}{5} = b$

Multiplying both sides by $\frac{5}{a}$, we get

$\frac{ax}{5} \times \frac{5}{a} = b \times \frac{5}{a}$ or $x = \frac{5b}{a}.$

(*ii*) $\frac{ax}{p} = c$

Multiplying both sides by $\frac{p}{a}$, we get

$\frac{ax}{p} \times \frac{p}{a} = c \times \frac{p}{a}$ or $x = \frac{cp}{a}.$

(*iii*) $\frac{x}{2y} = 3z$

Multiplying both sides by $2y$, we get

$\frac{x}{2y} \times 2y = 3z \times 2y$

or $x = 6yz.$

(*iv*) $\frac{2x}{9} = b + 7$

Multiplying both sides by $\frac{9}{2}$, we get

$\frac{2x}{9} \times \frac{9}{2} = (b + 7) \times \frac{9}{2}$

or $x = \frac{(b+7)\times 9}{2}.$

WORKSHEET–38

1. Let Bulbul has n marbles.

Then Kanika has $10 \times n + 7 = 10n + 7$ marbles

According to the question,

$n + 10n + 7 = 29$

or $11n = 29 - 7 = 22$

(Transposing 7 to RHS)

or $n = \frac{22}{11} = 2$

∴ $10n + 7 = 10 \times 2 + 7 = 20 + 7$

$= 27.$

Therefore, Bulbul has 2 marbles and Kanika has 27 marbles.

2. Let breadth = x

So, length = $12 + x$

Perimeter of a rectangle

$$= 2 \times (\text{length} + \text{breadth})$$
$$= 2 \times (12 + x + x)$$
$$= 2 \times (12 + 2x)$$
$$= 2 \times 12 + 2 \times 2x$$
$$= 24 + 4x.$$

But it is given that the perimeter of the triangle is 48 cm.

$\therefore \quad 24 + 4x = 48$

or $\quad 4x = 48 - 24 = 24$

or $\quad x = \frac{24}{4} = 6$

$\therefore \quad 12 + x = 12 + 6 = 18$

Thus, length = 18 cm

and breadth = 6 cm.

3. (*i*) $y - 15 = -30$

Transposing – 15 to RHS;

$y = -30 + 15$

Thus $y = -15.$

(*ii*) $y + 90 = -60$

Transposing 90 to RHS;

$y = -60 - 90$

Thus $y = -150.$

4.(*i*) $4x - 3 = 13$

Here, LHS $= 4x - 3$

$= 4 \times 1 - 3$

(Substituting $x = 1$)

$= 1 \neq$ RHS

So $x = 1$ does not satisfy the equation $4x - 3 = 13$.

(*ii*) $5p + 2 = 17$

Here, LHS $= 5p + 2$

$= 5 \times 3 + 2$

(Substituting $p = 3$)

$= 17 =$ RHS

So $p = 3$ satisfies the equation $5p + 2 = 17$

(*iii*) $5x = 25$

Here LHS $= 5x$

$= 5 \times 5$

(Substituting $x = 5$)

$= 25 =$ RHS

So $x = 5$ satisfies the equation $5x = 25$.

5. (*i*) Let each of the base angle be *a*.

According to the angle sum property of a triangle,

$a + a + 35° = 180°$

or $\quad 2a + 35° = 180°$

This is the required equation.

Here, $\quad 2a = 180° - 35°$

(Transposing 35° to RHS)

or $\quad 2a = 145°$

or $\quad a = \frac{145^o}{2}$

(Dividing both sides by 2)

or $\quad a = 72.5°$

So, each of the base angles is 72.5°.

(*ii*) Let the number be x

Twice $x = 2x$

Thrice $x = 3x$

According to the question,

$2x + 3x = 50$

This is the required equation.

Here, $\quad 5x = 50$

or $\quad x = \frac{50}{5} = 10$

(Dividing both sides by 5)

So the number is 10.

(*iii*) Let the one number be x

Then the other number $= \frac{x}{4}$

Sum of these two numbers = 200

$\therefore \quad x + \frac{x}{4} = 200$

This is the required equation.

Here, $\frac{4x + x}{4} = 200$

or $\frac{5x}{4} = 200$

or $\frac{5x}{4} \times \frac{4}{5} = 200 \times \frac{4}{5}$

(Multiplying both sides by $\frac{4}{5}$)

or $x = 40 \times 4 = 160$

$\therefore$ $\frac{x}{4} = \frac{160}{4} = 40$

Thus the required numbers are 160 and 40.

(*iv*) Let Ravi has ₹ x

Then Reema will have ₹ $2x$

Sum of their rupees = 150

$\therefore$ $x + 2x = 150$

This is the required equation.

or $3x = 150$

or $x = \frac{150}{3} = 50$

So Ravi has ₹ 50.

6. (*i*) $35 - 5(y - 4) = 5$

Subtracting 35 from both sides, we get

$-5(y - 4) = -30$

or $5(y - 4) = 30$

Dividing both sides by 5, we get

$y - 4 = \frac{30}{5} = 6$

or $y = 6 + 4$

(Transposing – 4 to RHS)

or $y = 10.$

(*ii*) $-8 = 10(p - 2)$

or $-\frac{8}{10} = p - 2$

(Dividing both sides by 10)

or $2 - \frac{4}{5} = p$

(Transposing – 2 to LHS)

or $p = \frac{10 - 4}{5}$

or $p = \frac{6}{5}.$

(*iii*) $40 = 4 + 3(x + 5)$

or $40 - 4 = 3(x + 5)$

or $x + 5 = \frac{36}{3} = 12$

(Dividing both sides by 3)

or $x = 12 - 5$

(Transposing 5 to RHS)

or $x = 7.$

(*iv*) $50 = 16 + 2(m - 5)$

or $50 - 16 = 2(m - 5)$

or $m - 5 = \frac{34}{2} = 17$

or $m = 5 + 17$

or $m = 22.$

WORKSHEET–39

1. Ratio of ages of Ram and Shyam is 3 : 5, *i.e.*, $\frac{3}{5}$. It means 'Ram's age is equal to three-fifth of Shyam's age'.

Let Shyam's age (in years) = x

Then Ram's age = $\frac{3}{5} \times x = \frac{3}{5}x$

Since sum of their ages is 40 years

$\therefore$ $x + \frac{3}{5}x = 40$

or $\frac{5x + 3x}{5} = 40$

or $\frac{8x}{5} = 40$

or $x = 40 \times \frac{5}{8} = 25$

(Multiplying both sides by $\frac{5}{8}$)

$\therefore \quad \frac{3}{5}x = \frac{3}{5} \times 25 = 15.$

Hence Ram's age is 15 years and Shyam's age is 25 years.

2. (*i*) $3(x + 6) = 4(2x - 8)$

or $3x + 18 = 8x - 32$

or $3x - 8x = -32 - 18$

or $-5x = -50$

or $x = \frac{-50}{-5} = \frac{50}{5}$

or $x = 10.$

(*ii*) $\frac{5m}{3} + 7 = \frac{m}{4} - 1$

Multiplying both sides by LCM of 3 and 4 = 12, we get

$20m + 84 = 3m - 12$

or $20m - 3m = -12 - 84$

or $17m = -96$

or $m = \frac{-96}{17}.$

3. (*i*) $y + \frac{1}{7} = \frac{3}{7}$

Here, LHS $= y + \frac{1}{7}$

$= \frac{3}{7} + \frac{1}{7}$

(Substituting $y = \frac{3}{7}$)

$= \frac{4}{7}$

Clearly LHS ≠ RHS

So, $y = \frac{3}{7}$ is not the solution of $y + \frac{1}{7} = \frac{3}{7}$.

(*ii*) $7 - x = 4$

Here LHS $= 7 - x$

$= 7 - 2 = 5$

(Substituting $x = 2$)

Clearly LHS ≠ RHS

So $x = 2$ is not the solution of $7 - x = 4$.

(*iii*) $2p = 18$

Here, LHS $= 2p$

$= 2 \times 9 = 18$

(Substituting $p = 9$)

Clearly LHS = RHS

So $p = 9$ is the solution of $2p = 18$.

(*iv*) $5x = 125$

Here LHS $= 5x$

$= 5 \times 9 = 45$

(Substituting $x = 9$)

Clearly LHS ≠ RHS

So $x = 9$ is not the solution of $5x = 125$.

4. (*i*) $x - 3 = 40$

The statement form of this equation is 'Take away 3 from *x* gives 40'.

(*ii*) $7p + 2 = 9$

The statement form of this equation is ' The sum of 7 times *p* and 2 is 9'.

(*iii*) $3m + 5 = 15$

The statement form of this equation is 'The sum of 3 times *m* and 5 is 15'.

(*iv*) $\frac{4x}{2} = 10$

The statement form of this equation is 'Half of four times *x* is 10'.

(*v*) $7x - 2 = 3$

The statement form of this equation is 'Take away 2 from seven times *x* gives 3'.

5. (*i*) $9x + 5 = 4x + 30$

Transposing 5 to RHS and $4x$ to LHS simultaneously, we get

$9x - 4x = 30 - 5$

or $5x = 25$

or $x = 5.$

(*ii*) $5x + 2 = 3x + 12$

Transposing 2 to RHS and $3x$ to LHS simultaneously, we get

$5x - 3x = 12 - 2$

or $2x = 10$

or $x = 5.$

(*iii*) $b + 3 = 33 - b$

Transposing 3 to RHS and $-b$ to LHS simultaneously, we get

$b + b = 33 - 3$

or $2b = 30$

or $b = 15.$

(*iv*) $4t + 5 = t + 15$

Transposing 5 to RHS and t to LHS simultaneously, we get

$4t - t = 15 - 5$

or $3t = 10$

or $t = \frac{10}{3}$

(*v*) $2 - (3 - x) = -4$

or $2 - 3 + x = -4$

or $-1 + x = -4$

Transposing -1 to RHS, we get

$x = -4 + 1$

or $x = -3$

6. (*i*) Let Meenu' previous weight = x kg

So, after losing 15 kg, her weight = $(x - 15)$ kg

Now, according to the given condition,

$x - 15 = 75$

This is the required equation.

Here $x = 75 + 15 = 90.$

(Transposing -15 to RHS)

So Meenu's previous weight was 90 kg.

(*ii*) Let 8% of x be 30.

$\therefore \frac{8}{100} \times x = 30$

This is the required equation.

Multiplying both sides by $\frac{100}{8}$, we get

$$\frac{8}{100} \times x \times \frac{100}{8} = 30 \times \frac{100}{8}$$

or $x = \frac{3000}{8}$

or $x = 375.$

(*iii*) Let Priti had m mangoes originally.

After giving 18 mangoes to Shanu, Priti was left with $(m - 18)$ mangoes.

But Priti was left with 45 mangoes.

$\therefore m - 18 = 45$

This is the required equation.

Here $m = 45 + 18 = 63$

(Transposing -18 to RHS)

So, Priti had 63 mangoes originally.

WORKSHEET–40

1. Let Roma's present age be x years. After 15 years, her age = $(x + 15)$ years

Also, after 15 years, her age

= 4 times x

$= 4x$

Therefore, $4x = x + 15$

or $3x = 15$

(Transposing x to LHS)

or $x = \frac{15}{3} = 5.$

Hence, Roma's present age is 5 years.

2. (*i*) Length of each part

$$= \frac{\text{Length of ribbon}}{\text{Number of parts}}$$

$$= \frac{x}{5} \text{ m.}$$

(*ii*) If the length of each part is 10 m,

Then $\frac{x}{5} = 10$

or $x = 5 \times 10 = 50.$

So, the length of whole piece is 50 m.

3. Let the two consecutive numbers be x and $x + 1$.

$\because$ Sum of these $= 139$

$\therefore$ $x + x + 1 = 139$

or $2x + 1 = 139$

or $2x = 139 - 1 = 138$

(Transposing 1 to RHS)

or $\frac{2x}{2} = \frac{138}{2}$

(Dividing both sides by 2)

or $x = 69$

$\therefore$ $x + 1 = 69 + 1 = 70.$

Hence, the numbers are 69 and 70.

4. Let the number be p.

$\therefore$ Five times $p = 5p$

According to the given condition,

$5p + 2 = 37$

or $5p = 37 - 2 = 35$

(Transposing 2 to RHS)

or $\frac{5p}{5} = \frac{35}{5}$

(Dividing both sides by 5)

or $p = 7$

So, the required number is 7.

5. (*i*) $\frac{y}{2} = 10$

Multiplying both sides by 2, we get

$\frac{y}{2} \times 2 = 10 \times 2$ or $y = 20.$

(*ii*) $\frac{c}{4} = 10$

Multiplying both sides by 4, we get

$\frac{c}{4} \times 4 = 10 \times 4$ or $c = 40.$

(*iii*) $3x - 5 = 10$

Adding 5 to both sides, we get

$3x - 5 + 5 = 10 + 5$

or $3x = 15.$

Dividing both sides by 3, we get

$$\frac{3x}{3} = \frac{15}{3}$$

or $x = 5.$

(*iv*) $m - (-4) = 9$

or $m + 4 = 9$

Subtracting 4 from both sides, we get

$m + 4 - 4 = 9 - 4$

or $m = 5.$

(*v*) $2 - (3 - a) = -4$

or $2 - 3 + a = -4$

or $a - 1 = -4$

Adding 1 to both sides, we get

$a - 1 + 1 = -4 + 1$

or $a = -3.$

6. (*i*) $2x - 3 = 9 - x$

or $2x + x = 9 + 3$ (Transposing)

or $3x = 12$

or $x = \frac{12}{3} = 4.$

(*ii*) $5n - 9 = n + 7$

or $5n - n = 9 + 7$ (Transposing)

or $4n = 16$

or $n = 4.$

(*iii*) $18 - 5d = 3d - 6$

or $-5d - 3d = -6 - 18$

(Transposing)

or $-8d = -24$

or $d = \frac{-24}{-8} = \frac{24}{8}$

or $d = 3.$

(*iv*) $x + 4x + 5x = 14$

or $1x + 4x + 5x = 14$

or $10x = 14$

or $x = \frac{14}{10} = 1.4.$

(*v*) $2t + 3t + 5 = 20$

or $5t + 5 = 20$

or $5t = 20 - 5 = 15$

or $t = \frac{15}{5} = 3.$

7. (*i*) $y + 7 = 8$

Subtracting 7 from both sides, we get

$y + 7 - 7 = 8 - 7$

or $y = 1.$

(*ii*) $16 = x + 6$

Subtracting 6 from both sides, we get

$16 - 6 = x + 6 - 6$

or $10 = x$

or $x = 10.$

(*iii*) $14 = b + 2$

Subtracting 2 from both sides, we get

$14 - 2 = b + 2 - 2$

or $12 = b$

or $b = 12.$

(*iv*) $y - 10 = 18$

Adding 10 to both sides, we get

$y - 10 + 10 = 18 + 10$

or $y = 28.$

(*v*) $7x = 56$

Dividing both sides by 7, we get

$$\frac{7x}{7} = \frac{56}{7}$$

or $x = 8.$

(*vi*) $5t = 30$

Dividing both sides by 5, we get

$$\frac{5t}{5} = \frac{30}{5}$$

or $t = 6.$

(*vii*) $75 = 5y$

Dividing both sides by 5, we get

$$\frac{75}{5} = \frac{5y}{5}$$

or $15 = y$ or $y = 15.$

WORKSHEET–41

1. Let the number be x

According to question,

$$7x - 5 = 23$$

Where x stands for the number.

2. The number m divided by 5 gives 3.

3. $12x - 7$

In this equation at first adding + 7 on both sides

Example. $12x - 7 = 4$

$12x - 7 + 7 = 4 + 7$

$12x = 11$

$x = \frac{11}{12}.$

4. Horizontal axis.

5. No.

Solution of the equation $4p - 3 = 13$

$p = -4$ (Given)

Putting the value of p in given equation

$4 \times (-4) - 3 = 13$

$-16 - 3 = 13$

$-19 = 13$

LHS ≠ RHS.

6. Let Swati's age = x

According to question,

$3x + 7 = 49$

$3x = 49 - 7$

$3x = 42$

$x = 14$

Swati's age = 14 years.

7. Let the number be x

Fifth part of a number = $\frac{x}{5}$

Fourth part of a number = $\frac{x}{4}$

According to question,

$$\frac{x}{5} + 5 = \frac{x}{4} - 5$$

$$\frac{x}{5} - \frac{x}{4} = -5 - 5$$

$$\frac{4x - 5x}{20} = -10$$

$$-\frac{x}{20} = -10$$

$$x = 20 \times 10 = 200$$

Number = 200.

8. Let the denominator be x

The numerator of fraction = $x - 1$

According to question,

$$\frac{x - 1 + 4}{x + 5} = \frac{4}{5}$$

$$\frac{x + 3}{x + 5} = \frac{4}{5}$$

$$5(x + 3) = 4(x + 5)$$

(By cross-multiplication)

$$5x + 15 = 4x + 20$$

$$5x - 4x = 20 - 15$$

$$x = 5$$

$$x - 1 = 5 - 1 = 4$$

Original fraction = $\frac{4}{5}$.

9. (*i*)
$$\frac{3x - \frac{6}{7}}{4} + 1 = \frac{2x - \frac{1}{3}}{3} + 5$$

$$\frac{\frac{21x - 6}{7}}{\frac{4}{1}} + 1 = \frac{\frac{6x - 1}{3}}{3} + 5$$

$$\frac{21x - 6}{28} + 1 = \frac{6x - 1}{9} + 5$$

$$\frac{21x - 6 + 28}{28} = \frac{6x - 1 + 45}{9}$$

$$\frac{21x + 22}{28} = \frac{6x + 44}{9}$$

$$189x + 198 = 168x + 1232$$

$$189x - 168x = 1232 - 198$$

$$21x = 1034$$

$$x = \frac{1034}{21}$$

(*ii*)
$$\frac{3x + 7}{5x - 4} = \frac{13}{6}$$

$$6(3x + 7) = 13(5x - 4)$$

[By cross-multiplication]

$$18x + 42 = 65x - 52$$

$$18x - 65x = -52 - 42$$

$$47x = 94$$

$$x = \frac{94}{47} = 2.$$

(*iii*) $15(x - 4) - 2(x + 3) - 3(x + 8) = 0$

$$15x - 60 - 2x - 6 - 3x - 24 = 0$$

$$10x - 90 = 0$$

$$10x = 90$$

$$x = \frac{90}{10} = 9.$$

(*iv*)
$$\frac{1}{3}(4x - 1) + \frac{2}{5}(2x + 5) - 5\frac{14}{15} = 0$$

$$\frac{4x - 1}{3} + \frac{4x + 10}{5} - \frac{89}{15} = 0$$

$$\frac{5(4x - 1) + 3(4x + 10)}{15} = \frac{89}{15}$$

$$\frac{20x - 5 + 12x + 30}{15} = \frac{89}{15}$$

$$\frac{32x + 25}{15} = \frac{89}{15}$$

$$15(32x + 25) = 15 \times 89$$

$$32x + 25 = \frac{15 \times 89}{15}$$

$$32x + 25 = 89$$

$$32x = 89 - 25$$

$$32x = 64$$

$$x = \frac{64}{32}$$

$$x = 2.$$

❑❑

Chapter

6

LINES AND ANGLES

WORKSHEET–42

1. (C) Let the complement of 53° be x.

Then $x + 53° = 90°$

$\therefore$ $x = 90° - 53° = 37°$.

2. (A) The sum of two complementary angles is a right angle *i.e.*, 90°.

3. (D) Let each of two complementary angles be x.

Then $x + x = 90°$

or $2x = 90°$

$\therefore$ $x = \frac{90^o}{2} = 45°$.

4. (B) As the sum of two complementary angles is 90°, each of them will be acute.

5. (C) Let the required angle = $2x$

Then the other angle $= \frac{2x}{2} = x$

So, $2x + x = 90° \Rightarrow 3x = 90°$

$\Rightarrow$ $x = \frac{90°}{3} = 30°$

$\therefore$ $2x = 2 \times 30° = 60°$.

6. (A) A line is obtained when a line segment is extended on both sides so a line has no end points.

7. (D) $x + 62° = 90°$

$\Rightarrow$ $x = 90° - 62° = 28°$.

8. (B) Let one of two complementary angles = x

Then the other one = $90° - x$

According to the question,

$x - (90° - x) = 18°$

or $2x = 18° + 90° = 108°$

or $x = \frac{108°}{2} = 54°$

$\therefore$ $90° - x = 90° - 54° = 36°$.

9. (D) Sum of angles of a linear pair = 180°.

10. (A) Every line segment has two end points.

11. (A) Since $\angle 1$ and $\angle 2$ are vertically opposite angles

$\therefore$ $\angle 1 = \angle 2$.

12. (C) Sum of two supplementary angles = 180°

Here, $40° + 140° = 180°$.

13. (A) Supplement of 71° $= 180° - 71° = 109°$.

14. (A) Let one of two supplementary angles = x

$\therefore$ Other one = $180° - x$

But $x - (180° - x) = 88°$ (Given)

$\therefore$ $2x - 180° = 88°$

or $2x = 88° + 180° = 268°$

or $x = \frac{268^o}{2} = 134°$

$\therefore$ $180° - x = 180° - 134° = 46°$.

15. (C) $\because \angle 1 + \angle 2 = 180° \neq 90°$

$\therefore$ $\angle 1$ and $\angle 2$ do not form a pair of complementary angles.

16. (A) Two intersecting lines pass through either one or infinitely many common points.

17. (B) Since $\angle 1$ and $\angle 2$ form a pair of interior angles on the same side of transversal n.

$\therefore$ $\angle 1 + \angle 2 = 180°$.

18. (D) Interior angles are $\angle 3$, $\angle 4$, $\angle 5$ and $\angle 6$. $\angle 4$ and $\angle 6$, $\angle 3$ and $\angle 5$ are the pairs of alternate interior angles.

WORKSHEET–43

1. (*i*) $\because 60° + 30° = 90°$

So 60° and 30° form a pair of complementary angles:

(*ii*) $70° + 30° = 100° \neq 90°$; 70° and 30° do not form a pair of complementary angles.

(*iii*) $35° + 45° = 80° \neq 90°$; 35 and 45° do not form a pair of complementary angles.

(*iv*) $60° + 20° = 80° \neq 90°$; 60° and 20° do not form a pair of complementary angles.

2. Let the angle be x. Then its complement is $90° - x$.

But $x = 90° - x$ (Given)

$\therefore$ $2x = 90°$

or $x = 45°$.

3. Yes. Since the sum of angles of a linear pair is 180°, therefore, a linear pair is an example of supplementary angles.

4. Let one angle be x. Then the other angle is $x + 18°$.

Now x and $x + 18°$ are complementary angles.

$\therefore$ $x + x + 18° = 90°$

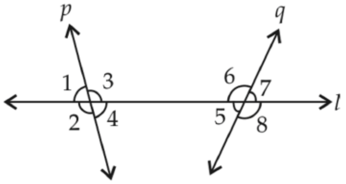
$\Rightarrow$ $2x = 90° - 18° = 72°$

$\Rightarrow$ $x = \dfrac{72^o}{2} = 36°$

$\therefore$ $x + 18° = 36° + 18° = 54°$

So the measures of the two angles are 36° and 54°.

5. There are two lines p and q; and l is their transversal (see figure).



All exterior angles are:

$\angle 1$, $\angle 2$, $\angle 7$ and $\angle 8$.

All interior angles are:

$\angle 3$, $\angle 4$, $\angle 5$ and $\angle 6$.

6. We know that the sum of two complementary angles is 90°.

(*i*) Complement of $60° = 90° - 60° = 30°$.

(*ii*) Complement of $33° = 90° - 33° = 57°$.

(*iii*) Complement of $82° = 90° - 82° = 8°$.

7. We know that sum of the supplementary angles is 180°.

(*i*) Supplement of $58° = 180° - 58° = 122°$.

(*ii*) Supplement of $113° = 180° - 113° = 67°$.

(*iii*) Supplement of $125° = 180° - 125° = 55°$.

8. (*i*) Vertically opposite angles are:

$\angle POY$ and $\angle QOX$;

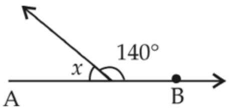
$\angle POX$ and $\angle QOY$

(*ii*) Vertically opposite angles are:

$\angle QON$ and $\angle POM$;

$\angle QOM$ and $\angle PON$.

9. (*i*) x and 140° form a linear pair of angles with AB (see figure).



$\therefore$ $x + 140° = 180°$

$\Rightarrow$ $x = 180° - 140°$

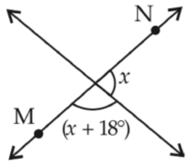
$\Rightarrow$ $x = 40°$.

(*ii*) x and $(x + 18°)$ form a linear pair of angles with MN (see figure).

$\therefore \quad x + x + 18° = 180°$

$\Rightarrow \quad 2x + 18° = 180°$

$\Rightarrow \quad 2x = 180° - 18°$



$\Rightarrow \quad 2x = 162°$

$\Rightarrow \quad x = \dfrac{162°}{2}$

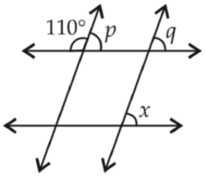
$\Rightarrow \quad x = 81°.$

10. (*i*) $p + 110° = 180°$ (Linear pair)

$\Rightarrow \quad p = 180° - 110° = 70°$

$q = p = 70°$

(Corresponding angles)



$x = q$ (Corresponding angles)

$= 70°.$

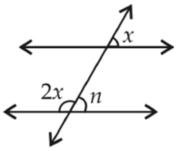
(*ii*) x and 130° form a pair of corresponding angles.

$\therefore \quad x = 130°.$

(*iii*) Angles n and x form a pair of corresponding angles (see figure).

$\therefore \quad n = x$

Angles $2x$ and n form a linear pair of angles



$\therefore \quad 2x + n = 180°$

$\Rightarrow \quad 2x + x = 180° \qquad (\because n = x)$

$\Rightarrow \quad 3x = 180°$

$\Rightarrow \quad x = \dfrac{180^o}{3} \quad \Rightarrow \quad x = 60°.$

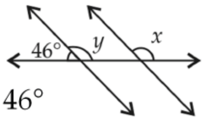
(*iv*) $x = y$ (pair of corresponding angles)

$46° + y = 180°$

(Linear pair of angles)

$\Rightarrow \quad 46° + x = 180°$

$(\because x = y)$



$\Rightarrow \quad x = 180° - 46°$

$\Rightarrow \quad x = 134°.$

WORKSHEET–44

1. A pair of angles becomes a linear pair if it follows the conditions given below:

(*a*) The angles have a common vertex;

(*b*) The angles have a common arm;

(*c*) The non-common arms are on opposite sides of the common arm; and

(*d*) The non-common arms are opposite rays.

(*i*) Two acute angles cannot make a linear pair.

(*ii*) Two right angles can make a linear pair.

2. Pairs of the vertically opposite angles are:

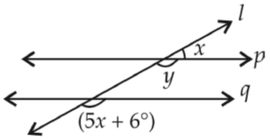
$\angle 1$ and $\angle 4$; $\quad \angle 2$ and $\angle 3$

$\angle 5$ and $\angle 7$; $\quad \angle 6$ and $\angle 8$.

3. $p \parallel q$ and l is transversal

$\Rightarrow \quad x + y = 180°$ (Linear pair of angles)

$\Rightarrow \quad y = 180° - x$



Also, $\quad 5x + 6° = y$

(Pair of corresponding angles)

$\Rightarrow \quad 5x + 6° = 180° - x \quad (\because y = 180° - x)$

$\Rightarrow \quad 6x = 180° - 6° = 174°$

$\Rightarrow \quad x = \dfrac{174^o}{6} \quad \Rightarrow \quad x = 29°.$

4. We know that

(*a*) A pair of angles forms complementary angles if their sum is 90°.

(*b*) A pair of angles forms supplementary angles if their sum is 180°.

(*i*) $120° + 60° = 180°$

This pair is of supplementary angles.

(*ii*) $45° + 45° = 90°$

This pair is of complementary angles.

(*iii*) $110° + 70° = 180°$

This pair is of supplementary angles.

(*iv*) $36° + 54° = 90°$

This pair is of complementary angles.

(*v*) $95° + 85° = 180°$

This pair is of supplementary angles.

(*vi*) $40° + 50° = 90°$

This pair is of complementary angles.

5. We know that sum of an angle and its complement is 90°.

(*i*) Complement of $80° = 90° - 80°$
$= 10°$.

(*ii*) Complement of $30° = 90° - 30°$
$= 60°$.

(*iii*) Complement of $12° = 90° - 12°$
$= 78°$.

6. We know that sum of an angle and its supplement is 180°.

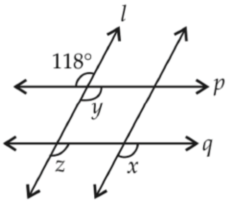
(*i*) Supplement of $110° = 180° - 110°$
$= 70°$.

(*ii*) Supplement of $80° = 180° - 80°$
$= 100°$.

(*iii*) Supplement of $145° = 180° - 145°$
$= 35°$.

7. (*i*) $y = 118°$ (Vertically opposite angles)

$\because$ $p \parallel q$ and l is transversal

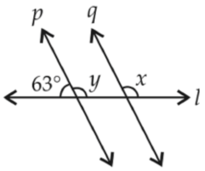


$\therefore$ $z = y = 118°$ (Corresponding angles)

$x = z = 118°$ (Corresponding angles)

(*ii*) $y + 63° = 180°$ (Linear pair of angles)

$\Rightarrow$ $y = 180° - 63° = 117°$



$\because$ $p \parallel q$ and l is transversal

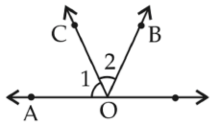
$\therefore$ $x = y$ (Corresponding angles)

$= 117°$.

8. (*i*) Yes. In the given figure, a pair of angles is formed with two equal corresponding angles. So $l \parallel m$.

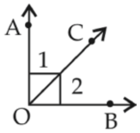
(*ii*) Yes. In the given figure, alternate interior angles are equal. So, $l \parallel m$.

9. (*i*)



$\angle 1$ and $\angle 2$ are adjacent angles because they have a common vertex O, a common arm OC and non-common arms OA and OB (see figure) are on either side of the common arm OC.

(*ii*) $\angle 1$ and $\angle 2$ are adjacent angles because they have a common vertex O, a common arm OC and non-common arms OA and OB (see figure) are on either side of the common arm OC.

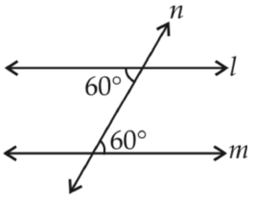


(*iii*) $\angle 1$ and $\angle 2$ are not adjacent angles because they have no common arm.

(*iv*) $\angle 1$ and $\angle 2$ are not adjacent angles because they have no common arm.

WORKSHEET–45

1. (*i*)

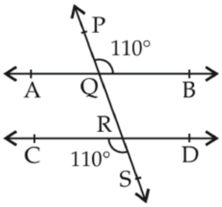


Line n intersects lines l and m in distinct points. The two angles each of measure 60° (see figure) are alternate interior angles.

So $l \parallel m$.

(*ii*) $\angle QRD = \angle CRS = 110^\circ$

(Vertically opposite angles)



Clearly, $\angle QRD$ and $\angle PQB$ are corresponding angles which are equal of measure 110° each.

$\therefore$ AB $\parallel$ CD.

2. EF $\parallel$ GH and AB is transversal

$\therefore \quad x = 80^\circ$ (Corresponding angles)

AB $\parallel$ CD and GH is transversal

$\therefore \quad y = 80^\circ$

(Alternate interior angles).

3. $\angle EFD = \angle CFQ = 50^\circ$

(Vertically opposite angles)

$\angle QFD + \angle CFQ = 180^\circ$

(Linear pair of angles)

$\Rightarrow \angle QFD = 180^\circ - 50^\circ = 130^\circ$

$\angle CFE = \angle QFD = 130^\circ$

(Vertically opposite angles)

$\angle AEF = \angle CFQ = 50^\circ$

(Corresponding angles)

$\angle PEB = \angle AEF = 50^\circ$

(Vertically opposite angles)

$\angle AEP = \angle CFE = 130^\circ$

(Corresponding angles)

$\angle FEB = \angle AEP = 130^\circ$

(Vertically opposite angles).

4. $\because$ AB $\parallel$ CD and BE is transversal

$\therefore \quad x = \angle ECD$

(Corresponding angles)

$= 30^\circ$

$\because$ AB $\parallel$ CD and AC is transversal

$\therefore \quad y = \angle DCA$

(Alternate interior angles)

$= 60^\circ$

Since z and $\angle ACE$ form a linear pair

$\therefore \quad z = \angle ACE = \angle ACD + \angle DCE$

$= 60^\circ + 30^\circ = 90^\circ$.

5. (*i*) Pairs of vertically opposite angles are:

$\angle 1$ and $\angle 3$, $\angle 2$ and $\angle 4$.

(*ii*) Pairs of adjacent angles are:

$\angle 1$ and $\angle 4$, $\angle 4$ and $\angle 3$, $\angle 3$ and $\angle 2$, $\angle 2$ and $\angle 1$.

6. In the given figure, AB and CD are two lines and EF is transversal.

Since $\angle CQP$ and $\angle APE$ are corresponding angles of same measure each of 120°.

Therefore, AB $\parallel$ CD

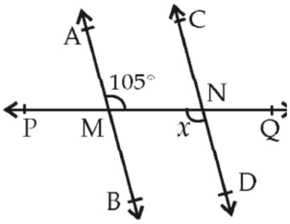
Further, AB $\parallel$ CD and GH is transversal

$\therefore \angle SRD = \angle PSR$

(Alternate interior angles)

or $\quad x = 105^\circ$.

7. (*i*) In the adjoining figure, AB ∥ CD and PQ is transversal.



∴ ∠MND = ∠AMN

(Alternate interior angles)

or $x = 105°$.

(*ii*) $x = 130°$ (Corresponding angles)

(*iii*) Angles x and 50° which are shown in the given figure are corresponding angles.

∴ $x = 50°$.

(*iv*) Angles x and 110° which are shown in the given figure are corresponding angles

∴ $x = 110°$.

8. (*i*) All pairs of alternate angles are:

∠1 and ∠6, ∠4 and ∠7, ∠2 and ∠5, ∠3 and ∠8.

(*ii*) All pairs of corresponding angles are:

∠1 and ∠5, ∠2 and ∠6, ∠3 and ∠7, ∠4 and ∠8

(*iii*) ∠3 and ∠5

(*iv*) ∠4 and ∠6.

WORKSHEET–46

1. (*i*) The shown angles x and 63° in the given figure are vertically opposite angles.

∴ $x = 63°$.

(*ii*) The shown angles x and 95° in the given figure form a linear pair

∴ $x + 95° = 180°$

∴ $x = 180° - 95° = 85°$.

(*iii*) The shown angles x and 153° in the given figure form a linear pair.

∴ $x + 153° = 180°$

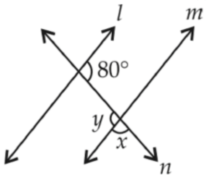
∴ $x = 180° - 153° = 27°$.

(*iv*) $l \parallel m$ and n is transversal. Angles y and 80° are alternate interior angles

∴ $y = 80°$

$x + y = 180°$

(Linear pair of angles)



⇒ $x + 80° = 180°$

⇒ $x = 180° - 80°$

$= 100°$.

2. (*i*) Let the complement of 13° be x_1, then

$x_1 + 13° = 90°$

⇒ $x_1 = 90° - 13° = 77°$.

(*ii*) Let the complement of 78° be x_2, then

$x_2 + 78° = 90°$

⇒ $x_2 = 90° - 78° = 12°$.

(*iii*) Let the complement of 35° be x_3, then

$x_3 + 35° = 90°$

⇒ $x_3 = 90° - 35° = 55°$.

(*iv*) Let the complement of 18° be x_4, then

$x_4 + 18° = 90°$

⇒ $x_4 = 90° - 18° = 72°$.

3. (*i*) Let the supplement of 152° be y_1, then

$y_1 + 152° = 180°$

⇒ $y_1 = 180° - 152° = 28°$.

(*ii*) Let the supplement of 105° be y_2, then

$y_2 + 105° = 180°$

⇒ $y_2 = 180° - 105° = 75°$.

(*iii*) Let the supplement of 76° be y_3, then

$$y_3 + 76° = 180°$$

$$\Rightarrow \quad y_3 = 180° - 76° = 104°.$$

(*iv*) Let the supplement of 128° be y_4, then

$$y_4 + 128° = 180°$$

$$\Rightarrow \quad y_4 = 180° - 128° = 52°.$$

4. (*i*) Pairs of adjacent angles are:

$\angle 1$ and $\angle 2$, $\angle 2$ and $\angle 3$, $(\angle 1 + \angle 2)$ and $\angle 3$, $\angle 1$ and $(\angle 2 + \angle 3)$.

There is no linear pair.

(*ii*) Pairs of adjacent angles are:

$\angle 1$ and $\angle 2$, $\angle 2$ and $\angle 3$, $\angle 3$ and $\angle 4$, $\angle 4$ and $\angle 1$.

The linear pairs are:

$\angle 1$ and $\angle 2$, $\angle 2$ and $\angle 3$, $\angle 3$ and $\angle 4$, $\angle 4$ and $\angle 1$.

(*iii*) Pairs of adjacent angles are:

$\angle 1$ and $\angle 2$, $\angle 2$ and $\angle 3$, $\angle 3$ and $\angle 4$, $\angle 4$ and $\angle 1$.

Linear pairs are:

$\angle 1$ and $\angle 2$, $\angle 2$ and $\angle 3$, $\angle 3$ and $\angle 4$, $\angle 4$ and $\angle 1$.

(*iv*) Pairs of adjacent angles are:

$\angle 1$ and $\angle 2$, $\angle 2$ and $\angle 3$, $\angle 3$ and $\angle 4$, $\angle 4$ and $\angle 5$, $\angle 5$ and $\angle 6$, $\angle 6$ and $\angle 1$, $(\angle 1 + \angle 2)$ and $\angle 3$, $(\angle 2 + \angle 3)$ and $\angle 4$, $(\angle 3 + \angle 4)$ and $\angle 5$, $(\angle 4 + \angle 5)$ and $\angle 6$, $(\angle 5 + \angle 6)$ and $\angle 1$, $(\angle 6 + \angle 1)$ and $\angle 2$, $(\angle 1 + \angle 2)$ and $\angle 6$, $(\angle 2 + \angle 3)$ and $\angle 1$, $(\angle 3 + \angle 4)$ and $\angle 2$, $(\angle 4 + \angle 5)$ and $\angle 3$, $(\angle 5 + \angle 6)$ and $\angle 4$, $(\angle 6 + \angle 1)$ and $\angle 5$.

Linear pairs are:

$(\angle 1 + \angle 2)$ and $\angle 3$, $(\angle 2 + \angle 3)$ and $\angle 4$, $(\angle 3 + \angle 4)$ and $\angle 5$, $(\angle 4 + \angle 5)$ and $\angle 6$, $(\angle 5 + \angle 6)$ and $\angle 1$, $(\angle 1, + \angle 6)$ and $\angle 2$, $(\angle 1 + \angle 2)$ and $\angle 6$, $(\angle 2 + \angle 3)$ and $\angle 1$, $(\angle 3 + \angle 4)$ and $\angle 2$, $(\angle 4 + \angle 5)$ and $\angle 3$, $(\angle 5 + \angle 6)$ and $\angle 4$, $(\angle 6 + \angle 1)$ and $\angle 5$.

5. (*i*) Since angles x and 112° form a linear pair

$$\therefore \quad x + 112° = 180°$$

$$\Rightarrow \quad x = 180° - 112° = 68°.$$

(*ii*) Since angles x and $x - 100°$ form a linear pair

$$\therefore \quad x + x - 100° = 180°$$

$$\Rightarrow \quad 2x = 180° + 100° = 280°$$

$$\Rightarrow \quad x = \frac{280^o}{2} = 140°.$$

(*iii*) Since angles x and 123° are vertically opposite angles

$$\therefore \quad x = 123°.$$

(*iv*) Since angles x and $(3x + 60°)$ form a linear pair

$$\therefore \quad x + 3x + 60° = 180°$$

$$\Rightarrow \quad 4x = 180° - 60° = 120°$$

$$\Rightarrow \quad x = \frac{120^o}{4} = 30°.$$

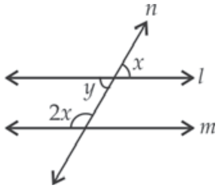
6. (*i*) $\because$ $l \parallel m$ and n is transversal

$$\therefore \quad y = x$$

(Vertically opposite angles)

And $2x + y = 180°$

(Interior angles on the same side of the transversal n)



$$\Rightarrow \quad 2x = 180° - y = 180° - x$$

$$(\because y = x)$$

$$\Rightarrow \quad 3x = 180°$$

$$\Rightarrow \quad x = \frac{180^o}{3} = 60°.$$

(*ii*) $x + (x + 50°) = 180°$

(Interior angles on the same side of transversal)

$\Rightarrow \quad 2x = 180° - 50° = 130°$

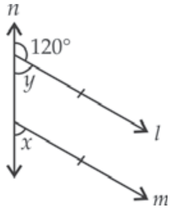
$\Rightarrow \quad x = \frac{130^o}{2} = 65°.$

(*iii*) $\because$ $l \parallel m$ and n is transversal

$\therefore \quad y + 120° = 180°$

$\Rightarrow \quad y = 180° - 120° = 60°$

Also, $\quad x = y = 60°.$



(*iv*) Angles x and 60° are interior angles on the same side of transversal.

$\therefore \quad x + 60° = 180°$

$\Rightarrow \quad x = 180° - 60° = 120°.$

(*v*) Angles x and 25° are alternate interior angles

$\therefore \quad x = 25°.$

WORKSHEET–47

1. No, two obtuse angles cannot form a linear form.

2. (*i*) $67° + 23° = 90°$

$\Rightarrow$ The pair of angles 67° and 23° is of complementary angles.

(*ii*) $40° + 50° = 90°$

$\Rightarrow$ The pair of angles 40° and 50° is of complementary angles.

(*iii*) $127° + 53° = 180°$

$\Rightarrow$ The pair of angles 127° and 53° is of supplementary angles.

(*iv*) $113° + 67° = 180°$

$\Rightarrow$ The pair of angles 113° and 67° is of supplementary angles.

3. Interior angles are: $\angle 3$, $\angle 4$, $\angle 5$ and $\angle 6$.

4. (*i*) A line intersects the lines l and m, and a pair of corresponding angles is equal.

So, $l \parallel m$.

(*ii*) The upper horizontal line intersects the lines l and m, and a pair of corresponding angles is equal.

So $l \parallel m$.

(*iii*) An oblique transversal intersects the lines l and m, and a pair of alternate interior angles is equal.

So, $l \parallel m$.

(*iv*) $110° + 80° = 190° \neq 180°$

A transversal intersects the lines l and m, and a pair of interior angles on the same side of the transversal is not supplementary.

So l in not parallel to m.

5. (*i*) Angles b and 60° are vertically opposite

$\therefore \quad b = 60°$

Angles a and b form a linear form

$\therefore \quad a + b = 180°$

$\Rightarrow \quad a = 180° - b = 180° - 60°$ $\quad (\because b = 60°)$

$\Rightarrow \quad a = 120°$

Angles a and c are vertically opposite angles

$\therefore \quad c = a = 120° \quad (\because a = 120°)$

Thus $\quad a = 120°, b = 60°, c = 120°.$

(*ii*) Angles b and 40° are vertically opposite

$\therefore \quad b = 40°$

Angles 40°, c and 45° are on the same side of a straight line.

$\therefore \quad 40° + c + 45° = 180°$

$\Rightarrow \quad c = 180° - 40° - 45° = 95°$

Angles a and $(c + 45°)$ are vertically opposite.

$\therefore \quad a = c + 45°$

$= 95° + 45° \quad (\because c = 95°)$

$= 140°$

Thus $\quad a = 140°, b = 40°, c = 95°.$

6. (*i*) Angles x and $(x + 28°)$ form a linear pair

$\therefore \; x + x + 28° = 180°$

$\Rightarrow \quad 2x = 180° – 28° = 152°$

$\Rightarrow \quad x = \dfrac{152^o}{2} = 76°.$

(*ii*) Angles x, x, $3x$ and $3x$ form a complete angle.

$\therefore \; x + x + 3x + 3x = 360°$

$\Rightarrow \quad 8x = 360°$

$\Rightarrow \quad x = \dfrac{360^o}{8} = 45°.$

(*iii*) Angles x and $(3x + 60°)$ form a linear pair.

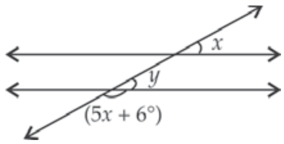
$\therefore \quad x + 3x + 60° = 180°$

$\Rightarrow \quad 4x = 180° – 60° = 120°$

$\Rightarrow \quad x = \dfrac{120^o}{4} = 30°.$

(*iv*) $\quad y = x \quad$ (Corresponding angles)

Angles y and $(5x + 6°)$ form a linear pair.



$\therefore \quad y + 5x + 6° = 180°$

$\Rightarrow \quad x + 5x + 6° = 180° \quad (\because y = x)$

$\Rightarrow \quad 6x = 180° – 6° = 174°$

$\Rightarrow \quad x = \dfrac{174^o}{6} = 29°.$

7. (*i*) Angles x, $x + 20°$ and $60°$ are on the same side of a straight line

$\therefore \; x + x + 20° + 60° = 180°$

$\Rightarrow \quad 2x + 80° = 180°$

$\Rightarrow \quad 2x = 180° – 80°$

$= 100°$

$\therefore \quad x = \dfrac{100^o}{2} = 50°.$

(*ii*) Angles x, $20°$, $\dfrac{x}{3}$ and $160°$ form a complete angle.

$\therefore \quad x + 20° + \dfrac{x}{3} + 160° = 360°$

$\Rightarrow \quad x + \dfrac{x}{3} = 360° – 160° – 20°$

$\Rightarrow \quad \dfrac{4x}{3} = 180°$

$\Rightarrow \quad x = \dfrac{3}{4} \times 180°$

$= 3 \times 45°$

$\Rightarrow \quad x = 135°.$

(*iii*) Angles x, $\dfrac{x}{3}$ and $120°$ form a complete angle.

$\therefore \quad x + \dfrac{x}{3} + 120° = 360°$

$\Rightarrow \quad x + \dfrac{x}{3} = 360° – 120°$

$\Rightarrow \quad \dfrac{4x}{3} = 240°$

$\Rightarrow \quad x = 240° \times \dfrac{3}{4}$

$= 60° \times 3$

$\Rightarrow \quad x = 180°.$

(*iv*) Angles x, $(x + 20°)$ and $(x + 10°)$ are on the same side of a straight lines

$\therefore \quad x + x + 20° + x + 10° = 180°$

$\Rightarrow \quad 3x + 30° = 180°$

$\Rightarrow \quad 3x = 180° – 30° = 150°$

$\Rightarrow \quad x = \dfrac{150°}{3}$

$= 50°.$

WORKSHEET–48

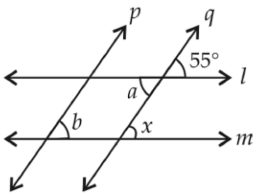
1. AB ∥ CD and an oblique line is transversal (see figure).

$\therefore\ x = 60°$ (Corresponding angles)

CD ∥ EF and an oblique line is transversal (see figure).

$\therefore\ y = 60°$ (Alternate interior angles)

2. Angles a and 55° vertically opposite angles



$\therefore\ a = 55°$

$l \parallel m$ and q is transversal.

$\therefore\ x = a$ (Alternate interior angles)
$= 55°$

$p \parallel q$ and m is transversal

$\therefore\ b = x$ (Corresponding angles)
$= 55°$

Thus, $a = 55°$ and $b = 55°$.

3. ∠BCA, ∠ACD and ∠DCE are on the same side of line BCE.

$\therefore$ ∠BCA + ∠ACD + ∠DCE = 180°

$\Rightarrow$ 74° + ∠ACD + 59° = 180°

$\Rightarrow$ ∠ACD + 133° = 180°

$\Rightarrow$ ∠ACD = 180° – 133°
= 47°

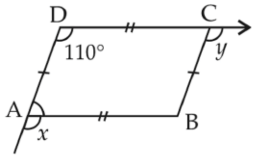
Also, ∠BAC = 47°

(See figure)

In the given figure, line AC intersects AB and CD. And so ∠BAC and ∠ACD are alternate interior angles each of measure 47°.

Therefore, AB ∥ CD.

4. (*i*) AB ∥ CD and AD is transversal



$\therefore\ x = 110°$ (Corresponding angles)

AD ∥ BC and DC is transversal

$\therefore\ y = 110°$ (Corresponding angles)

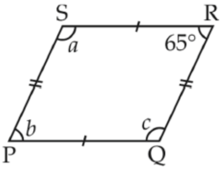
Thus, $x = y = 110°$.

(*ii*) PS ∥ QR and SR is transversal

$\therefore\ a + 65° = 180°$

(Interior angles on the same side of transversal SR)

$\Rightarrow\ a = 180° - 65° = 115°$



SR ∥ PQ and SP is transversal

$\therefore\ a + b = 180°$

(Interior angles on the same side of transversal SP)

$\Rightarrow\ 115° + b = 180°$ ($\because a = 115°$)

$\Rightarrow\ b = 180° - 115° = 65°$

SR ∥ PQ and RQ is transversal

$\therefore\ c + 65° = 180°$

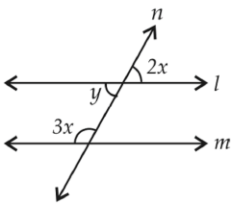
(Interior angles on the same side of transversal RQ)

$\Rightarrow\ c = 180° - 65° = 115°$.

Thus, $a = c = 115°, b = 65°$.

5. (*i*) Angles y and $2x$ are vertically opposite angles.

$\therefore\ y = 2x$



$l \parallel m$ and n in transversal, so angles y and $3x$ are on the same side of the transversal.

$\therefore \quad y + 3x = 180^\circ$

$\Rightarrow \quad 2x + 3x = 180^\circ$

$\Rightarrow \quad 5x = 180^\circ$

$\Rightarrow \quad x = \dfrac{180^\circ}{5} = 36^\circ.$

(*ii*) Angles x and $(x + 30^\circ)$ are on the same side of the transversal.

$\therefore \quad x + x + 30^\circ = 180^\circ$

$\Rightarrow \quad 2x = 180^\circ - 30^\circ = 150^\circ$

$\Rightarrow \quad x = \dfrac{150^\circ}{2}$

$\Rightarrow \quad x = 75^\circ.$

(*iii*) Angles $4x$ and $5x$ are on the same side of the transversal.

$\therefore \quad 4x + 5x = 180^\circ$

$\Rightarrow \quad 9x = 180^\circ$

$\Rightarrow \quad x = \dfrac{180^\circ}{9}$

$\Rightarrow \quad x = 20^\circ.$

6. (*i*) AC $\parallel$ BD and AB is transversal.

Angles x and $3x$ are on the same side of the transversal AB.

$\therefore \quad x + 3x = 180^\circ$

$\Rightarrow \quad 4x = 180^\circ$

$\Rightarrow \quad x = \dfrac{180^o}{4}$

$\Rightarrow \quad x = 45^\circ.$

(*ii*) Angle $3x$ is a right angle

i.e., $\quad 3x = 90^\circ$

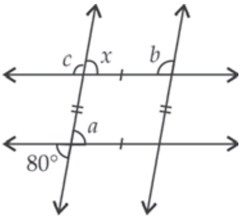
$\therefore \quad x = \dfrac{90^o}{3} = 30^\circ.$

(*iii*) Angles a and 80° are vertically opposite angles

$\therefore \quad a = 80^\circ.$

Angles x and a are corresponding angles.

$\therefore \quad x = a = 80^\circ$



Angles c and x form a linear pair.

$\therefore \quad c + x = 180^\circ$

$\Rightarrow \quad c = 180^\circ - x = 180^\circ - 80^\circ \quad (\because\ x = 80^\circ)$

$\quad = 100^\circ$

Angles b and c are corresponding angles.

$\therefore \quad b = c = 100^\circ \quad (\because\ c = 100^\circ)$

Thus, $\quad a = 80^\circ, b = 100^\circ, c = 100^\circ.$

(*iv*) Angles a and 118° are corresponding angles.

$\therefore \quad a = 118^\circ$

Angles c and 118° are corresponding angles.

$\therefore \quad c = 118^\circ$

Angles b and c are alternate interior angles.

$\therefore \quad b = c = 118^\circ \quad (\because\ c = 118^\circ)$

Thus, $\quad a = 118^\circ, b = 118^\circ, c = 118^\circ.$

WORKSHEET–49

1. True, because two acute angles can be complement to each other.

$\therefore$ Two acute angles $= 89^\circ + 1^\circ = 90^\circ$

(Both are acute and complementary).

2. Straight angle = 180°

Right angle = 90°

Supplement angle of straight angle

$= 180^\circ - 180^\circ = 0^\circ$

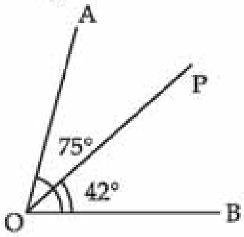
Supplement angle of right angle

$= 180^\circ - 90^\circ = 90^\circ.$

3. $\angle$AOB = 75° (Given)

$\angle$POB = 42° (Given)

Since ∠AOB and ∠POB are complementary



$$\angle POB + \angle AOP = \angle AOB$$

$$42° + \angle AOP = 75°$$

$$\angle AOP = 75° - 42° = 33°.$$

4. Let the first supplementary angle = x

and second supplementary angle

$$= 180° - x$$

According to question,

$$(180 - x) - x = 52°$$

$$180° - 2x = 52°$$

$$-2x = 52° - 180° = -128°$$

$$x = 64°$$

First supplementary angle = 64°

Second supplementary angle = $180° - x$

$$= 180° - 64° = 116°.$$

Angles are 64° and 118°.

5. Let the first complementary angle = $x°$

and second complementary angle

$$= 90° - x$$

According to question,

$$x = 90° - x$$

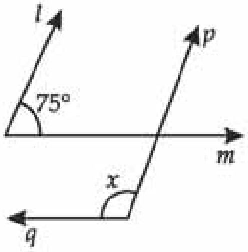
$$2x = 90°$$

$$x = \frac{90°}{2} = 45°.$$

6. No, as ∠1 and ∠2 have no same vertex.

7. $m = q$ (Given)

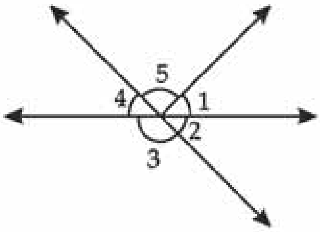
$$x + 75° = 180°$$



$$x = 180° - 75°$$

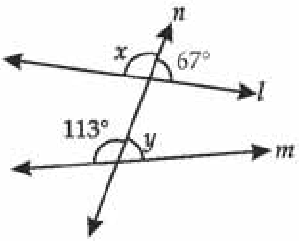
$$x = 105°.$$

8. When two lines intersect, they form two pairs of opposite angles called vertically opposite angles



Also, ∠2 and ∠4, ∠3 and ∠5 + ∠1, ∠2 and ∠3, ∠3 and ∠4 are linear pairs.

9. Yes,



l ∥ m

Let one angle is x and y.

$$67° + x = 180°$$

$$x = 113°$$

$$113° + y = 180°$$

$$y = 67°$$

They are equal to each other, then l is parallel to m.

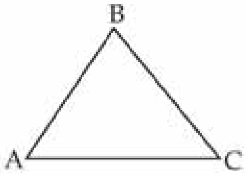
❑❑

Chapter
7

TRIANGLES

WORKSHEET-50

1. (C) In the adjoining figure, the side opposite to the vertex B is CA.



2. (C) One median passes through each vertex of a triangle. So, number of medians is 3.

3. (A) We know that exterior angle of a triangle is equal to the sum of two opposite interior angles.

$$\therefore \quad \angle ACD = \angle BAC + \angle ABC$$
$$= \angle 1 + \angle 2.$$

4. (D) Sum of angles of a triangle

$$= 2 \text{ right angles}$$
$$= 2 \times 90^\circ = 180^\circ.$$

5. (C) $60^\circ + 70^\circ + \angle x = 180^\circ$

(Angle sum property)

$$\Rightarrow \quad \angle x = 180^\circ - 130^\circ = 50^\circ.$$

6. (A) Exterior angle = Sum of two interior opposite angles

or $\quad 112^\circ = 55^\circ + x$

$$\therefore \quad x = 112^\circ - 55^\circ$$
$$= 57^\circ.$$

7. (A) ∵ Exterior angle = Sum of two corresponding interior angles

$$\therefore \quad x = 55^\circ + 50^\circ = 105^\circ.$$

8. (C) $x + x + x = 180^\circ$

(Angle sum property)

$$\Rightarrow \quad 3x = 180^\circ \quad \Rightarrow x = \frac{180^o}{3} = 60^\circ.$$

9. (D) $\quad x = 70^\circ$

(Vertically opposite angles)

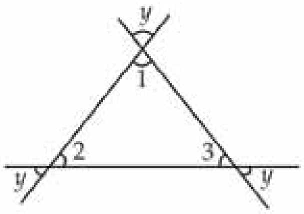
$$x + y + 60^\circ = 180^\circ$$

(Angle sum property)

$$\therefore \quad y = 180^\circ - 60^\circ - 70^\circ = 50^\circ.$$

10. (C) $\angle 1 + \angle 2 + \angle 3 = y + y + y$

$$\Rightarrow \quad 180^\circ = 3y \quad \Rightarrow \quad y = 60^\circ$$



11. (A) ∵ $AB = AC$

$$\therefore \angle C = \angle B = x$$

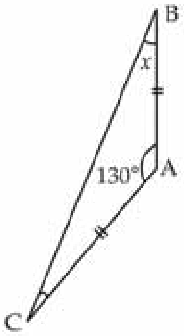
(Angles opposite to equal sides)

Further $\angle A + \angle B + \angle C$

$$= 180^\circ$$

(Angle sum property)

$$\Rightarrow \quad 130^\circ + x + x = 180^\circ$$
$$\Rightarrow \quad x = \frac{180^o - 130^o}{2}$$
$$= 25^\circ.$$



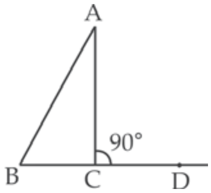
12. (A) $x + y + \angle B = 180^\circ$

(Angle sum property)

$$\Rightarrow \quad x + y = 180^\circ - 90^\circ = 90^\circ$$

$(\because \angle B = 90^\circ)$.

13. (B) Let the given exterior angles is $\angle ACD$.



$\therefore \quad \angle ACD = 90°$

Further $\angle BCA + \angle ACD = 180°$

(Linear pair of angles)

$\therefore \quad \angle BCA = 180° - 90° = 90°$

So Δ ABC is a right-angled triangle.

14. (C) We know that "The sum of any two sides of a triangle is greater than the third side."

$\therefore$ In ΔABC, $AB + BC > CA$

15. (D) 4 cm + 3 cm > 6 cm

$\Rightarrow$ Sum of two sides > Third side.

16. (B) Let the third side be x.

Sum of two sides > Third side

$\Rightarrow \quad 7 + x > 11$

$\Rightarrow \quad x > 4$

$\Rightarrow$ x cannot be less than or equal to 4 cm

$\Rightarrow$ x cannot be 3 cm.

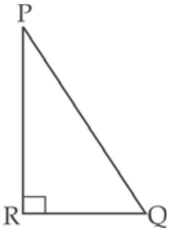
17. (A) $\angle P + \angle Q + \angle R = 180°$

$\Rightarrow \quad \angle R = 180° - 35° - 55° = 90°$

So ΔPQR is a right angled triangle

So, $RP^2 + QR^2 = PQ^2$

(Pythagoras property).



18. (C) $PR^2 = PQ^2 + QR^2$

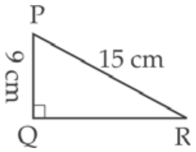
(Pythagoras property)

$\Rightarrow QR^2 = 15^2 - 9^2$

$= 225 - 81$

$= 144 = 12 \times 12$

$\Rightarrow \quad QR = 12$ cm.



WORKSHEET–51

1. A line segment joining the mid-point of a side of a triangle to its opposite vertex is called a median of triangle. A triangle has three medians

2. (*i*) Let the missing angle be x.

Then $40° + 40° + x = 180°$

(Angle sum property)

or $80° + x = 180°$

$\therefore \quad x = 180° - 80° = 100°$.

(*ii*) Let the missing angle be y.

Then $45° + 90° + y = 180°$

(Angle sum property)

$\therefore \quad y = 180° - 45° - 90° = 45°$.

3. (*i*) Sum of two sides

$= BC + CA$

$= 10$ cm $+ 10$ cm $= 20$ cm

$\therefore \quad BC + CA > AB$

So, the given measures are the sides of a triangle.

(*ii*) Sum of two sides

$= AB + BC$

$= 8$ cm $+ 8$ cm $= 16$ cm

$\therefore \quad AB + BC > CA$

So, the given measures are the sides of a triangle.

4. Let the other leg be x.

According to the Pythagoras property of a triangle,

$$x^2 + 12^2 = 13^2$$

$$\therefore \quad x^2 = 13^2 - 12^2 = 169 - 144$$

$$= 25$$

$$\text{or} \quad x^2 = 5^2$$

$$\therefore \quad x = 5 \text{ m.}$$

5. x is the length of one leg of the given right triangle.

$\therefore \quad x^2 + 3^2 = 5^2$

(Pythagoras property)

or $\quad x^2 = 5 \times 5 - 3 \times 3$

or $\quad x^2 = 25 - 9$

or $\quad x^2 = 16 = 4 \times 4$

$\therefore \quad x = 4$ cm.

6. There are three sides in the triangle ABC.

These are AB, BC and CA.

There are three vertices in the triangle ABC. These are A, B and C.

There are three interior angles in the triangle ABC. These are $\angle$A, $\angle$B and $\angle$C.

7. We know that an exterior angle of a triangle is equal to the sum of interior opposite angles.

(*i*) $\quad 105° = 30° + x$

$\therefore \quad x = 105° - 30° = 75°.$

(*ii*) $\quad 120° = x + 40°$

$\therefore \quad x = 120° - 40° = 80°.$

8. A triangle is formed only when the total measure of the three angles is 180°.

(*i*) Total measure of angles

$= \angle A + \angle B + \angle C$

$= 30° + 60° + 90°$

$= 180°$

So, the given measures form a triangle.

(*ii*) Total measure of angles

$= \angle A + \angle B + \angle C$

$= 100° + 70° + 30°$

$= 200°$

So, the given measures do not form a triangle.

9. (*i*) Yes, the triangle is possible because the sum of two sides (5 cm + 12 cm = 17 cm) is greater than the third side (13 cm).

(*ii*) Yes, the triangle is possible because the sum of two sides (3 cm + 6 cm = 9 cm) is greater than the third side (7 cm).

10. x is an exterior angle of ΔBCD

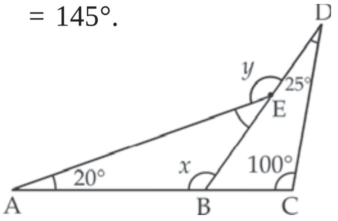
$\therefore \quad x = 100° + 25° = 125°$

y is an exterior angle of ΔABE

$\therefore \quad y = 20° + x = 20° + 125°$

$(\because x = 125°)$

$= 145°.$

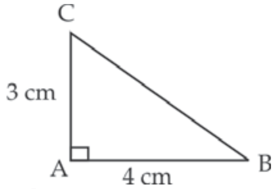


WORKSHEET–52

1. The perpendicular line segment from a vertex of a triangle to its opposite side is called an altitude of a triangle. A triangle has 3 altitudes.

The three altitudes do not always meet in the interior of the triangle.

2. In ΔABC, $\angle$A = 90°



So, BC is hypotenuse

$\therefore \quad BC^2 = AC^2 + AB^2$

(Pythagoras property)

$= 3^2 + 4^2 = 3 \times 3 + 4 \times 4$

$= 9 + 16 = 25$

$= 5 \times 5$

$\therefore \quad BC = 5$ cm.

3. Let the given isosceles triangle be ABC such that

$AB = AC,$

$BC^2 = 72$ sq. m

And $\angle A = 90°$

According to the Pythagoras property,

$BC^2 = AB^2 + AC^2$

or $\quad 72 = AB^2 + AB^2 \quad (\because AB = AC)$

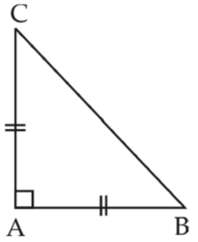
or $\quad 2\ AB^2 = 72$

or $\quad AB^2 = \frac{72}{2} = 36$

$= 6 \times 6$

$\therefore \quad AB = 6$ m

$\therefore \quad AB = AC = 6$ m.



4. (*i*) $x + 55° + 45° = 180°$

(Angle sum property)

or $\quad x + 100° = 180°$

$\therefore \quad x = 180° - 100° = 80°.$

(*ii*) $x + 2x + 30° = 180°$

(Angle sum property)

or $\quad 3x + 30° = 180°$

$\therefore \quad 3x = 180° - 30° = 150°$

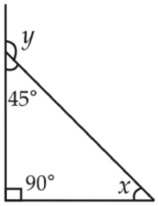
$\therefore \quad x = \frac{150^o}{3} = 50°$

And $\quad 2x = 2 \times 50° = 100°.$

5. (*i*) $\because$ Sum of interior angles = 180°

$\therefore\ 45° + 90° + x = 180°$

$\therefore\ x = 180° - 45° - 90° = 45°$



Now,

$y = x + 90°$

(Exterior angle property)

$= 45° + 90° = 135°.$

(*ii*) According to angle sum property of a triangle,

$50° + x + 20° + x = 180°$

or $\quad 2x + 70° = 180°$

$\therefore \quad 2x = 180° - 70°$

$= 110°$

$\therefore \quad x = \frac{110^o}{2}$

$x = 55°$

Now, $\quad y = 50° + x$

(Exterior angle property)

$= 50° + 55° \quad (\because x = 55°)$

$= 105°.$

6. (*i*) An exterior angle of a triangle is the sum of interior opposite angles. It is called 'exterior angle property'.

$110° = x + 30°$

(Exterior angle property)

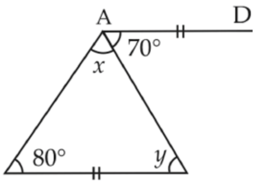
$\therefore \quad x = 110° - 30° = 80°.$

(*ii*) AD $\parallel$ BC and AC is transversal

$\therefore\ y = 70°$ (Alternate interior angles)

$x + y + 80° = 180°$

(Angle sum property)



or $\quad x + 70° + 80° = 180°$

$(\because y = 70°)$

or $\quad x + 150° = 180°$

$\therefore \quad x = 180° - 150°$

$= 30°$

7. (*i*) We know that according to the angle sum property of a triangle, "Sum of interior angles of a triangle is 180°".

Here $\angle P + \angle Q + \angle R$

$= 65° + 35° + 70°$

$= 170°$

Which is not 180°, so the given angles do not form a triangle.

(*ii*) We know that "To form a triangle, the sum of any two sides must be greater than the third side."

Here $\overline{YZ} + \overline{XZ} = 25 \text{ cm} + 25 \text{ cm}$

$= 50 \text{ cm}$

$\therefore \quad \overline{YZ} + \overline{XZ} = \overline{XY}$

Clearly, $\overline{YZ} + \overline{XZ}$ is not greater than $\overline{XY}$.

So, the given lengths of sides do not form a triangle.

WORKSHEET–53

1. No, because in this case sum of measures of the three angles is more than 180°.

2. Let the required angle be x and the other two angles be y and z.

$\therefore \quad x = y + z$

Also $\quad x + y + z = 180°$

(Angle sum property)

or $\quad x + x = 180° \quad (\because x = y + z)$

or $\quad 2x = 180°$

$\therefore \quad x = \dfrac{180^o}{2}$

or $\quad x = 90°.$

3. Let each of the two equal angles be x and the third one be y. Then

$x = 2y$

And $\quad x + x + y = 180°$

(Angle sum property)

or $\quad 2y + 2y + y = 180°$

or $\quad y = \dfrac{180^o}{5} = 36°$

$\therefore \quad x = 2y = 2 \times 36° = 72°$

Hence, all the angles are 72°, 72° and 36°.

4. Angles are in the ratio 3 : 4 : 1

Let the angles be $3x$, $4x$ and x

$\therefore \quad 3x + 4x + x = 180°$

(Angle sum property)

$\therefore \quad x = \dfrac{180^o}{8} = 22.5°$

$\therefore \quad 3x = 3 \times 22.5° = 67.5°$

And $\quad 4x = 4 \times 22.5° = 90°$

Hence, the angles are 67.5°, 90° and 22.5°.

5. Let the required angle be x.

We know that one angle of a right triangle is of 90°.

Now, $\quad x + 90° + 72° = 180°$

or $\quad x + 162° = 180°$

$\therefore \quad x = 180° - 162°$

or $\quad x = 18°.$

6. Let each of three equal angles be x.

Then $\quad x + x + x = 180°$

(Angle sum property of a triangle)

or $\quad 3x = 180°$

$\therefore \quad x = \dfrac{180^o}{3} = 60°.$

So, all the angles are 60°, 60° and 60°.

7. No, it is not possible because in this case the third angle is of 0° but measure of each of the angles of a triangle must be a positive quantity.

8. The two angles are in the ratio 2 : 8

Let these angles be $2x$ and $8x$.

Now $2x + 8x + 80° = 180°$

(Angle sum property of a triangle)

or $10x = 180° – 80° = 100°$

$$\therefore \quad x = \frac{100^o}{10} = 10°$$

$\therefore \quad 2x = 2 \times 10° = 20°$

And $8x = 8 \times 10° = 80°$

Thus, the measures of the angles are 80°, 20° and 80°.

9. (*i*) Sum of angles $= 68° + 49° + 63°$

$= 180°$

We know that total measure of three angles of a triangle is 180°.

So, given angles form a triangle.

(*ii*) Sum of angles $= 47° + 72° + 64°$

$= 183°$

We know that total measure of three angles of a triangle is 180°.

So, given angles do not form a triangle.

10. (*i*) Let the third angle be x.

$30° + 80° + x = 180°$

(Angle sum property)

or $110° + x = 180°$

$\therefore \quad x = 180° – 110° = 70°.$

(*ii*) Let the third angle be y.

$40° + 40° + y = 180°$

or $80° + y = 180°$

$\therefore \quad y = 180° – 80° = 100°.$

11. (*i*) Sum of interior angles of a triangle $= 180°$

(Angle sum property)

$\therefore \quad 60° + 75° + x = 180°$

or $135° + x = 180°$

$\therefore \quad x = 180° – 135°$

or $x = 45°.$

(*ii*) An exterior angle of a triangle

= Sum of interior opposite angles

(Exterior angle property)

$\therefore \quad 110° = 50° + x$

or $50° + x = 110°$

$\therefore \quad x = 110° – 50°$

or $x = 60°.$

WORKSHEET – 54

1. Yes, each angle may be 60°.

2. Measure of each angle of an equilateral triangle is 60°.

3. Let the measure of the third angle be x

So $80° + 10° + x = 180°$

(Angle sum property of a triangle)

or $90° + x = 180°$

$\therefore \quad x = 180° – 90° = 90°.$

As one angle of the triangle is 90°, the triangle is right-angled triangle.

4. (*i*) $\angle A$ and $\angle C$ are angles opposite to the equal sides.

$\therefore \quad \angle A = \angle C = x$

Now $\angle A + \angle B + \angle C = 180°$

(Angle sum property)

or $x + 90° + x = 180°$

$$\therefore \quad x = \frac{90^o}{2}$$

$= 45°.$

(*ii*) Sides AC and AB are opposite to the equal angles of given triangle.

$\therefore \quad AC = AB$

or $\quad x = 4.$

5. Let the two angles which are in the ratio 3 : 8 be $3x$ and $8x$ respectively.

Now $\quad 70° + 3x + 8x = 180°$

(Angle sum property of a triangle)

$\therefore \quad 11x = 180° - 70°$

$= 110°$

$\therefore \quad x = \dfrac{110°}{11} = 10°$

$\therefore \quad 3x = 3 \times 10° = 30°$

and $\quad 8x = 8 \times 10° = 80°$

Thus, the measures of the other two angles of the triangle are 30° and 80°.

6. Let the measures of the triangle be $2x$, $3x$, and $5x$.

Now $\quad 2x + 3x + 5x = 180°$

(Angle sum property)

or $\quad 10x = 180°$

$\therefore \quad x = \dfrac{180^o}{10} = 18°$

$\therefore$ $2x = 2 \times 18° = 36°$; $3x = 3 \times 18° = 54°$; and $5x = 5 \times 18° = 90°$.

Thus, the required angles are 36°, 54° and 90°.

7. $\quad x + 80° + 50° = 180°$

(Angle sum property of a triangle)

or $\quad x + 130° = 180°$

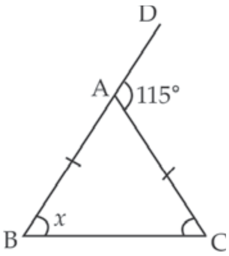
$\therefore \quad x = 180° - 130° = 50°.$

8. (*i*) Two sides of the given triangle are equal.

$\therefore \quad x = 40°$

(Angles opposite to equal sides)

(*ii*) In the given figure AB = AC



$\therefore \quad \angle C = \angle B = x$

(Angles opposite to equal sides)

Further $\angle DAC = \angle B + \angle C$

(Exterior angle property)

or $\quad 115° = x + x = 2x \quad (\because \angle C = x)$

$\therefore \quad x = \dfrac{115^o}{2} = 57.5°.$

9. Let each of the required angles be x.

We know that an exterior angle of a triangle is equal to the sum of interior opposite angles.

$\therefore \quad 100 = x + x$

or $\quad 2x = 100°$

$\therefore \quad x = 50°.$

10. Let $\quad \angle A = x$ (see figure)

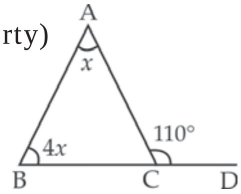
Then, $\quad \angle B = 4x$

Now, $\angle ACD = \angle A + \angle B$

(Exterior angle property)

or $110° = x + 4x = 5x$

$\therefore \quad x = \dfrac{110^o}{5} = 22°$



$\therefore \quad 4x = 4 \times 22° = 88°$

Further $\angle BCA + \angle ACD = 180°$

(Linear pair)

or $\quad \angle BCA + 110° = 180°$

$\therefore \quad \angle BCA = 180° - 110°$

$= 70°$

Thus, the required angles are 22°, 88° and 70°.

11. (*i*) Sum of the given angles

$= 70° + 80° + 30° = 180°.$

We know that 'The total measure of angles of a triangle is 180°.'

So, the given measures can be the three angles of a triangle.

(*ii*) Sum of the given angles

$= 36° + 48° + 80° = 164°$

We know that 'The total measure of angles of a triangle is 180°.'

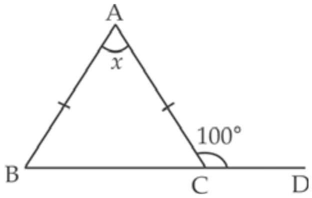
So, the given measures cannot be the angles of a triangle.

WORKSHEET–55

1. No. In this case, angle sum property of a triangle do not hold.

2. $\because \quad AB = AC$

$\therefore \quad \angle ACB = \angle ABC$



But $\angle ACB + 100° = 180°$

$\therefore \quad \angle ACB = 180° - 100° = 80°$

Now $\angle ACB + \angle ABC + x = 180°$

(Angle sum property)

or $\quad 80° + 80° + x = 180°$

$(\because \angle ACB = \angle ABC)$

$\therefore \quad x = 180° - 160° = 20°.$

3. In the given figure, 70° is an exterior angle and interior angles opposite to it are $3x$ and $4x$.

$\therefore \quad 70° = 3x + 4x$

(Exteriror angle property)

or $\quad 7x = 70°$

$\therefore \quad x = \frac{70°}{7} = 10°.$

4. Yes. In every triangle at least two of the angles are acute.

5. (*i*) $\angle A + \angle B + \angle C = 180°$

(Sum of angles of a triangle is 180°)

$\Rightarrow \quad 70° + 30° + \angle C = 180°$

$\Rightarrow \quad \angle C = 180° - 100°$

$= 80°.$

(*ii*) $\angle A + \angle B + \angle C = 180°$

(Sum of angles of a triangle is 180°)

$\Rightarrow \quad 120° + 20° + \angle C = 180°$

$\Rightarrow \quad \angle C = 180° - 140°$

$= 40°.$

6. (*i*) Given triangle is a right triangle (see figure).

$\therefore \quad x^2 = 3^2 + 4^2$

(Pythagoras property)

$= 9 + 16 = 25 = 5 \times 5$

$\therefore \quad x = 5$ cm.

(*ii*) Given triangle is a right triangle

$\therefore \quad x^2 + 9^2 = 15^2$

or $\quad x^2 = 15^2 - 9^2$

$= 15 \times 15 - 9 \times 9$

$= 225 - 81 = 144$

$= 12 \times 12$

$\therefore \quad x = 12$ cm.

7. (*i*) AB + BC = 7 cm + 24 cm = 31 cm

Here, AB + BC > CA

i.e., sum of lengths of two sides > length of third side.

So, the given measures are the sides of a triangle ABC.

(*ii*) PQ + QR = 3 cm + 4 cm = 7 cm

Here, PQ + QR > PR

i.e., sum of lengths of two sides > length of third side.

So, the given measures are the sides of a triangle PQR.

8. (*i*) Let in a triangle ABC;

AB = 9, BC = 60 and CA = 61

Here $CA^2 = 61^2 = 61 \times 61 = 3721$

And $AB^2 + BC^2 = 9^2 + 60^2$

$= 9 \times 9 + 60 \times 60$

$= 81 + 3600 = 3681$

Clearly, $CA^2 \neq AB^2 + BC^2$

So, the given measures will not form a triplet.

(*ii*) Let in a triangle PQR;

PQ = 7, QR = 10 and RP = 6.

Here $QR^2 = 10^2 = 10 \times 10 = 100$

And $PQ^2 + RP^2 = 7^2 + 6^2$

$= 7 \times 7 + 6 \times 6$

$= 49 + 36 = 85$

Clearly, $QR^2 \neq PQ^2 + RP^2$

So, the given measures will not form a triplet.

(*iii*) Let in a triangle XYZ;

XY = 1.5,

YZ = 2 and ZX = 2.5

Here, $ZX^2 = 2.5^2 = 2.5 \times 2.5$

$= 6.25$

And $XY^2 + YZ^2 = 1.5^2 + 2^2$

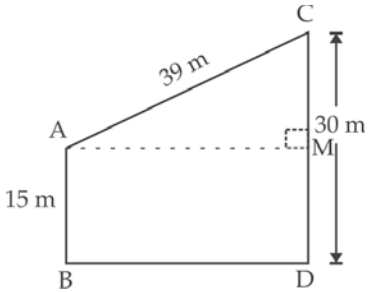
$= 1.5 \times 1.5 + 2 \times 2$

$= 2.25 + 4 = 6.25$

Clearly, $ZX^2 = XY^2 + YZ^2$

So, the given measures will form a triplet and the right angle is at the vertex Y, *i.e.*, opposite to side of length 2.5.

9. Let AB and CD be the two poles. Draw AM perpendicular to CD from A to meet CD at M.



$\therefore$ AM = BD, MD = AB = 15 m,

CM = CD – MD = 30 – 15 = 15 m,

And Δ AMC is a right triangle right at M.

$\therefore \; AC^2 = AM^2 + CM^2$

(Pythagoras property)

or $39^2 = AM^2 + 15^2$

or $AM^2 = 39^2 - 15^2 = 39 \times 39 - 15 \times 15$

$= 1521 - 225 = 1296 = 36 \times 36$

$\therefore$ AM = 36 m

$\therefore$ BD = 36 m ($\because$ AM = BD)

So, the distance between the feet of the poles is 36 m.

10. (*i*) Sum of angles $= \angle A + \angle B + \angle C$

$= 40° + 50° + 80°$

$= 170°$

Since, the sum of angles is not 180°, therefore, the given angles cannot form a triangle.

(*ii*) Sum of angles $= \angle A + \angle B + \angle C$

$= 75° + 85° + 35°$

$= 195°.$

Since, the sum of angles is not 180°, therefore, the given angles cannot form a triangle.

11. $\angle A + \angle B + \angle ACB = 180°$

(Angle sum property of a triangle)

or $x + 3x + 60° = 180°$

or $4x = 180° - 60° = 120°$

$\therefore \quad x = \frac{120^o}{4} = 30°$

$\therefore \quad 3x = 3 \times 30° = 90°$

So, all three angles are 30°, 90° and 60°.

WORKSHEET–56

1. (*i*) Let the measure of the third angle be x.

$59° + 45° + x = 180°$

(Angle sum property)

or $\quad 104° + x = 180°$

$\therefore \quad x = 180° - 104° = 76°.$

(*ii*) Let the measure of the third angle be y.

$35° + 116° + y = 180°$

or $\quad 151° + y = 180°$

$\therefore \quad y = 180° - 151° = 29°.$

2. Let the required angle be of measure x.

Since, the triangle is a right triangle, therefore, one of its angles is of measure 90°.

Now, $53° + 90° + x = 180°$

(Angle sum property)

or $\quad 143° + x = 180°$

$\therefore \quad x = 180° - 143° = 37°.$

3. Let one of equal angles be x.

Then third angle $= x + 30°$

So, $\quad x + x + x + 30° = 180$

or $\quad 3x = 150 \quad$ or $\quad x = 50°$

Thus required angles are of measures 50°, 50° and 80°.

4. (*i*) Angles x and 70° (see figure) are vertically opposite angles.

$\therefore \quad x = 70°$

Now $\quad x + y + 30° = 180°$

(Angle sum property)

or $\quad 70° + y + 30° = 180°$

$(\because x = 70°)$

$\therefore \quad y = 180° - 100°$

$= 80°.$

(*ii*) $y + 30° + 100° = 180°$

(Angle sum property)

$\therefore \quad y = 180° - 130° = 50°$

Further, $\quad x = y + 30°$

(Exterior angle property)

or $\quad x = 50° + 30° = 80°.$

5. (*i*) x is the hypotenuse of the given right-angled triangle.

$\therefore \quad x^2 = 15^2 + 8^2$

(Pythagoras property)

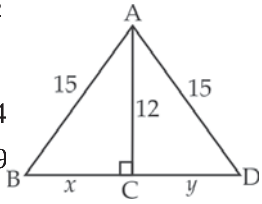
$= 15 \times 15 + 8 \times 8$

$= 225 + 64 = 289 = 17 \times 17$

$\therefore \quad x = 17.$

(*ii*) In right ΔABC, $BC^2 + AC^2 = AB^2$

(Pythagoras property)



or $\quad x^2 + 12^2 = 15^2$

$\therefore \quad x^2 = 15^2 - 12^2$

$= 225 - 144$

$= 81 = 9 \times 9$

$\therefore \quad x = 9$

Similarly, in right ΔADC,

$y^2 = 15^2 - 12^2 = 9 \times 9$

$\therefore \quad y = 9.$

6. (*i*) In ΔXYZ

$\angle X + \angle Y + \angle Z = 180°$

(Sum of angles of a triangle is 180°)

or $\quad 60° + 60° + \angle Z = 180°$

$\therefore \quad \angle Z = 180° - 120°$

$= 60°.$

(*ii*) In ΔLMN,

$\angle L + \angle M + \angle N = 180°$

or $\quad 90° + 45° + \angle N = 180°$

$\therefore \quad \angle N = 180° - 135°$

$= 45°.$

7. Let the interior opposite angles are $2x$ and $3x$.

We know that one exterior angle of a triangle is equal to the sum of interior opposite angles.

$\therefore \quad 125° = 2x + 3x$

$\Rightarrow \quad x = \frac{125°}{5} = 25°$

$\therefore \quad 2x = 2 \times 25° = 50°$

and $\quad 3x = 3 \times 25° = 75°$

Now, the third angle of the triangle

$= 180° - (50° + 75°)$

(Angle sum property)

$= 180° - 125° = 55°$

Thus, all the angles of the triangle are of measure 50°, 75° and 55°.

8. (*i*) y is an exterior angle and its interior opposite angles are of measures 30° and 60°.

$\therefore \quad y = 30° + 60°$

(Exterior angle property)

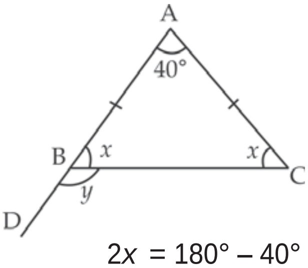
$= 90°$.

(*ii*) In ΔABC, $AB = AC$

$\therefore \angle ACB = \angle ABC = x$ (say)

Now $40° + x + x = 180°$

(Angle sum property)



$\therefore \quad 2x = 180° - 40° = 140°$

$\therefore \quad x = \frac{140^o}{2} = 70°$

Now, $\quad y = 40° + x$

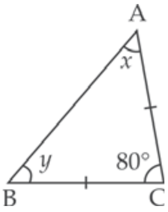
(Exterior angle property)

$= 40 + 70° = 110°$.

9. (*i*) Let $\angle ABC = y$

Now $x = y$

(Angles opposite to equal sides)



Using angle sum property of a triangle, we get

$x + y + 80° = 180°$

or $\quad x + x + 80° = 180°$

$(\because x = y)$

or $\quad 2x = 180° - 80° = 100°$

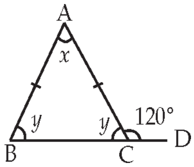
$\therefore \quad x = 50°$.

(*ii*) $\angle ABC = \angle ACB = y$ (say)

$(\because AC = AB)$

$y + 120° = 180°$ (Linear pair)

$\therefore \quad y = 180° - 120° = 60°$.

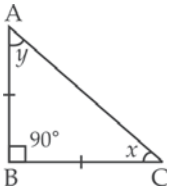


Now $\quad 120° = x + y$

(Exterior angle property)

$\therefore x = 120° - 60° = 60°$.

(*iii*) Let $\quad \angle A = y$



Here $\quad x = y$

$(\because AB = BC)$

Now, $x + y + 90° = 180°$

(Angle sum property)

$\therefore 2x = 180° - 90° = 90° \quad (\because x = y)$

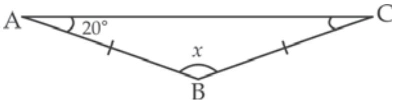
$x = 45°$.

(*iv*) $\angle C = \angle A = 20° \qquad (\because AB = BC)$

Now,

$x + 20° + 20° = 180°$

(Angle sum property)



$\therefore \quad x = 180° - 40° = 140°$.

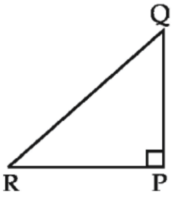
WORKSHEET–57

1. Right angle triangle.

2. No, because sum of the angles of triangle is 180°.

3. Opposite of right angle in a triangle is the longest side of a triangle.

So, QR is the longest side.



4. $\angle B = \angle C$ $(\because AB = AC)$

$\angle B + \angle C = 180° - \angle A$

$\angle B + \angle B = 180° - \angle A$

$(\because \angle B = \angle C)$

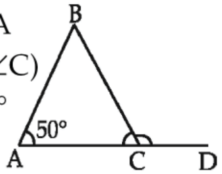
$2\angle B = 180° - 50°$

$2\angle B = 130°$

$\angle B = 65°$

$\angle BCD = \angle A + \angle B$

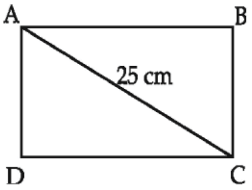
$\angle BCD = 50° + 65° = 115°$.



5. ABCD is a rectangle.

$AC = 25$ cm (Diagonal)

$BC = 24$ cm (Length)



AB (Breadth) $= \sqrt{AC^2 - BC^2}$

$= \sqrt{25^2 - 24^2}$

$= \sqrt{625 - 576} = \sqrt{49}$

$= 7$ cm

Perimeter of rectangle $= 2(l + b)$

$= 2(24 + 7)$

$= 2 \times 31 = 62$ cm.

6. Length of two sides of a triangle are 10 cm and 14 cm

$14 + 10 = 24$

$14 - 10 = 4$

Between 4 cm and 24 cm.

7. Let the two angles of the triangle be $2x°$ and $3x°$

$65° + 2x + 3x = 180°$

$65° + 5x = 180°$

$5x = 180° - 65°$

$5x = 115°$

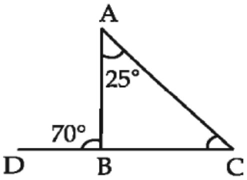
$x = 23°$

First angle $2x = 2 \times 23° = 46°$

Second angle $3x = 3 \times 23 = 69°$

Angles are 46° and 69°.

8. Let ABC be a triangle and ABD is an exterior angle of the triangle.



$\angle ABD = 70°$ (Given)

$\angle BAC = 25°$ (Given)

$\angle ABD = \angle BAC + \angle ACB$

$70° = 25° + \angle ACB$

$\angle ACB = 70° - 25° = 45°$

$\angle ABC = 180° - 70° = 110°$

(Because $\angle ABD$ and $\angle ABC$ are linear angle)

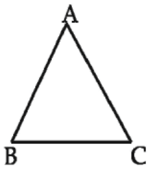
9. Let $\angle B = x$

$\angle A$ is 25° more than $\angle B$

$\angle A = x + 25°$

$\angle C$ is 10° less than $\angle B$

$\angle B = x - 10°$



Sum of angles of triangle $= 180°$

$\angle A + \angle B + \angle C = 180°$

$x + 25° + x + x - 10 = 180°$

$3x + 15° = 180°$

$3x = 165°$

$x = 55°$

Then $\angle A = x + 25 = 55° + 25° = 80°$

$\angle C = x - 10 = 55 - 10 = 45°$

$\therefore \angle A = 80°, \angle B = 55°, \angle C = 45°$.

10. Let ABC be a isosceles right-angled triangle whose AC is its hypotenuse.

So, $AC > AB$ or BC

$AB = BC$

According to question,

$$AC^2 = AB^2 + BC^2$$

$$72 = AB^2 + BC^2$$

$$72 = AB^2 + AB^2 \quad (\because AB = BC)$$

$$72 = 2AB^2$$

$$AB^2 = 36$$

$$AB = 6 \text{ cm.}$$

11. Let three angles of a triangle are $2x°$, $3x°$ and $5x°$

Sum of angles of triangle is 180°

$$2x° + 3x° + 5x° = 180°$$

$$10x° = 180°$$

$$x = 18°$$

Therefore, the measures of the three angles of the triangle are.

$2 \times 18° = 36°$; $3 \times 18° = 54°$, $5 \times 18° = 90°$

36°, 54° and 90° right-angled triangle, scalene triangle.

❑❑

Chapter

8 CONGRUENCE

WORKSHEET–58

1. (A) If line segments are congruent, then their lengths are equal.

$\therefore \overline{AB} = \overline{CD}$.

2. (C) The symbol of congruence in geometry is ≅ only.

3. (B) Measures of congruent angles are equal.

$\therefore \quad m\angle A = m\angle B$

or $\quad m\angle A - m\angle B = 0.$

4. (C) If $\Delta ABC \cong \Delta QRP$, then

$\angle A = \angle Q, \angle B = \angle R$ and $\angle C = \angle P$.

Therefore, $\angle C$ corresponds to $\angle P$.

5. (D) If $\Delta PQR \cong \Delta ABC$, then

$\angle P = \angle A, \angle Q = \angle B$ and $\angle R = \angle C$.

6. (B) AAA is not a criterion for congruence of two triangles.

7. (D) Observing the figures, we obtain

AB = PR, BC = RQ and CA = QP.

So, by SSS criterion for congruence,

$\Delta ABC \cong \Delta PRQ$.

8. (A) $\because \angle 1 = \angle 2, \angle 3 = \angle 4$ and included side AC is common.

$\therefore \Delta ABC \cong \Delta ADC$. (ASA criterion).

9. (C) AP = DP, $\angle APB = \angle DPC$, PB = PC

So, by SAS congruence criterion

$\Delta APB \cong \Delta DPC$.

10. (A) $\Delta LMN \cong \Delta JKT$

$\Rightarrow$ LM = JK, MN = KT, LN = JT.

11. (A) From the given figures, we have

AB = DE, BC = EF, AC = DF

So, we will use SSS criterion for congruence.

12. (B) Observing the given figures, we get

$\angle B$ and $\angle P$ are right angles such that

$\angle B = \angle P$

AC and RQ are hypotenuses such that

AC = RQ

AB and RP are sides such that

AB = RP

So, here criterion for congruence is RHS.

13. (D) $\angle D = \angle E = 55°$

$\Rightarrow \quad \angle F = 180° - 55° - 55° = 70°$

$\angle R = \angle F = 70°$.

14. (B) $\because \Delta LMN \cong \Delta XYZ$

$\therefore \quad \overline{LN} = \overline{XZ}$

15. (C) Since measures of congruent angles are equal, so, the measure of the other one will also be 75°.

16. (A) If the radii of two circles are equal, then they are congruent.

17. (D) Observing the figure, we get by SAS criterion of congruence

$\Delta PQR \cong \Delta CBA$.

18. (A) Remaining angle of ΔABC

$= 180° - 95° = 85°$

Now, the measure of required angle which corresponds to this angle is equal to 85°.

WORKSHEET–59

1. ∵ AB ≅ CD

∴ AB = CD

∴ CD = 8 cm. (∵ AB = 8 cm)

2. ∵ AB ≅ CD

∴ AB = CD

Adding BC to both sides, we get

AB + BC = BC + CD

AC = BD

Since the lengths of line segments AC and BD are equal, so they will be congruent.

Therefore, AC ≅ BD is true.

3. (*i*) In ΔABC and ΔDEF;

∠B = ∠E = 90°, $\overline{CA} = \overline{DF}$ and $\overline{BC} = \overline{ED}$.

So, Δ ABC ≅ Δ FED

(RHS congruence criterion)

(*ii*) In Δ LMO and Δ MNO;

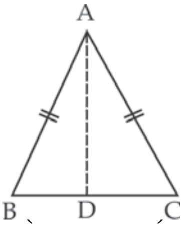
∠MOL = ∠MON = 90°,

$\overline{ML} = \overline{MN}$ and OL = ON.

So, Δ LMO ≅ Δ NMO.

(RHS congruence criterion)

4. Join AD.



In ΔABD and ΔACD,

AB = AC (Given)

BD = CD

(D is mid-point of BC)

AD = AD

So, by SSS congruence criterion,

Δ ABD ≅ Δ ACD.

5. In ΔPQR and ΔPSR,

∠PRQ = ∠PRS (Each 90°)

PQ = PS

QR = SR

So, Δ PQR ≅ Δ PSR (RHS congruence criterion)

6. In ΔPQR and ΔPMR,

∠Q = ∠M (Each 90°)

PR = PR (Common)

PQ = PM (Given)

∴ ΔPQR ≅ ΔPMR

(RHS congruence criterion)

So, QR = MR. (CPCT)

7. (*i*) ∵ $\overline{PQ} = \overline{SR}$ and $\overline{PS} = \overline{QR}$

∴ $\overline{PQ} \cong \overline{SR}$ and $\overline{PS} \cong \overline{QR}$

(*ii*) Since $\overline{AB} = \overline{BC} = \overline{CD} = \overline{DA}$

AB, BC, CD and DA are congruent to one another.

(*iii*) ∵ $\overline{CD} = \overline{DE} = \overline{EC}$

So $\overline{CD}$, $\overline{DE}$ and $\overline{EC}$ are congruent to one another

(*iv*) ∵ $\overline{NM} = \overline{NO}$

∴ $\overline{NM} \cong \overline{NO}$

8. (*i*) In ΔABC and ΔPQR;

∠A = ∠P, $\overline{AC} = \overline{PR}$ and ∠C = ∠R

So, by ASA congruence criterion,

Δ ABC ≅ Δ PQR.

(*ii*) In ΔABC and ΔPQR;

∠B = ∠Q = 90°,

hypotenuse $\overline{CA}$ = hypotenuse $\overline{PR}$

and side $\overline{BC}$ = side $\overline{QP}$

So, by RHS congruence criterion,

Δ ABC ≅ Δ RQP

(*iii*) In Δ ABC and Δ PQR;

∠A = ∠P, $\overline{AC} = \overline{PR}$ and ∠C = ∠R

So, by ASA congruence criterion,

Δ ABC ≅ Δ PQR

Also, Δ ABC ≅ Δ RQP

(*iv*) In ΔABC and ΔPQR;

$\overline{AB} = \overline{QR}$, $\overline{BC} = \overline{RP}$

and $\overline{CA} = \overline{PQ}$

So, by SSS congruence criterion

ΔABC ≅ ΔQRP.

9. (*i*) ΔPRM ≅ ΔQRM

(SSS congruence criterion)

∴ RP = RQ. (CPCT)

(*ii*) Δ MNR ≅ Δ SQR

(SSS congruence criterion)

RM = RS. (CPCT)

(*iii*) Δ AOB ≅ Δ DOC

(SAS congruence criterion)

∴ OB = OC. (CPCT)

(*iv*) Δ ABC ≅ Δ PQR

(RHS congruence criterion)

∴ AC = PR. (CPCT)

WORKSHEET–60

1. In ΔABC and ΔPQR,

∠B = ∠Q (Each 90°)

Hypotenuse AC = Hypotenuse PR

(Given)

Side BC = Side QR (Given)

So, by RHS congruence criterion, we have

Δ ABC ≅ Δ PQR.

2. According to the given conditions, it is clear that ‘the three sides of one triangle are equal to the three corresponding sides of another triangle”. Then the triangles are congruent by SSS congruence criterion.

i.e., Δ ABC ≅ DEF.

(SSS congruence criterion)

3. In ΔAOC,

∠A + ∠C + ∠AOC = 180°

(Angle sum property)

∠A = 180° – 100° – 20° = 60°

Similarly, in ΔBOD

∠B = 180° – 20° – 60° = 100°

Now, in ΔAOC and ΔBOD,

∠A = ∠D = 60°

AC = BD = 4 cm

∠C = ∠B = 100°

∴ Δ AOC ≅ Δ DOB

(ASA congruence criterion)

4. (*i*) In ΔABD and ΔBAC,

∠BAD = ∠ABC (Each 90°)

BD = AC (Given)

AB = BA. (Common side)

(*ii*) The three pairs of equal parts obtained in part (*i*) satisfy the conditions of RHS criterion of congruence for Δ BAD and Δ ABC.

i.e. Δ BAD ≅ Δ ABC

∴ ∠D = ∠C

(Corresponding parts of congruent triangles are equal)

(*iii*) From the part (*ii*),

Δ ABD ≅ Δ BAC

∴ AD = BC

(Corresponding parts of congruent triangles are equal)

5. (*i*) In ΔABD and ΔCBD,

$\angle A = \angle C$ (Each 90°)

Hypotenuse AD = Hypotenuse CD (Given)

Side AB = Side BC. (Given)

(*ii*) The three pairs of equal parts obtained in Part (*i*) satisfy the conditions of RHS criterion of congruence for ΔABD and ΔCBD under the correspondence

$ABD \leftrightarrow CBD$

$\therefore$ $\Delta\ ABD \cong \Delta\ CBD$.

(*iii*) $\Delta ABD \cong \Delta CBD$ [From part (*ii*)]

Since corresponding parts of congruent triangles are equal.

$\therefore$ $\angle ABD = \angle CBD$.

Therefore, BD bisects $\angle ABC$.

WORKSHEET–61

1. Since, AP and BQ both are perpendiculars on AB

$\therefore$ $AP \parallel BQ$.

Further $AP \parallel BQ$ and PQ is transversal.

$\therefore$ $\angle P = \angle Q$

(Alternate interior angles)

AP = BQ (Given)

$\angle A = \angle B$ (Each 90°)

$\therefore$ $\Delta\ APO \cong \Delta\ BQO$.

(ASA congruence criterion)

So, AO = BO (CPCT)

$\Rightarrow$ O is the mid-point of AB

And PO = QO (CPCT)

$\Rightarrow$ O is the mid-point of PQ.

2. In Δ ABC and Δ ADC,

BC = AD (Given)

$\angle BCA = \angle CAD$

(Alternate interior angles)

AC = AC (Common)

$\therefore$ $\Delta ABC \cong \Delta CDA$

(SAS congruence criterion)

So, AB = DC. (CPCT)

3. (*i*) In ΔLMN, LN = MN

$\therefore$ $\angle LMN = \angle L$

(Angles opposite to equal sides are equal)

Further $\angle LMN + \angle L + \angle N = 180°$

(Angle sum property)

or $2\angle L = 180° - 33° = 147°$

$(\because \angle N = 33°)$

$\therefore$ $\angle L = \dfrac{147^o}{2} = 73.5°$

Now $x = \angle N + \angle L$

(Exterior angle property)

$= 33° + 73.5° = 106.5°$.

(*ii*) In the given figure, $\angle QPR$ and 70° form a linear pair

$\therefore \angle QPR = 180° - 70° = 110°$

$\because$ $\angle Q$ and $\angle PRQ$ are opposite to equal sides

$\therefore$ $\angle Q = \angle PRQ$

Now $\angle Q + \angle PRQ + \angle QPR = 180°$

(Angle sum property)

or $2\angle Q + 110° = 180°$

$\therefore$ $\angle Q = \dfrac{70^o}{2} = 35°$

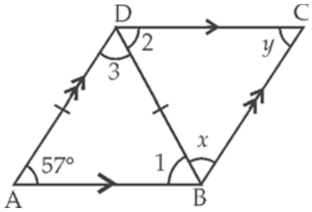
$x = \angle QPR + \angle Q = 110° + 35° = 145°$.

(Exterior angle property)

4. (*i*) In ΔABD, AD = BD

$\therefore \angle 1 = 57°$ (Angles opposite equal sides)

Further $AB \parallel DC$ and BD is transversal.



∴ ∠2 = ∠1 = 57°

(Alternate interior angles)

∠3 = 180° – 57° – 57°

(Angle sum property for ΔABD)

= 66°

AD ∥ BC and BD is transversal

∴ x = ∠3 = 66°

(Alternate interior angles)

y = 180° – 57° – 66° = 57°

(Angle sum property for Δ BCD)

(*ii*) MN ∥ QR and PQ is transversal

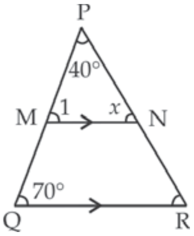
∴ ∠1 = 70° (Corresponding angles)

∠1 + x + 40° = 180°

(Angle sum property for ΔMNP)

or 70° + x + 40° = 180°

∴ x = 180° – 110° = 70°



5. (*i*) AB = CD, ∠ABE = ∠DCE, BE = CE

Thus, two sides and the angle included between them of ΔABE are equal to two corresponding sides and the angle included between them of ΔCDE. So, ΔABE and ΔCDE are congruent under the correspondence.

ABE ↔ DCE

∴ Δ ABE ≅ Δ DCE

(*ii*) ∠A = ∠E, AC = EF, ∠C = ∠F

Thus, two angles and the included side of ΔABC are equal to two corresponding angles and the included side of ΔEFD.

So, Δ ABC and Δ EFD are congruent under the correspondence.

ABC ↔ EDF

∴ Δ ABC ≅ Δ EDF.

6. (*i*) ∠C = 180° – (30° + 70°) = 80°

(Angle sum property for Δ ABC)

∠B = ∠E = ∠Q = 30°

BC = EF = QP = 2 cm

∠C = ∠F = ∠P = 80°

So ΔABC, ΔDEF and ΔPQR are congruent under the correspondence ABC ↔ DEF ↔ RQP by ASA congruent criterion.

(*ii*) In ΔMPQ,

∠P = 180° – (60° + 45°)

= 75°

In Δ SBD and Δ QMP,

∠S = ∠P = 75°

SD = MN = 8 cm

∠D = ∠M = 45°

∴ Δ SDB ≅ Δ PMQ

(ASA congruence criterion)

In Δ COG and Δ KLR,

∠C = ∠L = 60°

CO = LR = 8 cm

∠O = ∠R = 45°

∴ Δ COG ≅ Δ LRK.

(ASA congruence criterion)

7. In ΔABC and Δ CDE,

$BC = CD$ (Given)

$\angle BCA = \angle DCE$

(Vertically opposite angles)

$AC = EC$ (Given)

So, by SAS congruence criterion,

$\Delta ABC \cong \Delta EDC$.

WORKSHEET–62

1. AB ∥ CD and BC is transversal

$\therefore \angle B = \angle C$ …(*i*)

(Alternate interior angles)

AB ∥ CD and AD is transversal

$\therefore \angle A = \angle D$ …(*ii*)

(Alternate interior angles)

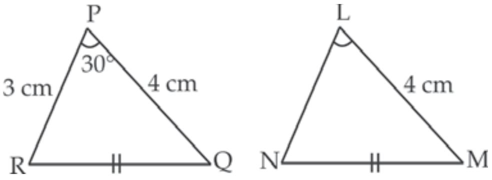
$AB = CD$ …(*iii*) (Each 3 cm)

From equations (*i*), (*ii*) and (*iii*), we conclude that

$\Delta CDO \cong \Delta BAO$

(ASA congruence criterion)

2. ΔPRQ and ΔLMN are congruent; and $PQ = LM$, $RQ = NM$.



So, $\angle Q$ must be equal to $\angle M$ to be congruent for the triangles. Therefore, ΔPRQ and ΔLMN are congruent under the correspondence

PRQ ↔ LNM

$\therefore NL = RP = 3$ cm and $\angle L = \angle P = 30°$.

3. In ΔABC and ΔDCB,

$\angle BAC = \angle BDC = 90°$ (Given)

Hypotenuse BC = Hypotenuse BC

(Common)

Side AC = Side DB (Given)

So by RHS congruence criterion, we have

$\Delta ABC \cong \Delta DCB$.

4. If the hypotenuse and one side of a right triangle are respectively equal to the hypotenuse and one side of another right angled triangle, the triangles are congruent.

The given ΔABC and ΔPQR may be congruence under the following correspondences:

$A \longleftrightarrow P$, $B \longleftrightarrow Q$, $C \longleftrightarrow R$

$A \longleftrightarrow P$, $B \longleftrightarrow R$, $C \longleftrightarrow Q$

5. (*i*) In Δ ABC and Δ PQR,

$AC = PR = 50$ cm

$\angle C = \angle P = 130°$

$BC = PQ = 60$ cm

$\angle A = \angle R = 27°$

Thus, ΔABC and ΔPQR are congruent by SAS as well as ASA congruence criterion under the correspondence ABC ↔ RQP.

(*ii*) In ΔABC and ΔPQR,

$\angle A = \angle P = 20°$

$AC = PR = 3.5$ cm

$\angle C = \angle R = 70°$

Thus ΔABC and ΔPQR are congruent by ASA congruence criterion under the correspondence ABC ↔ PQR.

6. In ΔAOC and ΔBOD,

$AO = BO$ (Given)

$\angle AOC = \angle BOD$

(Vertically opposite angles)

$CO = DO$ (Given)

$\therefore \Delta AOC \cong \Delta BOD$

(SAS congruence criterion)

Then $AC = BD$ (CPCT)

$\angle ACO = \angle BDO$ (CPCT)

These are alternate interior angles corresponding to the lines AC and BD with CD as transversal.

So, AC ∥ BD.

7. (*i*) $\Delta ABD \cong \Delta CDB$ by SAS congruence criterion.

Here corresponding parts are:

$$\overline{AB} = \overline{CD}$$
$$\angle ABD = \angle CDB$$
$$\overline{BD} = \overline{DB}.$$

(*ii*) $\Delta\ ABC \cong \Delta\ RPQ$ by ASA congruence criterion.

Here, corresponding parts are:

$$\angle B = \angle P$$
$$\overline{BC} = \overline{PQ}$$
$$\angle C = \angle Q.$$

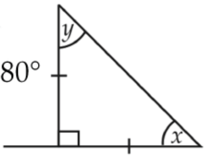
(*iii*) $\Delta ABC \cong \Delta EDF$ by SAS congruence criterion

Here, congruence parts are:

$$\overline{AB} = \overline{ED}$$
$$\angle A = \angle E$$
$$\overline{CA} = \overline{FE}.$$

WORKSHEET–63

1. (*i*) Angles x and y are opposite to equal sides in the triangle.



$\therefore$ $x = y$

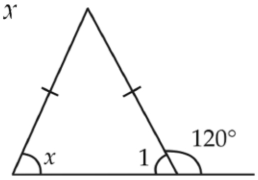
Now $x + y + 90° = 180°$

(Angle sum property for the triangle)

or $x + x + 90° = 180°$

$\therefore$ $x = \dfrac{90°}{2} = 45°.$

(*ii*) $\angle 1 = x$



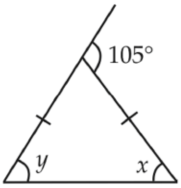
(Angles opposite to equal sides)

$\angle 1 + 120° = 180°$

(Linear pair)

$x = 180° - 120° = 60°$

(*iii*) $x = y$



(Angles opposite to equal sides)

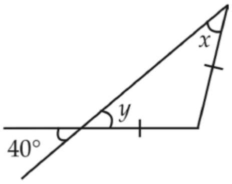
$105° = x + y$

(Exterior angle property)

or $105° = x + x$

$\therefore$ $x = \dfrac{105^o}{2} = 52.5°.$

(*iv*) Angles x and y are opposite to equal sides.



$\therefore$ $x = y$

Angles y and 40° are vertically opposite angles.

$\therefore$ $y = 40°$

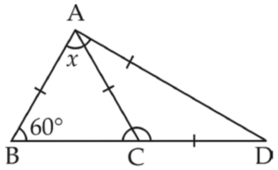
Therefore, $x = 40°.$

2. (*i*) In ΔABC,

$\therefore$ $\angle ACB = 60°$ $(\because AB = AC)$

$\angle ACD = 180° - \angle ACB = 120°$

(Linear pair of angles)



$\angle D = \angle CAD$ $(\because AC = CD)$

Now $2\angle D = 180° - \angle ACD$

$= 180° - 120° = 60°$

$\therefore$ $\angle D = \dfrac{60^o}{2} = 30°.$

$x = 180° - (\angle B + \angle D)$

$= 180° - (60° + 30°) = 90°.$

(*ii*) In ΔABD, AD = BD

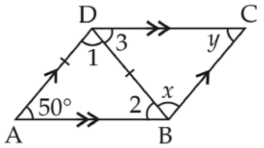
$\therefore$ $\angle 2 = 50°$

$\angle 1 = 180° - 50° - 50° = 80°$

AD ∥ BC and DB is transversal

$\therefore$ $x = \angle 1 = 80°$

(Alternate interior angles)



AB ∥ DC and DB is transversal

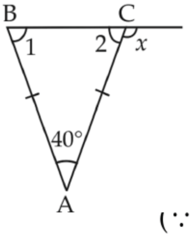
$\therefore \angle 3 = \angle 2 = 50^\circ$

(Alternate interior angles)

Now, in ΔBCD,

$$y = 180^\circ - (x + \angle 3)$$
$$= 180^\circ - (80^\circ + 50^\circ) = 50^\circ.$$

(*iii*) In ΔABC,



$\angle 1 = \angle 2$ ($\because$ AC = AB)

$\angle 1 + \angle 2 + 40^\circ = 180^\circ$

or $\angle 1 + \angle 1 + 40^\circ = 180^\circ$

$\therefore \quad \angle 1 = \dfrac{140^\circ}{2} = 70^\circ$

Now $x = \angle 1 + 40^\circ = 70^\circ + 40^\circ$

(Exterior angle property)

$= 110^\circ.$

(*iv*) DE ∥ BC and AB is transversal

$\therefore \angle 1 = 60^\circ$

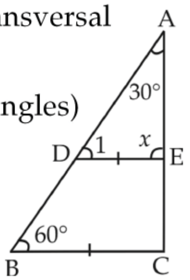
(Corresponding angles)

In ΔADE,

$x + 30^\circ + 60^\circ = 180^\circ$

(Angle sum property)

$\therefore \quad x = 180^\circ - 90^\circ = 90^\circ.$



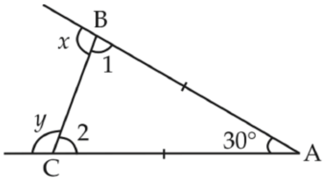
(*v*) $\angle 1 = \angle 2$ ($\because$ CA = BA)

$\angle 1 + \angle 2 + 30^\circ = 180^\circ$

(Angle sum property)

or $2\angle 1 = 180^\circ - 30^\circ = 150^\circ$

$\therefore \quad \angle 1 = 75^\circ = \angle 2$



Now, $x = \angle 2 + 30^\circ = 75^\circ + 30^\circ$

(Exterior angle property)

$= 105^\circ$

Similary, $y = \angle 1 + 30^\circ = 105^\circ$.

3. (*i*) Observing the figures, we conclude that three sides of one triangle are equal to the three corresponding sides of the other triangle. So, the triangles are congruent by SSS criterion.

(*ii*) Observing the figures, we conclude that two sides and the angle included between them of one triangle are equal to corresponding sides and the angle included between them of the other triangle. So, the triangle are congruent by SAS criterion.

(*iii*) Observing the figures, we conclude that two angles and their included sides of a triangle will be equal to the two corresponding angles and the included side of another triangle. So, the triangles are congruent by ASA criterion.

(*iv*) Observing the figures, we conclude that the hypotenuse and one side of a right-angled triangle are respectively equal to the hypotenuse and one side of the other right-angled triangle. So, the triangles are congruent by RHS criterion.

4. In Δ ABD and Δ ACD,

BD = CD = 3 cm

$\angle BDA = \angle CDA = 90^\circ$

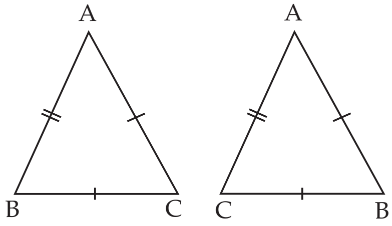
$AD = AD$ (Common)

So, $\Delta ABD \cong \Delta ACD$

(SAS congruence criterion)

WORKSHEET–64

1. $\angle Q$ or $\angle PQR$.
2. Yes,



In ΔABC and ΔACB

$AB = AC$ (Given)

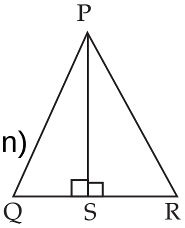
$BC = CB$

$CA = BA$

So, SSS congruence criterion is satisfied.

3. Given, $PQ = PR$

and $PS \perp QR$



In ΔPSQ and ΔPSR

$PS = QR$ (Given)

$PS = PS$ (Common)

$\angle PSQ = \angle PSR = 90°$

Due to RHS

$\therefore \quad \Delta PSQ \cong \Delta PSR$.

4.

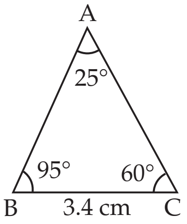


Fig. 1

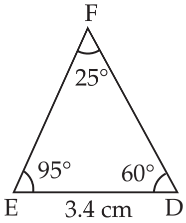


Fig. 2

From Fig. 1,

$$25° + 60° + x = 180°$$
$$85° + x = 180°$$
$$x = 95°$$

From Fig. 2,

$$60° + 95° + x = 180°$$
$$155° + x = 180°$$
$$x = 25°$$

From Fig.1 and Fig. 2,

$\angle A = \angle F$

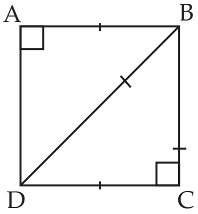
$\angle B = \angle E$

$BC = ED$

$\therefore \; \Delta ABC \cong \Delta DEF$ (ASA)

$\Delta ABC \cong \Delta FED$ by ASA.

5. ABCD is a square and all sides are equal



So, $AB = BC$

$= CD = DA$

In ΔABD and ΔBCD,

$AB = DC$

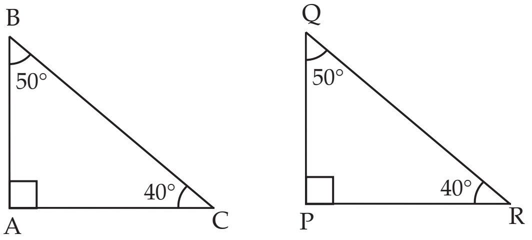
$AD = BC$

$BD = BD$

Due to condition SSS,

$\Delta ABD \cong BCD$ Proved.

6. Yes.



$\angle A = \angle P = 90°$

$BC = QR$

$\angle B = \angle Q$

Due to RHS

$\Delta ABC \cong \Delta PQR$.

7.

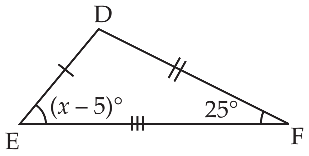


Fig. 1

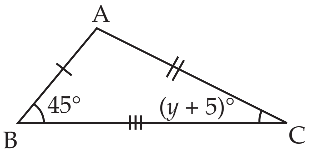
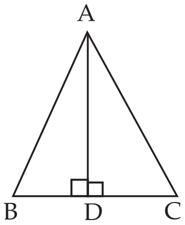


Fig.2

From Fig. 1,	From Fig. 2,
$x - 5 = 45°$	$y + 5 = 25°$
$x = 45° + 5$	$y = 25° - 5$
$x = 50°.$	$y = 20°$

8. (*i*) $\Delta ADB = \Delta ADC$,

$AB = AC,\ AD = AD$



(*ii*) Yes.

In ΔADB and ΔADC

$AB = AC$ (Given)

$\angle ADB = \angle ADC$ (Right angle)

$AD = AD$

Using SAS congruence of triangles, we have

$\Delta ADB \cong \Delta ADC.$

(*ii*) Yes.

In ΔABD and ΔADC

$AB = AC$ (Given)

$\Delta ADB \cong \Delta ADC$ (SAS)

So, $\angle B = \angle C$

Angles opposite to equal sides of a triangle are equal.

(*iv*) Yes.

In ΔABD and ΔACD

$AB = AC$ (Given)

$AD = AD$ (Common)

$\angle BAD = \angle CAD$

$\Delta ADB \cong \Delta ADC$

$BD = CD$

Corresponding parts of congruent triangles are equal.

Chapter

9

COMPARING QUANTITIES

WORKSHEET–65

1. (A) $\frac{5 \text{ km}}{500 \text{ m}} = \frac{5 \times 1000 \text{ m}}{500 \text{ m}}$

$(\because 1 \text{ km} = 1000 \text{ m})$

$= \frac{500 \times 10}{500} = \frac{10}{1}$.

2. (C) $\frac{11 \text{ m}}{50 \text{ cm}} = \frac{11 \times 100 \text{ cm}}{50 \text{ cm}}$

$(\because 1 \text{ m} = 100 \text{ cm})$

$= \frac{11 \times 50 \times 2}{50} = \frac{22}{1}$.

3. (A) $\frac{700 \text{ paise}}{₹\ 8} = \frac{700 \text{ paise}}{8 \times 100 \text{ paise}}$

$(\because ₹\ 1 = 100 \text{ paise})$

$= \frac{7}{8}$.

4. (D) $\frac{2}{3} = \frac{2}{3} \times \frac{3}{3} = \frac{2 \times 3}{3 \times 3} = \frac{6}{9}$.

5. (B) Distance = $\frac{160}{20} \times 25$ km

$= 8 \times 25$ km $= 200$ km.

6. (C) Per cent form of $\frac{3}{3} = \frac{3}{3} \times 100\%$

$= 1 \times 100\%$

$= 100\%$.

7. (B) Per cent form of 0.099

$= 0.099 \times 100\%$

$= 9.9\%$.

8. (C) Per cent voters who voted 'yes'

$= \frac{80}{125} \times 100\%$

$= 80 \times \frac{4}{5}\% = 64\%$.

9. (C) The whole figure is divided into 8 equal parts.

Number of shaded parts = 2

$\therefore$ Per cent of shaded parts

$= \frac{2}{8} \times 100\% = 25\%$.

10. (C) $150\% = \frac{150}{100} = \frac{50 \times 3}{50 \times 2} = \frac{3}{2}$.

11. (D) $11\% = \frac{11}{100} = 0.11$.

12. (A) Profit = ₹ (9200 – 8000) = ₹ 1200

Profit percentage

$= \frac{\text{Profit}}{\text{CP}} \times 100\%$

$= \frac{1200}{8000} \times 100\% = \frac{120}{8}\%$

$= 15\%$.

13. (C)Given ratio is: 1 : 6 : 7.

Their sum = 1 + 6 + 7 = 14

Their percentage are $\frac{1}{14} \times 100\%$,

$\frac{6}{14} \times 100\%$ and $\frac{7}{14} \times 100\%$ respectively.

i.e., $\frac{50}{7}\%$, $\frac{300}{7}\%$ and $\frac{100}{2}\%$

i.e., $7\frac{1}{7}\%$, $42\frac{6}{7}$ and 50%.

14. (C) Interest $= \dfrac{\text{Principal} \times \text{Rate} \times \text{Time}}{100}$

$\therefore \quad 560 = \dfrac{14000 \times \text{Rate} \times 2}{100}$

$\Rightarrow \quad \text{Rate} = \dfrac{560 \times 100}{14000 \times 2}\% = \dfrac{56}{28}\%$

= 2% per annum.

15. (A) $\because$ Out of 125 students, number of absentees = 20

$\therefore$ Out of 100 students, number of absentees

$$= \frac{20}{125} \times 100 = 16$$

Thus, 16% students are absent.

16. (C) $7\% = \dfrac{7}{100} = 0.07.$

17. (D) $22\% = \dfrac{22}{100} = \dfrac{11}{50}.$

WORKSHEET–66

1. First Student:

Fraction $= \dfrac{\text{Marks obtained}}{\text{Maximum marks}} = \dfrac{12}{20} = \dfrac{3}{5}$

Percentage $= \dfrac{3}{5} \times 100\% = 3 \times 20\%$

$= 60\%$

Second Student:

Fraction $= \dfrac{\text{Marks obtained}}{\text{Maximum marks}} = \dfrac{16}{20} = \dfrac{4}{5}$

Percentage $= \dfrac{4}{5} \times 100\% = 4 \times 20\%$

$= 80\%.$

2. (*i*) $75\% = \dfrac{75}{100} = \dfrac{3}{4}$

(*ii*) $10\% = \dfrac{10}{100} = \dfrac{1}{10}$

(*iii*) $12\dfrac{1}{2}\% = \dfrac{25}{2}\% = \dfrac{25}{2 \times 100} = \dfrac{1}{8}$

(*iv*) $40\% = \dfrac{40}{100} = \dfrac{4}{10} = \dfrac{2}{5}.$

3. Meera solves 28 sums in 4 hours

Meera's speed

$$= \frac{\text{Number of sums}}{\text{Number of hours taken}}$$

$= \dfrac{28}{4}$ = 7 sums per hour

Shabnam solves 36 sums in 8 hours

Shabnam's speed

$$= \frac{\text{Number of sums}}{\text{Number of hours taken}}$$

$= \dfrac{36}{8}$ = 4.5 sum per hours

So, Meera has more speed.

4. Cost of one chair $= \dfrac{\text{Cost of 32 chairs}}{32}$

$= ₹\,\dfrac{4480}{32} = ₹\,140.$

(*i*) Cost of 45 chairs

= 45 × cost of 1 chair

= 45 × ₹ 140

= ₹ 6300.

(*ii*) Number of required chairs

$$= \frac{8400}{\text{Cost of 1 chair}}$$

$= \dfrac{8400}{140}$ = 60 chairs.

5. Expenditure on grocery items

= 25% of ₹ 30000

$= ₹\,30000 \times \dfrac{25}{100}$

$= ₹\ 300 \times 25$

$= ₹\ 7500$

Expenditure on house rent

$= 20\%$ of ₹ 30000

$= ₹\ 30000 \times \frac{20}{100}$

$= ₹\ 300 \times 20 = ₹\ 6000$

So Mrs. Shah spends on both

$= ₹\ 7500 + ₹\ 6000$

$= ₹\ 13500.$

6. (*i*) $\frac{3}{5} = \frac{3}{5} \times 100\% = \frac{300}{5}\% = 60\%.$

(*ii*) $\frac{5}{8} = \frac{5}{8} \times 100\% = \frac{500}{8}\% = 62.5\%.$

(*iii*) $\frac{9}{20} = \frac{9}{20} \times 100\% = \frac{900}{20}\% = 45\%.$

(*iv*) $\frac{5}{4} = \frac{5}{4} \times 100\% = \frac{500}{4}\% = 125\%.$

7. (*i*) $\because \quad \frac{18}{9} = \frac{2}{1}$

$\therefore \quad 18 : 9 = 2 : 1.$

(*ii*) $\because \quad \frac{11}{44} = \frac{1}{4}$

$\therefore \quad 11 : 44 = 1 : 4.$

(*iii*) $\because \quad \frac{10}{1000} = \frac{1}{100}$

$\therefore \quad 10 : 1000 = 1 : 100.$

(*iv*) $\because \quad \frac{12}{4} = \frac{3}{1}$

$\therefore \quad 12 : 4 = 3 : 1.$

8. (*i*) $\because \quad \frac{10 \text{ kg}}{230 \text{ g}} = \frac{10 \times 1000 \text{ g}}{230 \text{ g}} = \frac{1000}{23}$

($\because$ 1 kg = 1000 g)

So, ratio of 10 kg to 230 g is 1000 : 23.

(*ii*) $\because \frac{30 \text{ days}}{36 \text{ hours}} = \frac{30 \times 24 \text{ hours}}{36 \text{ hours}} = \frac{20}{1}$

($\because$ 1 day = 24 hours)

So, ratio of 30 days to 36 hours is 20 : 1.

(*iii*) $\because \frac{3 \text{ km}}{300 \text{ m}} = \frac{3 \times 1000 \text{ m}}{300 \text{ m}} = \frac{10}{1}$

($\because$ 1 km = 1000 m)

So, ratio of 3 km to 300 m is 10 : 1.

(*iv*) $\because \frac{1 \text{ km}}{250 \text{ m}} = \frac{1000 \text{ m}}{250 \text{ m}} = \frac{4}{1}$

($\because$ 1 km = 1000 m)

So, ratio of 1 km to 250 m is 4 : 1.

WORKSHEET–67

1. Number of students who like eating pizza = 8% of 25

$= 25 \times \frac{8}{100} = \frac{8}{4} = 2$

So, the number of students who do not like eating pizza = 25 – 2 = 23.

2. Let the total number of students be x.

Number of students passed in Hindi + Number of students passed in English – Number of students passed in both.

= Total number of students.

$\therefore \quad x \times \frac{90}{100} + x \times \frac{85}{100} - 150 = x$

or $\quad 90x + 85x - 15000 = 100x$

or $\quad 75x = 15000$

$\therefore \quad x = \frac{15000}{75}$

or $\quad x = 200$

Thus, the total number of students is 200.

3. Profit = 20% of 1200 = $1200 \times \frac{20}{100}$

$= 12 \times 20 = ₹\ 240$

$\therefore$ SP = ₹ 1200 + ₹ 240 = ₹ 1440.

4. Principal, P = ₹ 20000

Rate of interest, R = 5%

Time, T = 2 years

Interest = $\frac{P \times R \times T}{100} = \frac{20000 \times 5 \times 2}{100}$

$= 200 \times 10 = ₹\ 2000.$

5. $1 : 2 = \frac{1}{2} = \frac{1}{2} \times \frac{2}{2} = \frac{2}{4}$

$2 : 3 = \frac{2}{3}$

$\because \frac{2}{4} \neq \frac{2}{3} \quad \therefore 1 : 2 \neq 2 : 3$

Therefore, 1 : 2 and 2 : 3 are not equivalent.

6. T = 4 years, R = 12%, P = ₹ 1800

Interest, I = $\frac{P\,R\,T}{100} = \frac{1800 \times 12 \times 4}{100}$

$= 18 \times 48 = ₹\ 864$

Amount = P + I = ₹ 1800 + ₹ 864

= ₹ 2664.

7. $\because$ Out of 500 fruits, number of rotten fruits = 5

$\therefore$ Out of 1 fruit, number of rotten fruits

$= \frac{5}{500} = \frac{1}{100}$

$\therefore$ Out of 100 fruits, number of rotten fruits

$= \frac{1}{100} \times 100 = 1$

So, 1% of fruits is rotten.

8. (*i*) $\because \frac{2\text{ km}}{400\text{ m}} = \frac{2 \times 1000\text{ m}}{400\text{ m}} = \frac{20}{4} = \frac{5}{1}$

$\therefore$ 2 km : 400 m = 5 : 1.

(*ii*) $\because \frac{1\,l}{100\text{ ml}} = \frac{1000\text{ ml}}{100\text{ ml}} = \frac{10}{1}$

$\therefore$ 1 *l* : 100 ml = 10 : 1

(*iii*) $\because \frac{₹\ 8}{80\text{ paise}} = \frac{8 \times 100\text{ paise}}{80\text{ paise}} = \frac{10}{1}$

$\therefore$ ₹ 8 : 80 paise = 10 : 1.

9. (*i*) 30% of 300 kg = $300 \times \frac{30}{100}$ kg

= 3 × 30 kg = 90 kg.

(*ii*) 25% of 25 marks = $25 \times \frac{25}{100}$ marks

$= \frac{25}{4}$ marks

= 6.25 marks.

(*iii*) 50% of 12.30 = $12.30 \times \frac{50}{100}$

$= \frac{12.30}{2} = 6.15.$

(*iv*) 55% of 330 = $330 \times \frac{55}{100} = \frac{33 \times 55}{10}$

$= \frac{1815}{10} = 181.5.$

10. (*i*) 39% of 800 kg = $800 \times \frac{39}{100}$ kg

= 8 × 39 kg = 312 kg.

(*ii*) 25% of 200 marks = $200 \times \frac{25}{100}$ marks

= 2 × 25 marks

= 50 marks.

(*iii*) 53% of 12.30 = $12.30 \times \frac{53}{100}$

$= \frac{1230}{100} \times \frac{53}{100}$

$= \frac{6519}{1000} = 6.519.$

(*iv*) 93% of $560 = 560 \times \frac{93}{100}$

$$= \frac{56 \times 93}{10} = \frac{5208}{10}$$

$$= 520.8.$$

WORKSHEET–68

1. Let the whole quantity be x km.

$$50\% \text{ of } x = 1000$$

or $$x \times \frac{50}{100} = 1000$$

or $$x = 2000 \text{ km}.$$

2. The whole figure is divided into 8 equal parts.

The number of shaded parts = 4.

∴ Percentage of the shaded portion

$$= \frac{4}{8} \times 100\% = \frac{100}{2}\% = 50\%.$$

3. Number of all balls = 800

Number of blue balls = 480

∴ Percentage of blue balls

$$= \frac{\text{Number of blue balls}}{\text{Number of all balls}} \times 100\%$$

$$= \frac{480}{800} \times 100\% = \frac{480}{8}\% = 60\%$$

4. CP = ₹ 20000, SP = ₹ 24000

Profit = SP – CP

= ₹ 24000 – ₹ 20000

= ₹ 4000

$$\text{Profit } \% = \frac{\text{Profit}}{\text{CP}} \times 100\%$$

$$= \frac{4000}{20000} \times 100\%$$

$$= \frac{40}{2}\% = 20\%.$$

5. Number of children who like playing cricket = 16% of 200

$$= 200 \times \frac{16}{100} = 32.$$

Number of children who do not like playing cricket = 200 – 32 = 168.

6. (*i*) 25% of $64 = 64 \times \frac{25}{100}$

$$= 64 \times \frac{1}{4} = 16.$$

(*ii*) $12\frac{1}{2} = \frac{12 \times 2 + 1}{2} = \frac{25}{2}$

$$12\frac{1}{2}\% \text{ of } 900 = 900 \times \frac{25}{200}$$

$$= \frac{9 \times 25}{2}$$

$$= \frac{225}{2}$$

$$= 112.5.$$

(*iii*) 2% of 2 hours

$$= 2 \times \frac{2}{100} \text{ hours}$$

$$= \frac{4}{100} \text{ hours} = 0.04 \text{ hours}.$$

= 0.04 × 60 minutes = 2.4 minutes.

7. (*i*) $\because \frac{₹\ 20}{40 \text{ paise}} = \frac{20 \times 100 \text{ paise}}{480 \text{ paise}}$

$$= \frac{200}{48} = \frac{25}{6}$$

∴ ₹ 20 : 480 paise = 25 : 6.

(*ii*) $\because \frac{5 \text{ km}}{600 \text{ m}} = \frac{5 \times 1000 \text{ m}}{600 \text{ m}} = \frac{50}{6} = \frac{25}{3}$

∴ 5 km : 600 m = 25 : 3.

(*iii*) $\because \dfrac{3l}{1500 \text{ ml}} = \dfrac{3000 \text{ ml}}{1500 \text{ ml}} = \dfrac{30}{15} = \dfrac{2}{1}$

$\therefore \quad 3l : 1500 \text{ ml} = 2 : 1.$

8. (*i*) The selling price (SP) of the book is more than the buying price (CP). So, the book provides profit.

$$\text{Profit} = \text{SP} - \text{CP}$$
$$= ₹\ 250 - ₹\ 200 = ₹\ 50$$
$$\text{Profit }\% = \frac{\text{Profit}}{\text{CP}} \times 100\%$$
$$= \frac{50}{200} \times 100\% = 25\%.$$

(*ii*) The SP of the chair is more than the CP. So, the chair provides profit.

$$\text{Profit} = \text{SP} - \text{CP}$$
$$= ₹\ 18500 - ₹\ 15000$$
$$= ₹\ 3500$$
$$\text{Profit }\% = \frac{\text{Profit}}{\text{CP}} \times 100\%$$
$$= \frac{3500}{15000} \times 100\%$$
$$= \frac{350}{15}\% = \frac{70}{3}\% = 23\frac{1}{3}\%.$$

9. (*i*) 10% of 18 litres

$$= 18 \times \frac{10}{100} \text{ litres} = \frac{18}{10} \text{ litres}$$
$$= 1.8 \text{ litres.}$$

(*ii*) 50% of 18.40

$$= 18.40 \times \frac{50}{100} = \frac{18.40}{2} = 9.20.$$

10. Let the total number of students be x

$\therefore$ Number of students who like to take

coffee $= x \times \dfrac{72}{100} = \dfrac{72x}{100}$

And number of students who like to take tea $= x \times \dfrac{52}{100} = \dfrac{52x}{100}$

Now, $\dfrac{72x}{100} + \dfrac{52x}{100} - 144 = x$

Multiplying throughout by 100, we get

$$72x + 52x - 14400 = 100x$$

or $\quad 124x - 100x = 14400$

or $\quad 24x = 14400$

or $\quad x = \dfrac{14400}{24}$

$\quad = 600$

Thus, the total number of students in the group is 600.

WORKSHEET–69

1. Sum of ratios = 4 + 2 = 6

$$\text{First part} = \frac{4}{6} \times 18000 = 4 \times 3000$$
$$= ₹\ 12000$$
$$\text{Second part} = \frac{2}{6} \times 18000 = 2 \times 3000$$
$$= ₹\ 6000.$$

2. Profit = 12% of CP $= ₹\ 50 \times \dfrac{12}{100} = ₹\ 6$

SP = CP + Profit = ₹ 50 + ₹ 6 = ₹ 56.

3. Loss is 5% of CP.

$\therefore \quad \text{CP} = \text{SP} \times \dfrac{100}{(100-5)} = ₹\ 570 \times \dfrac{100}{95}$

$= ₹\ 6 \times 100 = ₹\ 600.$

4. I = ₹ 8100, P = ₹ 72000, T = 3 years,

R = ?

$$\text{I} = \frac{\text{PRT}}{100}$$

or $\text{R} = \dfrac{\text{I} \times 100}{\text{P T}} = \dfrac{8100 \times 100}{72000 \times 3}$

$$= \frac{81 \times 10}{72 \times 3} = \frac{9 \times 10}{8 \times 3} = \frac{30}{8}$$

$= 3.75$

So, the rate of interest is 3.75% per annum.

5. Speed $= \frac{\text{Distance}}{\text{Time}} = \frac{1800}{6}$

$= 300$ km / hour.

6. ₹ 30 = 30 × 100 paise

$$\therefore \quad \frac{₹\ 30}{900 \text{ paise}} = \frac{30 \times 100 \text{ paise}}{900 \text{ paise}}$$

$$= \frac{30}{9} = \frac{10}{3}$$

or ₹ 30 : 900 paise = 10 : 3.

7. $8\frac{1}{50} = \frac{8 \times 50 + 1}{50} = \frac{400 + 1}{50} = \frac{401}{50}$

$$= \frac{401}{50} \times 100\% = 401 \times 2\%$$

$= 802\%$.

8. 16% of 7700 $= 7700 \times \frac{16}{100}$

$= 77 \times 16 = 1232.$

9. T = 5 years, P = ₹ 2500, R = 3%

$$I = \frac{PRT}{100} = \frac{2500 \times 3 \times 5}{100} = 25 \times 15$$

= ₹ 375

Amount = P + I = ₹ 2500 + ₹ 375

= ₹ 2875.

10. (*i*) $0.75 = 0.75 \times 100\%$

$$= \frac{75}{100} \times 100\% = 75\%.$$

(*ii*) $\because \quad 2\frac{1}{4} = \frac{2 \times 4 + 1}{4} = \frac{8+1}{4} = \frac{9}{4}$

$$\therefore \quad 2\frac{1}{4} = 2\frac{1}{4} \times 100\% = \frac{9}{4} \times 100\%$$

$= 9 \times 25\% = 225\%.$

(*iii*) $\frac{47}{50} = \frac{47}{50} \times 100\% = 47 \times 2\% = 94\%.$

11. Speed $= \frac{\text{Distance}}{\text{Time}} = \frac{120}{3} = 40$ km / h

(*i*) Distance covered = Speed × Time

= 40 × 8 = 320 km

(*ii*) Time $= \frac{\text{Distance}}{\text{Speed}} = \frac{840}{40} = 21$ hours.

WORKSHEET–70

1. $\frac{1}{8} = \frac{1}{8} \times 100\% = \frac{25}{2}\% = 12\frac{1}{2}\%.$

2. 4 km = 4 × 1000 m = 4000 m

∴ 4 km : 400 m = 4000 m : 400 m

= 10 : 1.

3. ∵ 4 cm = 1000 km

$$\therefore \quad 1 \text{ cm} = \frac{1000}{4} \text{ km}$$

$$\therefore \quad 3.5 \text{ cm} = \frac{1000}{4} \times 3.5 \text{ km}$$

$$= \frac{3500}{4} \text{ km} = 875 \text{ km}$$

So, the actual distance is 875 km.

4. ∵ Cost of 7 chairs = ₹ 714

∴ Cost of 1 chair = ₹ $\frac{714}{7}$ = ₹ 102

∴ Cost of 83 chairs = ₹ 102 × 83

= ₹ 8466.

5. Percentage of absent students

$$= \frac{\text{Number of absentees}}{\text{Total number of students}} \times 100\%$$

$$= \frac{10}{45} \times 100\% = \frac{200}{9}\% = 22\frac{2}{9}\%.$$

6. Number of students owning a bicycle

$= 55\%$ of 1200.

$$= 1200 \times \frac{55}{100} = 660$$

$\therefore$ Number of students not owning a bicycle

$= 1200 - 660 = 540.$

7. $150\% = \frac{150}{100} = \frac{15}{10} = 1.5.$

8. Whole quantity $= 20 \times \frac{100}{80}$ minutes

$= \frac{100}{4}$ minutes

$= 25$ minutes.

9. Number of won matches

$= 25\%$ of 20

$$= 20 \times \frac{25}{100} = \frac{500}{100} = 5$$

$\therefore$ Number of lost matches

$= 20 -$ No. of won matches

$= 20 - 5 = 15.$

10. Profit = SP – CP

= ₹ 2300 – ₹ 2100 = ₹ 200

$$\text{Profit } \% = \frac{\text{Profit}}{\text{CP}} \times 100\%$$

$$= \frac{200}{2100} \times 100\% = \frac{200}{21}\%$$

$$= 9\frac{11}{21}\%.$$

11. 20% of 25 sweets $= 20 \times \frac{25}{100} = \frac{500}{100}$

$= 5$ sweets

80% of 25 sweets $= 80 \times \frac{25}{100} = \frac{2000}{100}$

$= 20$ sweets

Hence, Manu gets 5 sweets and Tanu gets 20 sweets.

12. Let the angles be 2A, 3A and 4A.

$\therefore$ $2A + 3A + 4A = 180°$ or $9A = 180°$

or $A = \frac{180^o}{9}$ or $A = 20°$

$\therefore$ $2A = 2 \times 20° = 40°$, $3A = 3 \times 20° = 60°$ and $4A = 4 \times 20° = 80°$.

So, the angles are of measures 40°, 60° and 80°.

WORKSHEET–71

1. Given ratio is 2 : 3 : 5

Sum of those = 2 + 3 + 5 = 10

Percentage of the first part

$$= \frac{2}{10} \times 100 = 20\%$$

Percentage of the second part

$$= \frac{3}{10} \times 100 = 30\%$$

Percentage of the third part

$$= \frac{5}{10} \times 100 = 50\%.$$

2. P = ₹ 8000, R = 3%,

$T = 4$ months $= \frac{4}{12}$ year $= \frac{1}{3}$ year

$$\text{Interest, } I = \frac{PRT}{100} = \frac{8000 \times 3 \times \frac{1}{3}}{100}$$

$$= \frac{8000 \times 3 \times 1}{3 \times 100} = 80$$

Thus, ₹ 80 are to be paid as interest.

3. P = ₹ 2500, R = 4%,

$T = 9$ months $= \frac{9}{12}$ year $= \frac{3}{4}$ year

$$I = \frac{PRT}{100} = \frac{2500 \times 4 \times 3}{4 \times 100} = ₹\ 75$$

Amount = I + P = ₹ 75 + ₹ 2500

= ₹ 2575

Thus, the interest is ₹ 75 and amount is ₹ 2575.

4. Profit = 18% of CP = CP × $\frac{18}{100}$

SP = CP + Profit

So, $150 = CP + CP \times \frac{18}{100}$

$= CP\ (1 + \frac{18}{100})$

$= \frac{118}{100} CP$

Therefore, $CP = \frac{150 \times 100}{118}$

$= \frac{75 \times 100}{59} = \frac{7500}{59}$

$= 127.12$

Thus, the cost price is ₹ 127.12.

5. Decrease = ₹ 90 – ₹ 50 = ₹ 40.

Decrease percentage

$= \frac{\text{Decrease}}{\text{Original price}} \times 100\%$

$= \frac{40}{90} \times 100\% = \frac{400}{9}\%$

$= 44\frac{4}{9}\%.$

6. Loss = 10% of CP = CP × $\frac{10}{100}$

$= \frac{1}{10} CP$

∵ SP = CP – Loss

∴ $270 = CP - \frac{1}{10} CP = (1 - \frac{1}{10})\ CP$

$= \frac{9}{10} CP$

∴ $CP = \frac{270 \times 10}{9} = 30 \times 10 = 300$

Therefore, the cost price is ₹ 300.

7. 33% of ₹ 13500 = ₹ 13500 × $\frac{33}{100}$

= ₹ 135 × 33

= ₹ 4455.

8. $\frac{20\text{ m}}{80\text{ cm}} = \frac{20 \times 100\text{ cm}}{80\text{ cm}} = \frac{100}{4} = \frac{25}{1}$

∴ 20 m : 80 cm = 25 : 1.

9. We know that 1 dozen = 12

∵ Cost of 1 mango = ₹ 2.25 = ₹ $\frac{225}{100}$

∴ Cost of 1 dozen mangoes

= ₹ $\frac{225}{100} \times 12$ = ₹ $\frac{2700}{100}$ = ₹ 27.

10. 1 : 2 or $\frac{1}{2} = \frac{1}{2} \times \frac{3}{3} = \frac{3}{6}$

and 3 : 8 or $\frac{3}{8}$

Since $\frac{3}{6} \neq \frac{3}{8}$. Therefore, 1 : 2 and 3 : 8 are not equivalent.

11. SP = CP + Profit

$= CP + 15\% \text{ of } CP = CP + \frac{15}{100} CP$

$= CP \left(1 + \frac{15}{100}\right) = CP \times \frac{115}{100}$

$= 600 \times \frac{115}{100} = 6 \times 115 = 690$

Therefore, selling price of the book is ₹ 690.

12. Percentage of marks secured by Nandini

$= \frac{\text{Marks secured}}{\text{Maximum marks}} \times 100\%$

$= \frac{22}{25} \times 100\% = 88\%.$

Percentage of marks obtained by Bhawna

$$= \frac{\text{Marks secured}}{\text{Maximum marks}} \times 100\%$$

$$= \frac{43}{50} \times 100\% = 86\%$$

Nandini secured more percentage of marks, and so her performance is better.

WORKSHEET–72

1. $\frac{1}{4} = \frac{1}{4} \times 100\% = 25\%.$

2. (*i*) $\because \quad \frac{30}{72} = \frac{6 \times 5}{6 \times 12} = \frac{5}{12}$

$\therefore \quad 30 : 72 = 5 : 12.$

(*ii*) $\because \quad \frac{7.25}{10.25} = \frac{7.25}{10.25} \times \frac{100}{100} = \frac{725}{1025}$

$$= \frac{25 \times 29}{25 \times 41} = \frac{29}{41}$$

$\therefore$ 7.25 : 10.25 = 29 : 41.

3. (*i*) $\frac{₹\ 6}{70 \text{ paise}} = \frac{6 \times 100 \text{ paise}}{70 \text{ paise}} = \frac{60}{7}$

i.e., ₹ 6 : 72 paise = 60 : 7.

(*ii*) $\frac{3 \text{ km}}{800 \text{ m}} = \frac{3 \times 1000 \text{ m}}{800 \text{ m}} = \frac{30}{8} = \frac{15}{4}$

i.e., 3 km : 800 m = 15 : 4.

4. $\because$ Distance covered in 3 hours
= 120 km

$\therefore$ Distance covered in 1 hour

$$= \frac{120}{3} = 40 \text{ km}$$

$\therefore$ Distance covered in 18 hours
= 40 × 18 km
= 720 km.

5. Percentage of broken eggs

$$= \frac{\text{Number of broken eggs}}{\text{Total number of eggs}} \times 100\%$$

$$= \frac{50}{400} \times 100\% = \frac{50}{4}\% = 12.5\%$$

6. I = ₹ 2025, T = 3 years, R = 2%.

$$I = \frac{PRT}{100} \text{ or } P = \frac{I \times 100}{RT}$$

$$\therefore \quad P = \frac{2025 \times 100}{2 \times 3} = 675 \times 50$$

$$= 33750.$$

Therefore, the loan taken was ₹ 33750.

7. Sum of ratios = 4 + 2 = 6

$$\text{First part} = \frac{4}{6} \times 48000 = 4 \times 8000$$

= ₹ 32000

$$\text{Second part} = \frac{2}{6} \times 48000 = 2 \times 8000$$

= ₹ 16000.

8. Percentage of marks secured by Neelam

$$= \frac{\text{Marks secured}}{\text{Maximum marks}} \times 100\%$$

$$= \frac{21}{25} \times 100\% = 84\%$$

Percentage of marks secured by Bina

$$= \frac{\text{Marks secured}}{\text{Maximum marks}} \times 100\%$$

$$= \frac{43}{50} \times 100\% = 86\%.$$

Since Bina secured more percentage of marks, therefore, her performance is better.

9. Number of won matches = 50% of 30

$$= 30 \times \frac{50}{100} = 15$$

No. of lost matches = Total no. of matches – No. of won matches

= 30 – 15 = 15.

10. Let the angles be 8A, 3A and 7A respectively.

$\therefore 8A + 3A + 7A = 180°$

or $\quad 18A = 180°$ or $A = 10°$

Therefore, $\quad 8A = 8 \times 10° = 80°,$

$\quad 3A = 3 \times 10° = 30°$

and $\quad 7A = 7 \times 10° = 70°$

Thus, the values of the angles are 80°, 30° and 70°.

11. Total number of rings = 20 + 10 = 30

Percentage of gold rings

$$= \frac{\text{Number of gold rings}}{\text{Total number of rings}} \times 100\%$$

$$= \frac{20}{30} \times 100\% = \frac{200}{3}\% = 66\frac{2}{3}\%$$

Percentage of silver rings

$$= \frac{\text{Number of silver rings}}{\text{Total number of rings}} \times 100\%$$

$$= \frac{10}{30} \times 100\% = \frac{100}{3}\% = 33\frac{1}{3}\%.$$

12. (*i*) $\frac{17}{25} = \frac{17}{25} \times 100\% = 17 \times 4\% = 68\%.$

(*ii*) $1\frac{1}{4} = 1\frac{1}{4} \times 100\% = \frac{5}{4} \times 100\%$

$= 5 \times 25\% = 125\%.$

WORKSHEET–73

1. $75\% = \frac{75}{100} = \frac{3}{4}$ or 3 : 4.

2. Let the parts be $4x$, $3x$ and $5x$ respectively.

Sum of those $= 4x + 3x + 5x$

$= 12x$

Percentage of the first part

$$= \frac{4x}{12x} \times 100\% = \frac{100}{3}\%$$

$$= 33\frac{1}{3}\%$$

Percentage of the second part

$$= \frac{3x}{12x} \times 100\% = \frac{100}{4}\%$$

$= 25\%$

Percentage of the third part

$$= \frac{5x}{12x} \times 100\% = \frac{500}{12}\%$$

$$= 41\frac{2}{3}\%.$$

3. P = ₹ 5000, R = 15%, T = 2 years

$$I = \frac{PRT}{100} = \frac{5000 \times 15 \times 2}{100} = 50 \times 30$$

$= 1500$

Amount = I + P = 1500 + 5000 = 6500

Thus, the interest is ₹ 1500 and the amount is ₹ 6500.

4. $\because$ 70% of a quantity = 35

$\therefore$ 1% of it $= \frac{35}{70}$

$\therefore$ 100% of it $= \frac{35}{70} \times 100 = 50$

Therefore, the whole quantity is ₹ 50.

5. Total CP = ₹ 20000 + ₹ 500 = ₹ 20500

SP = ₹ 30000

$\therefore$ Profit = SP – CP

= ₹ 30000 – ₹ 20500

= ₹ 9500.

$$\text{Profit per cent} = \frac{\text{Profit}}{\text{CP}} \times 100\%$$

$$= \frac{9500}{20500} \times 100\%$$

$$= \frac{9500}{205}\% = 46.34\%.$$

6. T = 3 years, I = ₹ 450, R = 5%

$$I = \frac{PRT}{100}$$

$$\text{or} \quad P = \frac{I \times 100}{RT} = \frac{450 \times 100}{5 \times 3}$$

$$= 30 \times 100 = 3000$$

So, the sum is ₹ 3000.

7. Number of students who got first division

$$= 75\% \text{ of } 1500$$

$$= \frac{75}{100} \times 1500 = 75 \times 15$$

$$= 1125$$

∴ Number of students who did not get first division

$$= 1500 - 1125 = 375.$$

8. Let the principal be P,

then amount = 2P

R = 10%

∴ I = 2P – P = P

$$\text{Now} \quad I = \frac{PRT}{100} \quad \text{or} \quad T = \frac{I \times 100}{P \times R}$$

$$\text{or} \quad T = \frac{P \times 100}{P \times 10} = 10.$$

Thus, the required number of years is 10.

9. I = ₹ 4500, P = ₹ 72000, T = 3 years,

R = ?

$$I = \frac{PRT}{100} \text{ or } R = \frac{I \times 100}{PT}$$

$$\text{or} \quad R = \frac{4500 \times 100}{72000 \times 3} = \frac{450}{72 \times 3} = \frac{150}{72}$$

$$= \frac{25}{12}$$

$$\text{or} \quad R = 2\frac{1}{12}\% \text{ per annum.}$$

10. P = ₹ 18000, R = 18%,

$$T = 6 \text{ months} = \frac{6}{12} = \frac{1}{2} \text{ year}$$

$$I = \frac{PRT}{100} = \frac{18000 \times 18 \times \frac{1}{2}}{100}$$

$$= \frac{180 \times 18}{2} = 1620$$

Amount = I + P = 1620 + 18000

= 19620

Thus, interest = ₹ 1620,

amount = ₹ 19620.

11. CP of a table providing profit

$$= ₹\ 990 \times \frac{100}{110} = ₹\ 900$$

CP of other table providing loss

$$= ₹\ 990 \times \frac{100}{90} = ₹\ 1100.$$

So, the cost prices of the tables are respectively ₹ 900 and ₹ 1100.

12. Let the CP of the table be ₹ P.

$$\text{Then } P - \frac{P \times 5}{100} = 540 \text{ or } P - \frac{P}{20} = 540$$

$$\text{or } \frac{19P}{20} = 540 \text{ or } P = \frac{540 \times 20}{19} = \frac{10800}{19}$$

or P = ₹ 568.42 (approx.)

13. $\text{Profit} = 20\% \text{ of CP} = \frac{20}{100} \times CP = \frac{CP}{5}$

Since SP = CP + Profit

$$\therefore \quad 720 = CP + \frac{CP}{5}$$

$$\text{or} \quad 720 = \frac{6}{5} CP$$

$$\text{or} \quad CP = \frac{720 \times 5}{6} = 600.$$

Hence, the cost price is ₹ 600.

WORKSHEET–74

1. (*i*) $\because$ 25% of a number = 18

$\therefore$ 1% of it $= \frac{18}{25}$

$\therefore$ 100% of it $= \frac{18}{25} \times 100$

$= 72$

So, the required number is 72.

(*ii*) $\because$ 75% of a number = 15

$\therefore$ 1% of it $= \frac{15}{75}$

$\therefore$ 100% of it $= \frac{15}{75} \times 100$

$= 20$

So, the required number is 20.

2. (*i*) 3 parts are shaded out of 8 parts

So, fraction of the shaded part $= \frac{3}{8}$

and percentage of the shaded part

$= \frac{3}{8} \times 100\% = 37\frac{1}{2}\%.$

(*ii*) 4 parts are shaded out of 8 parts

So, fraction of the shaded part

$= \frac{4}{8} = \frac{1}{2}$

and percentage of the shaded part

$= \frac{1}{2} \times 100\% = 50\%.$

3. Number of people having cars = 75%

Number of people not having cars

= (100 – 75)% = 25%.

4. Number of children who like watching movies = 25% of 80

$= \frac{25}{100} \times 80 = \frac{25 \times 8}{10} = \frac{200}{10}$

$= 20.$

5. Reeta's marks in Hindi

= 40% of maximum marks in Hindi

$= \frac{40}{100} \times 150 = 4 \times 15 = 60$

Reeta's marks in Maths

= 55% of maximum marks in Maths

$= \frac{55}{100} \times 180 = \frac{990}{10} = 99.$

6. Percentage of students who did not like playing cricket = (100 – 60)%

= 40 %

And their number = 40 % of 1500

$= \frac{40}{100} \times 1500$

$= 40 \times 15 = 600.$

7. (*i*) Loss = CP – SP

= ₹ 50 – ₹ 30 = ₹ 20

$\text{Loss } \% = \frac{\text{Loss}}{\text{CP}} \times 100\%$

$= \frac{20}{50} \times 100\% = 40\%.$

(*ii*) Profit = SP – CP

= ₹ 2500000 – ₹ 2225000

= ₹ 275000

$\text{Profit } \% = \frac{\text{Profit}}{\text{CP}} \times 100\%$

$= \frac{275000}{2225000} \times 100\%$

$= \frac{27500}{2225}\% = \frac{1100}{89}\%$

$= 12\frac{32}{89}\%.$

8. $\text{Loss\%} = \dfrac{\text{Loss}}{\text{CP}} \times 100\%$

$\therefore \quad 10\% = \dfrac{\text{Loss}}{\text{CP}} \times 100\%$

or $\quad \text{Loss} = \dfrac{\text{CP}}{10}$

Now, Loss = CP – SP

or $\dfrac{\text{CP}}{10} = \text{CP} - 819$ or $819 = \dfrac{9}{10}\text{CP}$

or $\quad \text{CP} = \dfrac{819 \times 10}{9} = 91 \times 10 = 910$

So, the cost price was ₹ 910.

9. Let $\quad$ CP = ₹ R.

Then, $\text{loss} = \text{R} \times \dfrac{20}{100} = \dfrac{\text{R}}{5}$

Now $\quad$ SP = CP – Loss

or $\quad$ CP = SP + Loss

$\therefore \quad \text{R} = 13500 + \dfrac{\text{R}}{5}$

or $\quad \text{R} - \dfrac{\text{R}}{5} = 13500$

or $\quad \dfrac{4\text{R}}{5} = 13500$ or $\text{R} = 5 \times 3375$

or $\quad$ R = 16875

So, the cost price of the article was ₹ 16875.

10. (*i*) 40% of 24.36

$$= \frac{40}{100} \times 24.36 = \frac{40 \times 2436}{100 \times 100}$$

$$= \frac{97440}{10000} = 9.744.$$

(*ii*) 10% of 69 litres

$$= \frac{10}{100} \times 69 \text{ litres} = 6.9 \text{ litres.}$$

(*iii*) 35% of 980

$$= \frac{35}{100} \times 980 = \frac{3430}{10} = 343.$$

11. (*i*) 100% of Raju's weight

$$= \frac{7.2}{10} \times 100 \text{ kg} = 72 \text{ kg.}$$

So, Raju's weight is 72 kg.

(*ii*) 100% of the journey

$$= \frac{62}{50} \times 100 \text{ km} = 124 \text{ km}$$

So, the whole journey is 124 km long.

(*iii*) $\because$ 5% of the enrolment = 75

$\therefore \quad$ 100% of the enrolment

$$= \frac{75}{5} \times 100 = 75 \times 20 = 1500$$

So, the strength of the school is 1500 children.

(*iv*) $\because$ 30% of the total marks = 60

$\therefore$ 100% of the total marks

$$= \frac{60}{30} \times 100 = 200$$

So, the total marks of the paper is 200.

WORKSHEET–75

1. Let the CP of the cow providing profit be x_1 and the CP of the cow providing loss be x_2.

So $\quad x_1 \times \dfrac{110}{100} = 1980$

and $\quad x_2 \times \dfrac{90}{100} = 1980$

or $\quad x_1 = \dfrac{1980 \times 10}{11}$ and $x_2 = \dfrac{1980 \times 10}{9}$

or $\quad x_1 = 1800$ and $x_2 = 2200$

Hence, the cost prices of the cows were ₹ 1800 and ₹ 2200 respectively.

2. Cost price for me = ₹ 1275

Profit = 10% of ₹ 1275 = ₹ $\frac{10}{100} \times 1275$

= ₹ 127.50

Selling price for me

= ₹ 1275 + ₹ 127.50

= ₹ 1402.50.

3. I = ₹ 1080, T = 2 years, P = ₹ 9000, R = ?

We have $I = \frac{PRT}{100}$

$\therefore \quad R = \frac{I \times 100}{P \times T}$

$\therefore \quad R = \frac{1080 \times 100}{9000 \times 2} = \frac{108}{18} = 6$

So, the rate of interest is 6% per annum.

4. CP of the machine providing profit

= ₹ 120000 × $\frac{100}{125}$

= ₹ 960 × 100

= ₹ 96000

CP of the machine providing loss

= ₹ 120000 × $\frac{100}{75}$

= ₹ 1600 × 100

= ₹ 160000

Total CP = ₹ 96000 + ₹ 160000

= ₹ 256000

Total SP = 2 × ₹ 120000 = ₹ 240000

Since CP > SP. So, there is a loss.

Loss = ₹ 256000 – ₹ 240000 = ₹ 16000

Loss per cent = $\frac{\text{Loss}}{\text{Total CP}} \times 100\%$

$= \frac{16000}{256000} \times 100\%$

$= \frac{100}{16}\% = 6\frac{1}{4}\%.$

5. Total CP for Shyam

= 45000 + 200 = ₹ 45200

Profit = $\frac{\text{Profit\%} \times \text{CP}}{100}$

= $\frac{10 \times 45200}{100}$ = ₹ 4520.

6. CP of fan = 1200 + 200 = ₹ 1400

SP of fan to gain 10%

= 1400 + 1400 × $\frac{10}{100}$

= 1400 + 140 = ₹ 1540.

7. P = ₹ 500, I = ₹ 105, T = 6 years, R = ?

$I = \frac{PRT}{100}$ or $R = \frac{I \times 100}{PT}$

$\therefore \quad R = \frac{105 \times 100}{500 \times 6} = \frac{21}{6} = \frac{7}{2} = 3.5\%.$

8. P = ₹ 300, I = ₹ 60, R = 5%, T = ?

$I = \frac{PRT}{100}$ or $T = \frac{I \times 100}{PR}$

$\therefore \quad T = \frac{60 \times 100}{300 \times 5}$ = 4 years.

9. ∵ In 2100 km petrol consumed

= 28 litres

∴ In 1 km petrol consumed

= $\frac{28}{2100}$ litre

∴ In 3600 km petrol consumed

= $\frac{28}{2100}$ × 3600 litres

= $\frac{4 \times 36}{3}$ litres = 48 litres.

10. Cost of 1 chair = $\frac{3532.50}{15}$ = ₹ 235.50

Number of chairs

$$= \frac{₹\ 5416.50}{\text{Cost of 1 chair}}$$

$$= \frac{₹\ 5416.50}{₹\ 235.50} = \frac{541650}{23550}$$

$$= 23.$$

11. (*i*) $x : 5 :: 28 : 35$

or $\frac{x}{5} = \frac{28}{35}$

$\therefore$ $x = \frac{5 \times 28}{35} = \frac{28}{7} = 4.$

(*ii*) $16 : x :: x : 25$

or $\frac{16}{x} = \frac{x}{25}$

or $x^2 = 16 \times 25 = 4 \times 4 \times 5 \times 5$

$\therefore$ $x = 4 \times 5 = 20.$

12. (*i*) $\because$ 150 steps = 125 m

$\therefore$ 1 step $= \frac{125}{150}$ m $= \frac{5}{6}$ m

$\therefore$ 360 steps $= \frac{5}{6} \times 360$ m

= 300 m

Harsh covers a distance of 300 m in 360 steps.

(*ii*) Required number of steps

$$= \frac{172.8 \text{ m}}{\text{Distance in 1 step}}$$

$$= \frac{172.8 \text{ m}}{\frac{5}{6} \text{ m}} = \frac{1728}{10} \times \frac{6}{5} = 207.36$$

Clearly Harsh takes 207 steps and a fraction of 1 step, but the step cannot be in decimal.

So, he will take 208 steps.

WORKSHEET–76

1. (*i*) Ratio of $\frac{1}{2}$ and $\frac{1}{4} = \frac{1}{2} : \frac{1}{4} = 2 : 1$

Ratio of $\frac{1}{7}$ and $\frac{1}{14} = \frac{1}{7} : \frac{1}{14} = 2 : 1$

Since $\frac{1}{2} : \frac{1}{4} = \frac{1}{7} : \frac{1}{14}$.

Therefore, $\frac{1}{2}, \frac{1}{4}, \frac{1}{7}, \frac{1}{14}$ are in proportion.

(*ii*) Ratio of 2 and $3\frac{1}{2} = 2 : \frac{7}{2} = 4 : 7$

Ratio of 3 and $4\frac{1}{2} = 3 : \frac{9}{2} = 6 :9$

$= 4 : 6$

Since $4 : 7 \neq 4 : 6$

Therefore, 2, $3\frac{1}{2}$, 3, $4\frac{1}{2}$ are not in proportion.

2. $\because$ Weight of wheat in 12 bags = 90 kg

$\therefore$ Weight of wheat in 1 bag

$= \frac{90}{12}$ kg $= \frac{15}{2}$ kg

$\therefore$ Weight of wheat in 20 bags

$= \frac{15}{2} \times 20$ kg = 150 kg.

3. $\because$ Cost of 16 books = ₹ 72

$\therefore$ Cost of 1 book = ₹ $\frac{72}{16}$ = ₹ $\frac{9}{2}$

$\therefore$ Cost of 30 books = ₹ $\frac{9}{2} \times 30$

= ₹ 135

Required number of books

$$= \frac{₹\ 207}{\text{Cost of 1 book}} = \frac{₹\ 207}{₹\ \frac{9}{2}}$$

$$= \frac{207 \times 2}{9} = 23 \times 2 = 46.$$

4. $\because$ Distance covered in 450 steps

$= 225$ m

$\therefore$ Distance covered in 1 step

$$= \frac{225}{450} \text{ m} = \frac{1}{2} \text{ m}$$

$\therefore$ Distance covered in 900 steps

$$= \frac{1}{2} \times 900 \text{ m} = 450 \text{ m}.$$

5. (*i*) Required percentage

$$= \frac{25 \text{ paise}}{₹\ 2} \times 100\%$$

$$= \frac{25 \text{ paise}}{200 \text{ paise}} \times 100\%$$

$$= \frac{25}{2}\% = 12\frac{1}{2}\%.$$

(*ii*) Required percentage

$$= \frac{75 \text{ m}}{1 \text{ km}} \times 100\%$$

$$= \frac{75 \text{ m}}{1000 \text{ m}} \times 100\% = \frac{75}{10}\%$$

$= 7.5\%$.

6. $4.8\% = \frac{4.8}{100} = \frac{48}{1000} = \frac{6}{125}$.

7. (*i*) Required percentage

$$= \frac{400 \text{ m}}{4 \text{ km}} \times 100\%$$

$$= \frac{400 \text{ m}}{4000 \text{ m}} \times 100\% = 10\%.$$

(*ii*) Required percentage

$$= \frac{40 \text{ kg}}{1 \text{ quintal}} \times 100\%$$

$$= \frac{40 \text{ kg}}{100 \text{ kg}} \times 100\% = 40\%.$$

8. (*i*) 75% of 400

$$= \frac{75}{100} \times 400 = 75 \times 4 = 300$$

Decreasing 300 from 400, we get 400 – 300 = 100.

(*ii*) 5% of 120

$$= \frac{5}{100} \times 120 = \frac{600}{100} = 6$$

Increasing ₹ 6 in, we get

₹ 120 + ₹ 6 = ₹ 126.

9. CP = SP + Loss = ₹ 20 + ₹ 5 = ₹ 25

$$\text{Loss per cent} = \frac{\text{Loss}}{\text{CP}} \times 100\%$$

$$= \frac{5}{25} \times 100\% = \frac{100}{5}\%$$

$= 20\%$.

10. $$\text{Gain per cent} = \frac{\text{Gain}}{\text{CP}} \times 100$$

$$\text{or Gain} = \frac{\text{CP} \times \text{Gain per cent}}{100}$$

$$= \frac{20.25 \times 10}{100} = ₹\ 2.025$$

SP = Gain + CP

= ₹ 2.025 + ₹ 20.25 = ₹ 22.275

= ₹ 22.28.

11. Number of papaya trees = 40% of 480

$$= \frac{40}{100} \times 480 = 4 \times 48 = 192$$

Number of other trees = 480 – 192

= 288.

12. (*i*) Let the fourth proportion be x.

Then, $8 : 32 = 217 : x$ or $\frac{8}{32} = \frac{217}{x}$.

or $\frac{1}{4} = \frac{217}{x}$

$\therefore \quad x = 4 \times 217 = 868$

Thus, the fourth proportion is 868.

(*ii*) Let the fourth proportion be y.

Then 3 kg : 7 kg = 15 kg : y

$$\text{or} \quad \frac{3}{7} = \frac{15}{y}$$

$$\therefore \quad y = \frac{7 \times 15}{3} = 7 \times 5 = 35$$

Thus, the fourth proportion is 35 kg.

WORKSHEET–77

1. CP = Buying price + Transportation charges

= ₹ 80000 + ₹ 1000 = ₹ 81000

SP = ₹ 50000

Loss = CP – SP

= ₹ 81000 – ₹ 50000 = ₹ 31000

$$\text{Loss\%} = \frac{\text{Loss}}{\text{CP}} \times 100\%$$

$$= \frac{₹\,31000}{₹\,81000} \times 100\% = \frac{3100}{81}\%$$

$$= 38\frac{22}{81}\%.$$

2. $\text{SP} = \text{CP} + \text{CP} \times \dfrac{\text{Gain\%}}{100}$

$$= 200 + 200 \times \frac{10}{100}$$

$$= 200\left(1 + \frac{10}{100}\right) = 200 \times \frac{11}{10} = 220$$

So, the selling price is ₹ 220.

3. Let CP = x

$$\text{SP} = \text{CP} - \text{CP} \times \frac{\text{Loss\%}}{100}$$

$$\therefore \; 8 = x - x \times \frac{20}{100} \text{ or } 8 = x\left(1 - \frac{20}{100}\right)$$

$$\text{or } 8 = x \times \frac{4}{5} \text{ or } x = \frac{8 \times 5}{4} \text{ or } x = 10$$

Hence, the cost price is ₹ 10.

4. Let CP of 1 chair be x

Then CP of 10 chairs = $10x$

$\therefore$ SP of 16 chairs = $10x$

$$\therefore \quad \text{SP of 1 chair} = \frac{10x}{16} = \frac{5x}{8}$$

Since the CP of 1 chair is greater than the SP of 1 chair. Therefore, there is loss.

$$\text{Loss on 1 chair} = x - \frac{5x}{8} = \frac{3x}{8}$$

$$\text{Loss \%} = \frac{\text{Loss}}{\text{CP of 1 chair}} \times 100\%$$

$$= \frac{\frac{3x}{8}}{x} \times 100\% = \frac{3 \times 100}{8}\%$$

$$= \frac{3 \times 25}{2}\% = 37\frac{1}{2}\%.$$

5. Let CP of 1 article = x

$\therefore$ CP of 6 articles = $6x$

$\therefore$ SP of 4 articles = $6x$

$$\therefore \quad \text{SP of 1 article} = \frac{6x}{4} = \frac{3x}{2}$$

Gain = SP of 1 article – CP of 1 article

$$= \frac{3x}{2} - x = \frac{x}{2}$$

$$\text{Gain\%} = \frac{\text{Gain}}{\text{CP of 1 article}} \times 100\%$$

$$= \frac{\frac{x}{2}}{x} \times 100\% = 50\%.$$

6. P = ₹ 8500, R = 18%, T = 3 years

$$I = \frac{PRT}{100} = \frac{8500 \times 18 \times 3}{100} = 85 \times 54$$

= ₹ 4590

Amount = Principal + Interest

= ₹ 8500 + ₹ 4590 = ₹ 13090.

7. P = ₹ 300, Amount = ₹ 300 × 2 = ₹ 600,
I = Amount – P = ₹ 600 – ₹ 300 = ₹ 300,
R = 4%

We have $I = \frac{PRT}{100}$ or $T = \frac{I \times 100}{P \times R}$

∴ $T = \frac{300 \times 100}{300 \times 4} = 25$ years.

8. ∵ Cost of 280 match boxes = ₹ 36

∴ Cost of 1 match box = ₹ $\frac{36}{280}$

∴ Cost of 650 match boxes

= ₹ $\frac{36}{280} \times 650$ = ₹ $\frac{9}{7} \times 65$

= ₹ 83.57.

9. Let the third proportion be *x*.

Then $\frac{25}{4\frac{1}{6}} = \frac{x}{25}$ or $\frac{25 \times 6}{25} = \frac{x}{25}$

∴ $x = \frac{25 \times 25 \times 6}{25} = 150.$

10. Let the fourth proportion be *x*.

Then $\frac{4.8}{1.6} = \frac{5.4}{x}$

∴ $x = \frac{1.6 \times 5.4}{4.8} = \frac{16 \times 54}{48 \times 10}$

$= \frac{54}{3 \times 10} = 1.8.$

11. $\frac{\text{Original price}}{\text{New price}} = \frac{3}{5}$

or New price = $\frac{5}{3}$ × Original price

= $\frac{5}{3}$ × 7500 = 5 × 2500
= 12,5000

So, the new price is ₹ 12,500.

12. Let principal = *x*

Then amount = 2*x*

∴ Interest, I = 2*x* – *x* = *x*

T = 20 years

Now $I = \frac{PRT}{100}$ or $R = \frac{I \times 100}{PT}$

∴ $R = \frac{x \times 100}{x \times 20} = \frac{100}{20} = 5$

Thus, the rate of interest is 5% per annum.

WORKSHEET–78

1. 1 litre = 1000 mL

10 mL% = $\frac{10}{1000} \times 100 = 1\%.$

2. Capacity of Jug = 1.5 litre
= 1500 mL

Capacity of a glass = $\frac{1500\text{ mL}}{6}$ = 250 mL

Now, ratio of a glass to the 1 Jug

$= \frac{250}{1500} = \frac{1}{6} = 1 : 6.$

3. P = ₹ 400
R = 5% p.a
SI = ₹ 240

$T = \frac{S.I \times 100}{P \times R}$

$T = \frac{240 \times 100}{400 \times 5} = 12$

T = 12 years.

4. Weight of man = 40 kg
Weight he able to carry = 50 × 40
= 2000 kg.

5. SI = 2 paise,
P = ₹ 1 = 100 paise

Time = 6 months = $\frac{1}{2}$ year

Rate of Interest = $\frac{SI \times 100}{P \times T} = \frac{2 \times 100}{100 \times \frac{1}{2}}$

$$= \frac{200 \times 2}{100} = 4\%.$$

6. A shop has 120 shirts

Deffective shirts = 20

$\therefore$ Percentage of defective shirts

$$= \frac{20}{120} \times 100$$

$$= \frac{100}{6} = \frac{50}{3} = 16\frac{2}{3}\%.$$

7. CP = ₹ 800

SP = ₹ 920

Profit = SP – CP

Profit = ₹ 920 – ₹ 800

Profit = ₹ 120

$$\text{Profit }\% = \frac{\text{Profit}}{\text{CP}} \times 100$$

$$\text{Profit }\% = \frac{120}{800} \times 100$$

Profit % = 15

Profit = 15%.

8. SP = ₹ 255

Loss = 15%

Let cost price = ₹ x

Loss = CP – SP

Loss = $x - 255$

According to question,

$$\frac{x - 255}{x} = \frac{15}{100}$$

$100\,x - 25500 = 15x$

$85x = 25500$

$$x = \frac{25500}{85}$$

$x = 300$

CP = ₹ 300.

9. Number of pages in book = 12 × 8

= 96 pages

Number of days if she reads 16 pages per day $= \frac{96}{16} = 6$ days.

❑❑

Chapter

10 RATIONAL NUMBERS

WORKSHEET–79

1. (D) $\frac{30}{-45} = \frac{-30}{45} = \frac{-2}{3}$.

2. (A) $\frac{4}{5}$ = 0.8. It is less than 1.

So, $\frac{4}{5}$ lies to the left of 1.

3. (B) $\frac{4}{7}$ is a positive quantity and – 1 is a negative quantity

So, $\frac{4}{7} > -1$.

4. (B) A number which is greater than – 3 and less than – 2 is

$$-2.5 \text{ or } -\frac{25}{10} \text{ or } \frac{-5}{2}.$$

5. (A) LCM of 5, 7 and 9 = 5 × 7 × 9 = 315

$$\frac{-4}{5} = \frac{-4}{5} \times \frac{63}{63} = \frac{-252}{315}$$

$$\frac{-6}{7} = \frac{-6}{7} \times \frac{45}{45} = \frac{-270}{315}$$

$$\frac{-8}{9} = \frac{-8}{9} \times \frac{35}{35} = \frac{-280}{315}$$

$$\because \frac{-280}{315} < \frac{-270}{315} < \frac{-252}{315}$$

$$\therefore \frac{-8}{9} < \frac{-6}{7} < \frac{-4}{5}$$

So, $\frac{-4}{5}$ is the greatest.

6. (D) $\frac{3}{5} = \frac{-3}{-5} \neq \frac{-5}{-3}$.

7. (B) Next two numbers in the pattern – 1, – 2, – 3 are – 4 and – 5 respectively.

Next two numbers in the pattern 3, 6, 9 are 12 and 15 respectively.

Therefore, the required numbers are $\frac{-4}{12}$ and $\frac{-5}{15}$.

8. (C) $\frac{-46}{72} = \frac{-23 \times 2}{36 \times 2} = \frac{-23}{36}$.

9. (D) P = $\frac{11}{3}$ = 3.666...

Therefore, P lies between 3 and 4.

10. (A) Since 3, 7, 9 are in the ascending order.

Therefore, $\frac{3}{5}, \frac{7}{5}, \frac{9}{5}$ are in the ascending order.

11. (B) LCM of 4, 7, and 8 is 56

$$\frac{-5}{7} = \frac{-40}{56}; \frac{-5}{4} = \frac{-70}{56}; \frac{-5}{8} = \frac{-35}{56}$$

∵ – 35, – 40, – 70 are in the descending order.

∴ $\frac{-35}{56}, \frac{-40}{56}, \frac{-70}{56}$ are in the descending order.

∴ $\frac{-5}{8}, \frac{-5}{7}, \frac{-5}{4}$ are in the descending order.

12. (A) LCM of 10 and 15 is 30.

$$\frac{-9}{10} - \frac{11}{15} = \frac{-9\times 3 - 11\times 2}{30}$$

$$= \frac{-27-22}{30} = \frac{-49}{30}.$$

13. (C) $\frac{1}{2} - \frac{1}{3} = \frac{3-2}{6} = \frac{1}{6}.$

14. (B) $-\frac{7}{2} \times \left(-\frac{4}{3}\right) = \frac{7}{2} \times \frac{4}{3}$

[$\because -a \times (-b) = a \times b$]

$$= \frac{14}{3}.$$

15. (C) Reciprocal of $\frac{-7}{2}$ is $\frac{1}{\left(\frac{-7}{2}\right)}$

$$= \frac{2}{-7} = \frac{-2}{7}.$$

16. (D)Reciprocal of 1= $\frac{1}{1}$ = 1

The product of 1 and its reciprocal

= 1 × 1 = 1.

WORKSHEET–80

1. (*i*) $\frac{-2}{3} = -\left(\frac{2}{3}\right)$

It is a negative rational number.

(*ii*) $\frac{4}{-5} = \frac{-4}{5} = -\left(\frac{4}{5}\right)$

It is a negative rational number.

2.

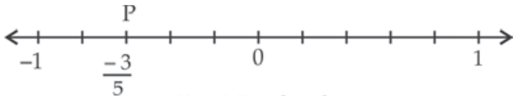


Fig: Number line

The point P represents $\frac{-3}{5}$ on the number line.

3. $-3\frac{1}{2} = -\left(3\frac{1}{2}\right) = \frac{-7}{2}$

$$= \frac{-7\times 5}{2\times 5} = \frac{-35}{10}$$

$$-4\frac{2}{5} = -\left(4\frac{2}{5}\right) = \frac{-22}{5}$$

$$= \frac{-22\times 2}{5\times 2} = \frac{-44}{10}$$

$$\because \quad \frac{-35}{10} > \frac{-44}{10}$$

Therefore, $-3\frac{1}{2}$ is greater integer.

4. $\frac{2}{3} = \frac{2\times 2}{3\times 2} = \frac{4}{6}$

$\because -1 < 1 < 4$

$\therefore \frac{-1}{6} < \frac{1}{6} < \frac{4}{6}$ or $\frac{-1}{6} < \frac{1}{6} < \frac{2}{3}$

i.e., $\frac{-1}{6}, \frac{1}{6}, \frac{2}{3}$ are in ascending order.

5. $\frac{-7}{12} \div 14 = \frac{-7}{12} \div \frac{14}{1} = \frac{-7}{12} \times \frac{1}{14}$

$$= \frac{-1}{12\times 2} = -\frac{1}{24}.$$

6. (*i*) Reciprocal of $\frac{-1}{7} = \frac{1}{\left(\frac{-1}{7}\right)}$

$$= \frac{7}{-1} = -7.$$

(*ii*) Reciprocal of $\frac{-5}{-11} = \frac{1}{\left(\frac{-5}{-11}\right)}$

$$= \frac{-11}{-5} = \frac{11}{5}.$$

7. $\frac{-2}{7} = \frac{-2}{7} \times \frac{11}{11} = \frac{-22}{77} = \frac{-22}{77} \times \frac{4}{4}$

$$= \frac{-88}{308}$$

$$\frac{-3}{11} = \frac{-3}{11} \times \frac{7}{7} = \frac{-21}{77} = \frac{-21}{77} \times \frac{4}{4}$$

$$= \frac{-84}{308}$$

$$\because \quad \frac{-88}{308} < \frac{-87}{308} < \frac{-86}{308} < \frac{-85}{308}$$

$$< \frac{-84}{308}$$

Therefore, the required three rational numbers are:

$$\frac{-87}{308}, \frac{-86}{308} \text{ and } \frac{-84}{308}.$$

8. First term $= \dfrac{1}{-8}$

Second term $= \dfrac{2}{-16} = \dfrac{2}{-8 \times 2}$

Third term $= \dfrac{3}{-24} = \dfrac{3}{-8 \times 3}$

Fourth term $= \dfrac{4}{-32} = \dfrac{4}{-8 \times 4}$

Similarly, fifth term $= \dfrac{5}{-8 \times 5} = \dfrac{5}{-40}$

sixth term $= \dfrac{6}{-8 \times 6} = \dfrac{6}{-48}$

and seventh term $= \dfrac{7}{-8 \times 7} = \dfrac{7}{-56}$.

9. (*i*) $\dfrac{3}{4} = \dfrac{3 \times (-6)}{4 \times (-6)} = \dfrac{-18}{-24}$

$$\left(\because \frac{-24}{4} = -6\right)$$

So, the required rational number is – 18.

(*ii*) $\dfrac{8}{42} = \dfrac{4}{21} = \dfrac{4 \times (-1)}{21 \times (-1)} = \dfrac{-4}{-21}$

$$\left(\because \frac{-21}{21} = -1\right)$$

So, the required rational number is – 4.

10. (*i*) $\dfrac{-5}{13} + \dfrac{(-2)}{13} = \dfrac{-5+(-2)}{13}$

(Denominators are same)

$$= \frac{-5-2}{13} = \frac{-7}{13}.$$

(*ii*) $\dfrac{-3}{8} + \dfrac{18}{20} = \dfrac{-3}{8} + \dfrac{9}{10}$

$$= \frac{-3 \times 5 + 9 \times 4}{40}$$

$$= \frac{-15 + 36}{40} = \frac{21}{40}.$$

11. (*i*) $\dfrac{6}{14} - \left(\dfrac{-5}{7}\right) = \dfrac{6}{14} + \dfrac{5}{7} = \dfrac{6+10}{14}$

$$= \frac{16}{14} = \frac{8}{7} = 1\frac{1}{7}.$$

(*ii*) $\dfrac{5}{16} - \left(\dfrac{-2}{8}\right) = \dfrac{5}{16} + \dfrac{2}{8}$

$$= \frac{5+4}{16} = \frac{9}{16}.$$

12. (*i*) $\dfrac{-7}{12} \times 8 = \dfrac{-(7 \times 8)}{12} = \dfrac{-56}{12} = \dfrac{-14}{3}$

$$= -4\frac{2}{3}.$$

(*ii*) $\dfrac{4}{10} \times \dfrac{-5}{12} \times \dfrac{2}{5} = \dfrac{4}{12} \times \dfrac{-5}{5} \times \dfrac{2}{10}$

$$= \frac{1}{3} \times (-1) \times \frac{1}{5}$$

$$= -\frac{1}{15}.$$

13. (*i*) Let us find LCM of 12, 4 and 8.

2	12, 4, 8
2	6, 2, 4
2	3, 1, 2
3	3, 1, 1
	1, 1, 1

∴ LCM = 2 × 2 × 2 × 3 = 24

Now, $\frac{1}{12} + \left(\frac{-3}{4}\right) + \frac{7}{8}$

$$= \frac{2 \times 1 + 6 \times (-3) + 3 \times 7}{24}$$

$$= \frac{2 - 18 + 21}{24} = \frac{5}{24}.$$

(*ii*) $3\frac{2}{5} - \frac{7}{10} + \left(\frac{-2}{15}\right) - 10\frac{1}{30}$

$$= \frac{17}{5} - \frac{7}{10} - \frac{2}{15} - \frac{301}{30}$$

$$= \frac{6 \times 17 + 3 \times (-7) + 2 \times (-2) + 1 \times (-301)}{30}$$

$$= \frac{102 - 21 - 4 - 301}{30} = \frac{-224}{30}$$

[$\because$ LCM (5, 10, 15, 30) = 30]

$$= \frac{-112}{15} = -7\frac{7}{15}.$$

WORKSHEET–81

1. Three rational numbers between 3 and – 3 are 2, 1 and 0.

2. A non-zero number and its reciprocal are multiplicative inverse each other.

So, the required fraction

$$= \text{Reciprocal of } \frac{-2}{-5}$$

$$= \frac{-5}{-2}.$$

3. (*i*) In $\frac{-7}{8}$;

8 is a positive and – 7 is a negative. So, this is a negative rational number.

(*ii*) In $\frac{-2}{-3}$; – 2 and – 3 both are negative. So, this is a positive rational number.

(*iii*) In $\frac{0}{11}$; 0 is neither positive nor negative and 11 is a positive. So, this rational number is neither positive nor negative.

(*iv*) In $\frac{12}{15}$; 12 and 15 both are positive. So, the rational number is positive.

4. LCM (2, 3, 4, 8) = 24

$$\frac{-1}{2} = \frac{-1 \times 12}{2 \times 12} = \frac{-12}{24}$$

$$\frac{-1}{4} = \frac{-1 \times 6}{4 \times 6} = \frac{-6}{24}$$

$$\frac{2}{3} = \frac{2 \times 8}{3 \times 8} = \frac{16}{24}$$

$$\frac{-5}{8} = \frac{-5 \times 3}{8 \times 3} = \frac{-15}{24}$$

Since 16, – 6, – 12, – 15 are in descending order.

Therefore, $\frac{16}{24}, \frac{-6}{24}, \frac{-12}{24}, \frac{-15}{24}$ are in descending order.

Therefore, $\frac{2}{3}, \frac{-1}{4}, \frac{-1}{2}, \frac{-5}{8}$ are in descending order.

5.

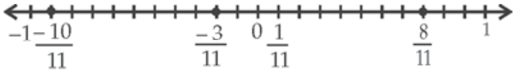


Fig: Number line

6. (*i*) $\frac{25}{12} + (-1) = \frac{25}{12} - 1 = \frac{25}{12} - \frac{1}{1}$

$$= \frac{25 - 12}{12} = \frac{13}{12}$$

$$= 1\frac{1}{12}.$$

(*ii*) $\frac{-3}{5} + \frac{3}{7} + \frac{-6}{35} = \frac{-3}{5} + \frac{3}{7} - \frac{6}{35}$

$$= \frac{-21 + 15 - 6}{35}$$

$$= \frac{-12}{35}.$$

7. (*i*) $\frac{-12}{30} - \frac{7}{15} = \frac{-12-14}{30} = \frac{-26}{30}$

$= \frac{-13}{15}.$

(*ii*) $\frac{-1}{26} - \left(\frac{4}{-13}\right) = \frac{-1}{26} + \frac{4}{13}$

$= \frac{-1+8}{26} = \frac{7}{26}.$

8. (*i*) $\frac{-6}{13} \times \frac{-26}{-12} = \frac{-6}{13} \times \frac{26}{12}$

$= \frac{-6}{12} \times \frac{26}{13}$

$= \frac{-1}{2} \times \frac{2}{1} = \frac{-2}{2}$

$= -1.$

(*ii*) $\frac{-15}{19} \div \frac{30}{38} = \frac{-15}{19} \times \frac{38}{30} = \frac{-15}{30} \times \frac{38}{19}$

$= \frac{-1}{2} \times \frac{2}{1} = \frac{-2}{2} = -1.$

9. (*i*) $\frac{-1}{3} = \frac{-1 \times 2}{3 \times 2} = \frac{-2}{6}$

$\frac{-1}{3} = \frac{-1 \times 3}{3 \times 3} = \frac{-3}{9}$

$\frac{-1}{3} = \frac{-1 \times 4}{3 \times 4} = \frac{-4}{12}$

Now, three rational numbers equivalent to $\frac{-1}{3}$ are $\frac{-2}{6}$; $\frac{-3}{9}$ and $\frac{-4}{12}$.

(*ii*) $\frac{-2}{-5} = \frac{-2 \times 2}{-5 \times 2} = \frac{-4}{-10}$

$\frac{-2}{-5} = \frac{-2 \times 3}{-5 \times 3} = \frac{-6}{-15}$

$\frac{-2}{-5} = \frac{-2 \times 4}{-5 \times 4} = \frac{-8}{-20}$

Now, three rational numbers equivalent to $\frac{-2}{-5}$ are $\frac{-4}{-10}$, $\frac{-6}{-15}$ and $\frac{-8}{-20}$.

10. (*i*) $\frac{2}{10} + \left(\frac{-12}{15}\right) + \left(\frac{-9}{20}\right)$

$= \frac{1}{5} + \left(\frac{-4}{5}\right) + \left(\frac{-9}{20}\right)$

$= \frac{4+(-16)+(-9)}{20}$

$= \frac{4-16-9}{20} = \frac{4-25}{20}$

$= \frac{-21}{20}$ or $-1\frac{1}{20}$.

(*ii*) $2\frac{1}{7} + \left(\frac{-3}{14}\right) + \left(\frac{-1}{28}\right) + 1\frac{1}{4}$

$= \frac{15}{7} + \left(\frac{-3}{14}\right) + \left(\frac{-1}{28}\right) + \frac{5}{4}$

$= \frac{60+(-6)+(-1)+35}{28}$

$= \frac{95-7}{28} = \frac{88}{28} = \frac{22}{7}$

$= 3\frac{1}{7}.$

WORKSHEET–82

1. Three rational numbers are

$\frac{-6}{11} \times \frac{2}{2}$, $\frac{-6}{11} \times \frac{3}{3}$ and $\frac{-6}{11} \times \frac{4}{4}$

i.e., $\frac{-12}{22}$, $\frac{-18}{33}$ and $\frac{-24}{44}$.

2. (*i*) $\frac{8}{-17} = \frac{8 \times (-1)}{-17 \times (-1)}$

(Multiplying numerator and denominator by – 1)

$= \frac{-8}{17}$.

(*ii*) $\frac{21}{-25} = \frac{21 \times (-1)}{-25 \times (-1)}$

(Multiplying numerator and denominator by – 1)

$= \frac{-21}{25}$.

3. $\frac{-15}{16} = \frac{-15}{16} \times \frac{-6}{-6}$

$(\because -96 \div 16 = -6)$

$= \frac{15 \times 6}{-(16 \times 6)} = \frac{90}{-96}$.

4. $\frac{19}{-5} = \frac{19}{-5} \times \frac{-2}{-2}$

$(\because -38 \div 19 = -2)$

$= \frac{-(19 \times 2)}{5 \times 2} = \frac{-38}{10}$.

5. Since $-3 < -2\frac{7}{12} < -2$

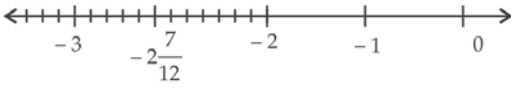


Fig: Number line

Therefore, $-2\frac{7}{12}$ is situated between – 3 and – 2 on a number line.

6. Absolute value of $\frac{-5}{3}$ is $\frac{5}{3}$.

7. Let the reciprocal of $\frac{-7}{-13}$ is x.

Then $\frac{-7}{-13} \times x = 1$ or $\frac{7x}{13} = \frac{1}{1}$

$\therefore \qquad x = \frac{-13}{-7}$.

8. True. As negative numbers and positive numbers are on opposite sides of zero on the number line, $\frac{1}{16}$ and – 1 are on opposite sides of zero on the number line.

9. (*i*) $\frac{3}{-14} = \frac{-3}{14} \times \frac{21}{21} = \frac{-63}{294}$

$\frac{-5}{21} = \frac{-5}{21} \times \frac{14}{14} = \frac{-70}{294}$

$\because -63 > -70 \quad \therefore \frac{-63}{294} > \frac{-70}{294}$

$\therefore \quad \frac{3}{-14} > \frac{-5}{21}$

i.e., $\frac{3}{-14}$ is greater

(*ii*) $\frac{-5}{9} = \frac{-5}{9} \times \frac{16}{16} = \frac{-80}{144}$

$\frac{11}{-16} = \frac{11}{-16} \times \frac{-9}{-9} = \frac{-99}{144}$

$\because \; -80 > -99 \quad \therefore \frac{-80}{144} > \frac{-99}{144}$

$\therefore \quad \frac{-5}{9} > \frac{11}{-16}$

i.e., $\frac{-5}{9}$ is greater.

10. $\frac{7}{9}$ is the absolute value of $\frac{-7}{9}$ and $\frac{7}{9}$ itself.

11. (*i*) Let us first find LCM of 4, 8, and 12.

2	4, 8, 12
2	2, 4, 6
2	1, 2, 3
3	1, 1, 3
	1, 1, 1

$\therefore$ LCM = 2 × 2 × 2 × 3 = 24

$$\text{Now, } \frac{-3}{4} + \frac{7}{8} + \frac{-11}{12}$$

$$= \frac{-18+21-22}{24} = \frac{-19}{24}.$$

(*ii*) Let us first find LCM of 3, 5 and 15.

$\therefore$ LCM = 3 × 5 = 15

3	3, 5, 15
5	1, 5, 5
	1, 1, 1

$$\text{Now, } \frac{8}{15} + \frac{-3}{5} + \frac{-1}{3}$$

$$= \frac{8-9-5}{15} = \frac{-6}{15} = \frac{-2}{5}.$$

12. (*i*) $\frac{4}{10} \times \frac{-5}{12} \times \frac{2}{5} = \frac{4}{12} \times \frac{-5}{5} \times \frac{2}{10}$

$$= \frac{1}{3} \times \frac{(-1)}{1} \times \frac{1}{5}$$

$$= \frac{1 \times (-1) \times 1}{3 \times 1 \times 5}$$

$$= \frac{-1}{15}$$

(*ii*) $\frac{-6}{11} \div \frac{-24}{22} = \frac{-6}{11} \times \frac{22}{-24}$

$$= \frac{6}{11} \times \frac{22}{24}$$

$$= \frac{6}{24} \times \frac{22}{11} = \frac{1}{4} \times \frac{2}{1}$$

$$= \frac{2}{4} = \frac{1}{2}.$$

(*iii*) Let us first find LCM of 8, 12 and 9.

2	8, 9, 12
2	4, 9, 6
2	2, 9, 3
3	1, 9, 3
3	1, 3, 1
	1, 1, 1

$\therefore$ LCM = 2 × 2 × 2 × 3 × 3 = 72

$$\text{Now, } \frac{1}{8} + \frac{5}{12} + \left(\frac{-2}{9}\right)$$

$$= \frac{9+30-16}{72} = \frac{39-16}{72}$$

$$= \frac{23}{72}.$$

(*iv*) $3\frac{1}{5} \times \frac{5}{11} \times 1\frac{1}{6} = \frac{16}{5} \times \frac{5}{11} \times \frac{7}{6}$

$$= \frac{16 \times 7}{11 \times 6} = \frac{8 \times 7}{11 \times 3}$$

$$= \frac{56}{33} = 1\frac{23}{33}.$$

WORKSHEET–83

1. 2 is the absolute value of $\frac{-2}{1}$ and $\frac{2}{1}$ itself.

2. Absolute values less than 4 can be 3, 2 and 1. Therefore, all required rational numbers are 3, – 3, 2, – 2, 1 and – 1.

3. (*i*) $\because$ 17 < 71

$\therefore$ $-17 \boxed{>} -71$.

(*ii*) $\frac{-6}{3} = \frac{-6 \times 2}{3 \times 2} = \frac{-12}{6}$

$\because$ 3 < 12

$\therefore$ – 3 > – 12

$\therefore \frac{-3}{6} > \frac{-12}{6}$ or $\frac{-3}{6} \boxed{>} \frac{-6}{3}$.

4. (*i*) $\frac{1}{2} - \frac{3}{4} = \frac{2}{4} - \frac{3}{4} = \frac{-1}{4}$

Reciprocal of $\frac{-1}{4} = \frac{4}{-1}$.

(*ii*) $\frac{5}{8} \times \frac{-3}{10} = \frac{5}{10} \times \frac{-3}{8} = \frac{1}{2} \times \frac{-3}{8}$

$$= \frac{-3}{16}.$$

$$\text{Reciprocal of } \frac{-3}{16} = \frac{16}{-3} = \frac{-16}{3}$$

$$= -5\frac{1}{3}.$$

5. $-3 = -3 \times \frac{3}{3} = \frac{-9}{3}$

$-4 = -4 \times \frac{3}{3} = \frac{-12}{3}$

$\frac{-12}{3} < \frac{-11}{3} < \frac{-10}{3} < \frac{-9}{3}.$

So two rational numbers are $\frac{-11}{3}$ and $\frac{-10}{3}$ (Answer may very).

6. (*i*) $\frac{-12}{20} = \frac{-3\times 4}{5\times 4} = \frac{-3}{5}$

(*ii*) $\frac{-10}{15} = \frac{-2\times 5}{3\times 5} = \frac{-2}{3}$

(*iii*) $\frac{-44}{80} = \frac{-11\times 4}{20\times 4} = \frac{-11}{20}.$

7. (*i*)

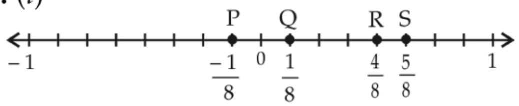


Fig: Number line

(*ii*)

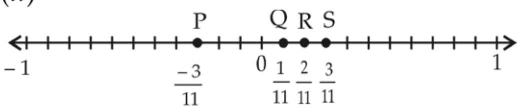


Fig: Number line

8. (*i*) $\frac{11}{18} \times (-9) + \frac{-1}{4} \times \frac{5}{6}$

$$= -\frac{11\times 9}{18} - \frac{5}{4\times 6}$$

$$= -\frac{11}{2} - \frac{5}{24} = \frac{-11\times 12 - 5\times 1}{24}$$

$$= \frac{-137}{24} = -5\frac{17}{24}.$$

(*ii*) $\left(\frac{21}{9}\times\frac{3}{7}\right) - \left(\frac{7}{8}\times\frac{16}{14}\right)$

$$= \left(\frac{21}{7}\times\frac{3}{9}\right) - \left(\frac{7}{14}\times\frac{16}{8}\right)$$

$$= \left(3\times\frac{1}{3}\right) - \left(\frac{1}{2}\times 2\right)$$

$$= 1 - 1 = 0.$$

(*iii*) $\left(\frac{-3}{2}\times\frac{4}{5}\right) + \left(\frac{9}{5}\times\frac{-10}{3}\right) - \left(\frac{1}{2}\times\frac{3}{4}\right)$

$$= \left(\frac{-3}{5}\times\frac{4}{2}\right) + \left(\frac{-10}{5}\times\frac{9}{3}\right) - \left(\frac{3}{2\times 4}\right)$$

$$= \left(\frac{-3}{5}\times 2\right) + (-2\times 3) - \frac{3}{8}$$

$$= \frac{-6}{5} - \frac{6}{1} - \frac{3}{8}$$

$$= \frac{-6\times 8 - 6\times 40 - 3\times 5}{40}$$

$$= \frac{-48 - 240 - 15}{40}$$

$$= \frac{-303}{40} = -7\frac{23}{40}.$$

WORKSHEET–84

1. (*i*) Reciprocal of $\frac{-8}{13} = \frac{1}{\left(\frac{-8}{13}\right)} = \frac{13}{-8}$

$$= \frac{-13}{8}.$$

(*ii*) Reciprocal of $\frac{-3}{-5} = \frac{1}{\left(\frac{-3}{-5}\right)} = \frac{-5}{-3}$

$$= \frac{5}{3}.$$

2. Distance = Time × Speed

$$= 8 \times 4\frac{1}{9} = 8 \times \frac{37}{9} = \frac{296}{9}$$

$$= 32\frac{8}{9} \text{ km.}$$

3. Let *x* would be added, then

$$x + \frac{-4}{15} = \frac{-5}{8}$$

$$\therefore \quad x = \frac{4}{15} + \frac{-5}{8}$$

$$= \frac{4 \times 8}{15 \times 8} + \frac{-5 \times 15}{8 \times 15}$$

$$= \frac{32}{120} + \frac{-75}{120} = \frac{32 - 75}{120}$$

$$= \frac{-43}{120}.$$

4. Let *x* would be subtracted. Then

$$\frac{4}{5} - x = \frac{2}{3}$$

$$\therefore \quad x = \frac{4}{5} - \frac{2}{3} = \frac{4 \times 3}{5 \times 3} - \frac{2 \times 5}{3 \times 5}$$

$$= \frac{12}{15} - \frac{10}{15} = \frac{2}{15}.$$

5. Let *y* would be added. Then

$$y + \frac{7}{8} + \frac{4}{5} = -\frac{7}{15}$$

$$\therefore \quad y = -\frac{7}{8} - \frac{4}{5} - \frac{7}{15}$$

$$= -\left(\frac{7}{8} + \frac{4}{5} + \frac{7}{15}\right) = -\frac{105 + 96 + 56}{120}$$

$$= -\frac{257}{120} = -2\frac{17}{120}.$$

6. Let *x* should be added. Then

$$x + \frac{1}{2} + \frac{1}{3} + \frac{1}{5} = 8$$

or $\quad x + \frac{15 + 10 + 6}{30} = 8$

[∵ LCM (2, 3, 5) = 30]

or $\quad x + \frac{31}{30} = 8$

$$\therefore \quad x = 8 - \frac{31}{30}$$

$$= \frac{240 - 31}{30} = \frac{209}{30}$$

or $\quad x = 6\frac{29}{30}$.

7. $\frac{-3}{4} - \frac{1}{-8} + \frac{11}{12} - \frac{-1}{16} + 0 - \frac{-1}{-16}$

$$= \frac{-3}{4} + \frac{1}{8} + \frac{11}{12} + \frac{1}{16} - \frac{1}{16}$$

$$= \frac{-3}{4} + \frac{1}{8} + \frac{11}{12}$$

$$= \frac{-18 + 3 + 22}{24} = \frac{7}{24}.$$

8. (*i*) $\left(\frac{25}{4} \times \frac{2}{5}\right) - \left(\frac{-1}{5} \times \frac{-10}{3}\right)$

$$= \left(\frac{25}{5} \times \frac{2}{4}\right) - \left(\frac{1}{3} \times \frac{10}{5}\right)$$

$$= \left(5 \times \frac{1}{2}\right) - \left(\frac{1}{3} \times 2\right)$$

$$= \frac{5}{2} - \frac{2}{3} = \frac{15 - 4}{6} = \frac{11}{6} = 1\frac{5}{6}.$$

(*ii*) $\left(\frac{-5}{9} \times \frac{72}{-200}\right) - \left(\frac{11}{18} \times \frac{36}{77}\right)$

$$+ \left(\frac{18}{-13} \times \frac{-52}{21}\right)$$

$$= \left(\frac{72}{9} \times \frac{5}{200}\right) - \left(\frac{11}{77} \times \frac{36}{18}\right) + \left(\frac{52}{13} \times \frac{18}{21}\right)$$

$$= \left(8 \times \frac{1}{40}\right) - \left(\frac{1}{7} \times 2\right) + \left(4 \times \frac{6}{7}\right)$$

$$= \frac{1}{5} - \frac{2}{7} + \frac{24}{7} = \frac{7 - 10 + 120}{35}$$

$$= \frac{117}{35} = 3\frac{12}{35}.$$

9. (*i*) $\frac{-7}{15} \times \frac{5}{-28} = \frac{7}{15} \times \frac{5}{28} = \frac{7}{28} \times \frac{5}{15}$

$$= \frac{1}{4} \times \frac{1}{3} = \frac{1}{12}.$$

(*ii*) $\frac{-55}{12} \times \frac{-96}{33} = \frac{55}{12} \times \frac{96}{33}$

$$= \frac{55}{33} \times \frac{96}{12}$$

$$= \frac{5}{3} \times \frac{8}{1} = \frac{40}{3}$$

$$= 13\frac{1}{3}.$$

10. (*i*) $\frac{15}{28} \times \frac{-119}{9} = \frac{15}{9} \times \frac{-119}{28}$

$$= \frac{5}{3} \times \frac{-17}{4}$$

$$= \frac{-5 \times 17}{3 \times 4} = \frac{-85}{12}.$$

(*ii*) $\frac{-19}{20} \times \frac{-30}{-57} = \frac{-19}{20} \times \frac{30}{57}$

$$= \frac{-19}{57} \times \frac{30}{20}$$

$$= \frac{-1}{3} \times \frac{3}{2} = \frac{-1}{2}.$$

(*iii*) $\frac{-39}{3} \times \frac{14}{5} \times \frac{-12}{56}$

$$= \frac{39}{3} \times \frac{14}{5} \times \frac{12}{56}$$

$$= \frac{13}{1} \times \frac{1}{4} \times \frac{12}{5}$$

$$= 13 \times \frac{3}{5} = \frac{39}{5}.$$

WORKSHEET–85

1. $\left|-\frac{1}{5}\right| = \frac{1}{5}$

Reciprocal of $\left|-\frac{1}{5}\right|$ = Reciprocal of $\frac{1}{5}$

$$= \frac{5}{1} = 5.$$

2. Let by x would be multiplied. Then

$$x \times \frac{-16}{21} = \frac{4}{7}$$

$$\therefore \quad x = \frac{4}{7} \times \frac{21}{-16} = \frac{4}{-16} \times \frac{21}{7}$$

$$= \frac{1}{-4} \times 3 = \frac{-3}{4}.$$

3. Let the required number be x. Then

$$-12 \times x = 84$$

$$\therefore \quad x = \frac{84}{-12} = \frac{7}{-1} = -7.$$

4. Let the required number be y. Then

$$\frac{7}{12} \times y = \frac{-50}{18}$$

Multiplying both sides by $\frac{12}{7}$, we get.

$$\frac{12}{7} \times \frac{7}{12} \times y = \frac{12}{7} \times \frac{-50}{18}$$

or $$y = \frac{2 \times (-50)}{7 \times 3} = \frac{-100}{21}$$

$$= -4\frac{16}{21}.$$

5. Let the required number be *x*. Then

$$\frac{-8}{11} \times x = \frac{-12}{55}$$

or $$x = \frac{-12}{55} \times \frac{11}{-8} = \frac{11}{55} \times \frac{12}{8}$$

$$= \frac{1}{5} \times \frac{3}{2} = \frac{3}{10}.$$

6. Let the required number be *y*. Then

$$\frac{-18}{45} \times y = 90 \text{ or } \frac{-2}{5} \times y = 90$$

∴ $$y = 90 \times \frac{5}{-2} = -45 \times 5$$

$$= -225.$$

7. Sum of $\frac{-9}{7}$ and $\frac{15}{14}$ is

$$S = \frac{-9}{7} + \frac{15}{14} = \frac{-18+15}{14}$$

$$= \frac{-3}{14}$$

Product of $\frac{-9}{7}$ and $\frac{15}{14}$ is

$$P = \frac{-9}{7} \times \frac{15}{14} = \frac{-9 \times 15}{7 \times 14}$$

Now, $$S \div P = \frac{-3}{14} \div \frac{-9 \times 15}{7 \times 14}$$

$$= \frac{-3}{14} \times \frac{7 \times 14}{-9 \times 15}$$

$$= \frac{-3}{-9} \times \frac{7}{15} \times \frac{14}{14}$$

$$= \frac{1}{3} \times \frac{7}{15} \times 1 = \frac{7}{45}$$

Thus, $$\frac{\text{Sum}}{\text{Product}} = \frac{7}{45}.$$

8. Sum $$= \frac{-12}{5} + \frac{-18}{15} = \frac{-12}{5} + \frac{-6}{5}$$

$$= \frac{-12-6}{5} = \frac{-18}{5}$$

Difference $$= \frac{-12}{5} - \left(\frac{-18}{15}\right)$$

$$= \frac{18}{15} - \frac{12}{5} = \frac{18-36}{15}$$

$$= \frac{-18}{15}$$

Now, $$\frac{\text{Sum}}{\text{Difference}} = \frac{\frac{-18}{5}}{\frac{-18}{15}}$$

$$= \frac{-18}{5} \times \frac{15}{-18} = 3.$$

9. Let *x* would be added. Then

$$x + \left(\frac{1}{2} + \frac{1}{3} + \frac{1}{4}\right) = 10$$

or $$x + \left(\frac{6+4+3}{12}\right) = 10 \text{ or } x + \frac{13}{12} = 10$$

or $$x = 10 - \frac{13}{12} = \frac{120-13}{12} = \frac{107}{12}$$

$$= 8\frac{11}{12}.$$

10. Let the other number be *y*. Then

$$\frac{-15}{9} + y = -10 \text{ or } \frac{-5}{3} + y = -10$$

∴ $$y = -10 + \frac{5}{3} = \frac{-30+5}{3}$$

$$= \frac{-25}{3}.$$

11. (*i*) $1 \div \frac{1}{8} = 1 \times \frac{8}{1} = \frac{1 \times 8}{1} = 8.$

(*ii*) $6 \div \frac{-4}{9} = 6 \times \frac{9}{-4} = \frac{6}{-4} \times \frac{9}{1}$

$= \frac{3}{-2} \times 9 = \frac{-27}{2} = -13\frac{1}{2}.$

(*iii*) $\frac{-8}{15} \div \frac{-16}{3} = \frac{-8}{15} \times \frac{3}{-16}$

$= \frac{-8}{-16} \times \frac{3}{15}$

$= \frac{1}{2} \times \frac{1}{5} = \frac{1}{10}.$

WORKSHEET–86

1. $\frac{-4}{12} = \frac{-1}{3}.$

2. Unlimited rational numbers.

3. $\frac{-1}{-5} = \frac{1}{5}$

Additive inverse = $\frac{-1}{5}.$

4. Yes. $\frac{-20}{45} = \frac{-4}{9}.$

5. No. $\frac{1}{2}\left\{\frac{1}{2}+\left(-\frac{1}{2}\right)\right\} = \frac{1}{2}\left(\frac{1}{2}-\frac{1}{2}\right)$

$= \frac{1}{2} \times 0 = 0.$

6. Reciprocal of $\frac{-28}{40} = \frac{-40}{28}$

Standard form $= \frac{-10}{7}$

7. Cost of $2\frac{3}{4}$ metres of cloth

$= ₹\, 73\frac{1}{3}$ (Given)

Cost of $\frac{11}{4}$ metres of cloth = $₹\frac{220}{3}$

∴ cost of 1 metre of cloth

$= \frac{220}{3} \times \frac{4}{11} = ₹\frac{80}{3}.$

8. Let the rational number be x

According to question,

$$x \times \left(\frac{-18}{35}\right) = -\frac{3}{7}$$

$$x = \frac{-3}{7} \times \frac{-35}{18}$$

$$x = \frac{5}{6}.$$

9. Let the length of each piece cut be = x metres

Length of the ribbon = 40 metres

Given, cut pieces of equal length each measuring = $\frac{8}{5}$

According to question,

$$x \times \frac{8}{5} = 40$$

$$x = 40 \times \frac{5}{8}$$

x = 25 pieces.

10. Difference = $\frac{33}{7} - \frac{27}{8}$

$= \frac{264-189}{56} = \frac{75}{56}$

Product = $\frac{-5}{3} \times \frac{63}{25}$

$= -\frac{21}{5}$

According to question,

$$\frac{75}{56} \times \frac{-5}{21} = -\frac{125}{392}.$$

11. (*i*) $\frac{3}{8} + \left(\frac{-4}{8}\right)$ and $\frac{-8}{16} + \frac{6}{16}$

$= \frac{3-4}{8}$ and $\frac{-8+6}{16}$

$= \frac{-1}{8}$ and $\frac{-2}{16}$

$= \frac{-1}{8} = \frac{-1}{8}$.

(*ii*) $\frac{3}{4} \times \left(\frac{4}{5} \times \frac{5}{6}\right)$ and $\frac{-3}{4} \times \frac{4}{5} \times \frac{5}{6} \times 0$

$= \frac{3 \times 4 \times 5}{4 \times 5 \times 6}$ and $\frac{-3 \times 4 \times 5}{4 \times 5 \times 6} \times 0$

$= \frac{1}{2}$ and $\frac{1}{2} \times 0 = \frac{1}{2}$ and $0 = \frac{1}{2} > 0$.

(*iii*) $\left(\frac{-4}{5} \times \frac{5}{4}\right)$ and $\frac{-4}{5} \times \frac{5}{4}$

$= \frac{-4}{5} \times \frac{5}{4}$ and $\frac{-4}{5} \times \frac{5}{4}$

$= -1$ and -1

$-1 = -1$.

❐❐

Chapter

11 SYMMETRY AND PRACTICAL GEOMETRY

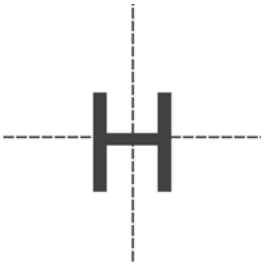
WORKSHEET–87

1. (C) A regular polygon has as many lines of symmetry as it has sides.

2. (A) A circle has infinitely many number of lines of symmetry. Each of them passes through its centre.

3. (D) A square has a rotational symmetry of order 4 about its centre.

4. (C) The letter 'H' has the reflectional symmetry about both the horizontal and vertical mirrors as shown below.



5. (D) Here, 360° is divisible only by 24°.

6. (C) A parallelogram has no line of symmetry.

7. (A) A rhombus has 2 lines of symmetry and rotational symmetry of order 2.

8. (D) A circle has rotational symmetry of infinite order.

9. (A) The least angle = $\frac{360°}{5}$ = 72°.

10. (D) Since BC + CA < AB, so the triangle is not possible.

11. (A) Each angle of an equilateral triangle is of measure 60°.

12. (B) Given BC = 5 cm.

13. (D) $\because$ DA ∥ BC and AB is transversal.

$\therefore \angle DAB = \angle ABC$

(Alternate interior angles)

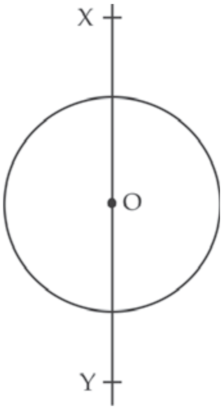
14. (C) We can join C to any point on AB.

15. (A) Each angle of an equilateral triangle is of measure 60°.

16. (B) To construct any triangle, we first draw a side.

17. (A) We should first draw BC = 6 cm because the given angle is on one end of BC.

WORKSHEET – 88

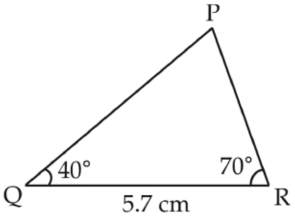


1. (*i*) A circle has infinitely many axes of symmetry passing through its centre.

Here, we are drawing an axis of symmetry namely XY, of the given circle having centre at O.

(*ii*) A parallelogram has no axis of symmetry.

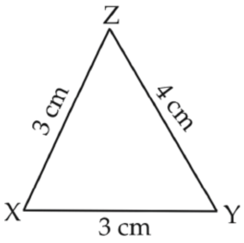
2. Here is a rough sketch of Δ PQR.



Rough sketch

Yes. The triangle is possible by ASA criterion.

3. Here is the rough sketch of the triangle XYZ.

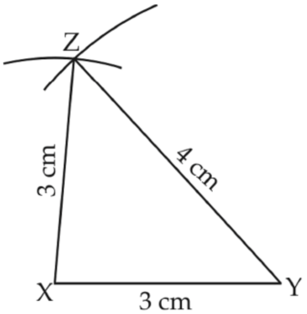


Rough sketch

Construction:

Step 1. Draw XY = 3 cm.

Step 2. Taking X as centre and radius of 3 cm, draw an arc.



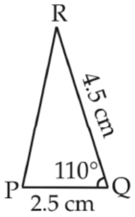
Step 3. Taking Y as centre and radius of 4 cm, draw another arc.

Step 4. The arcs obtained in step 2. and step 3, intersect each other at Z.

Step 5. Join XZ and YZ.

XYZ is the required triangle.

4. Here is a rough sketch of the triangle PQR.



Rough Sketch

Construction:

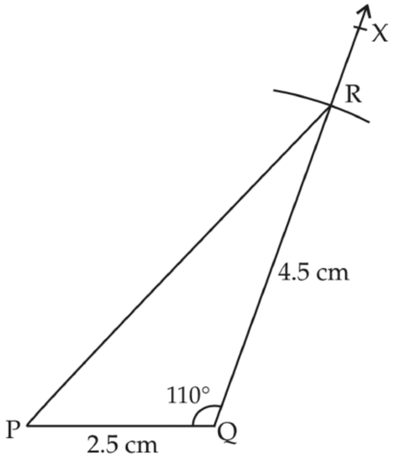
Step 1. Draw a line segment PQ = 2.5 cm

Step 2. Make an angle of measure 110° at Q such that ∠ PQX = 110°.

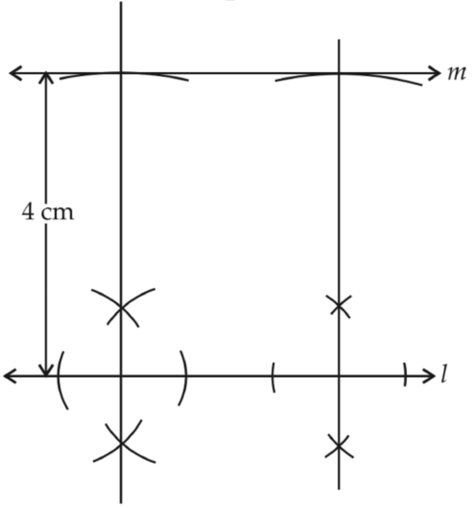
Step 3. Taking Q as centre and radius of 4.5 cm, draw an arc to cut QX at R.

Step 4. Join PR

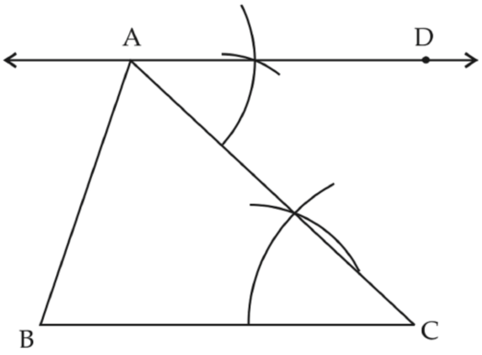
PQR is the required triangle.



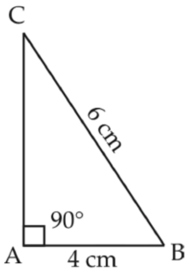
5. Line m is the required line.



6. Line AD passes through A such that AD ∥ BC.



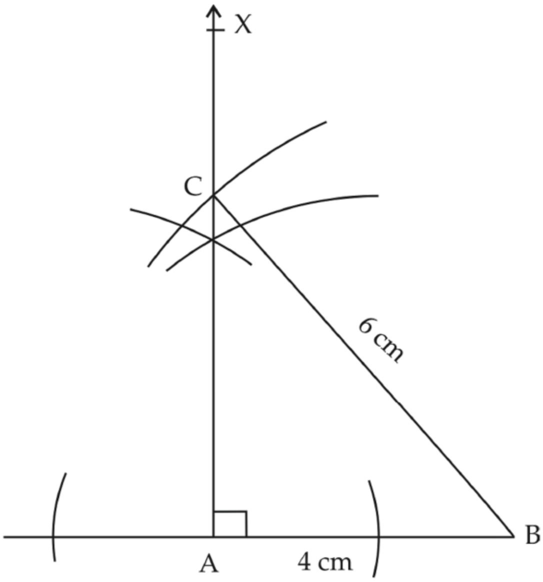
7. Here is a rough sketch of the triangle.



Rough Sketch

Constructions:

Step 1. Draw a line segment AB = 4 cm.



Step 2. Make an angle of measure 90° at the end A such that ∠BAX = 90°.

Step 3. Taking B as centre and radius of 6 cm, draw an arc to intersect the ray AX at C.

Step 4. Join BC.

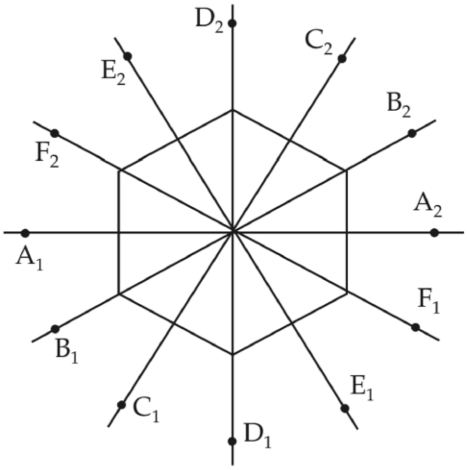
ABC is the required triangle.

WORKSHEET – 89

1. Centre of Rotation:

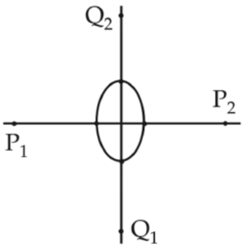
A fixed point about which an object rotates is called the centre of rotation.

2. (*i*)

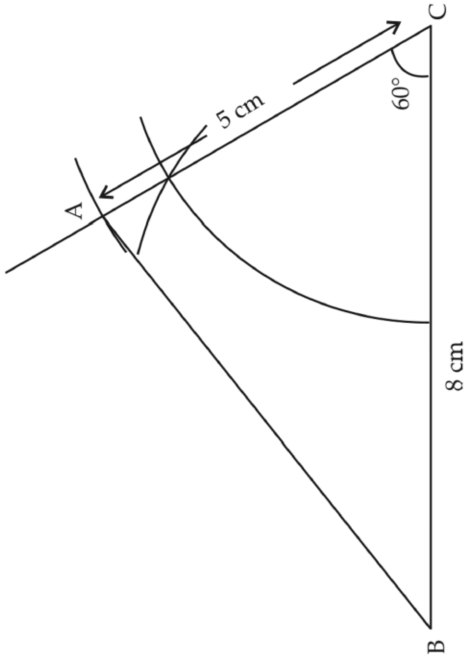


There are six lines of symmetry, namely A_1A_2, B_1B_2, C_1C_2, D_1D_2, E_1E_2 and F_1F_2.

(*ii*) There are two lines of symmetry, namely P_1P_2 and Q_1Q_2.



3.



4. (*i*) An isosceles triangle has one line of symmetry.

(*ii*) A regular hexagon has six lines of symmetry.

5. (*i*) The figure has rotational symmetry of order 6.

(*ii*) The figure has rotational symmetry of order 4.

6. The two examples are: (*a*) a parallelogram and (*b*) a scalene triangle.

7. A parallelogram has a rotational symmetry of order 2 but no line of symmetry.

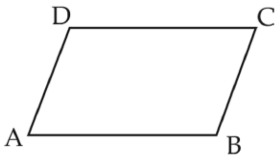
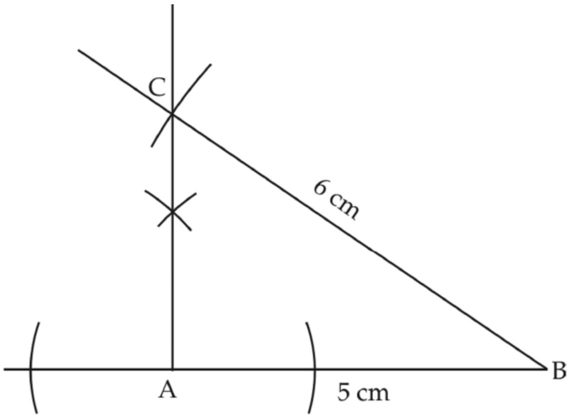


Fig: Parallelogram

8. Yes. Sum of two sides = 10 cm + 8 cm = 18 cm which is greater than third side.

So, the triangle is possible.

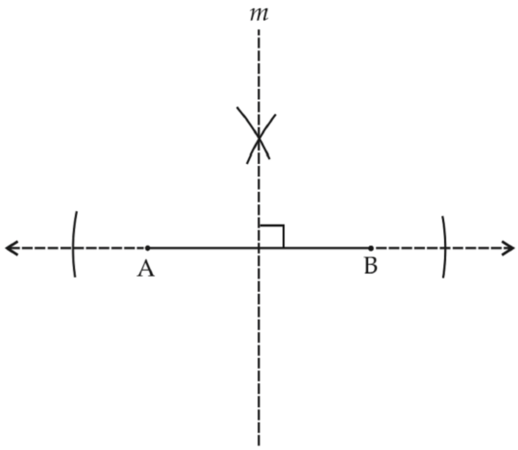
9. Here is a rough sketch of the triangle.



10. (*i*) A circle has **infinitely** many number of lines of symmetry.

(*ii*) A rectangle has **two** lines of symmetry.

11. AB is given line segment and *m* is its line of symmetry.



12. Construction:

Step 1. Draw a horizontal line *l*.

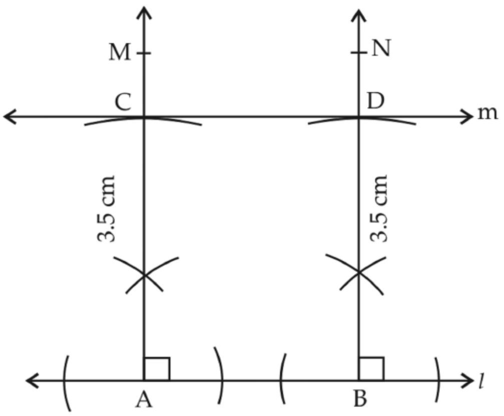
Step 2. Mark two points A and B on *l*.

Step 3. Draw two perpendiculars AM and BN on the line *l*.

Step 4 Mark two points C and D on respectively AM and BN such that AC = BD = 3.5 cm.

Step 5. Join CD and extend it to both sides, call it line *m*.

The lines *l* and *m* are required lines such that $l \parallel m$.



WORKSHEET–90

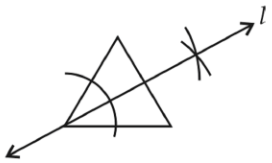
1. One.

2. The order of rotational symmetry of a regular octagon is 8.

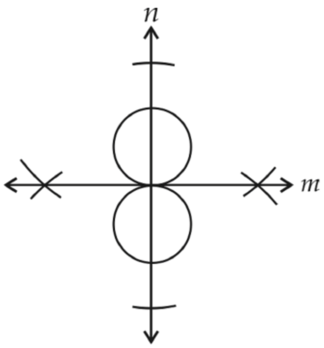
3. Angle of Rotation:

The least angle through which rotating an object about a fixed point, it appears in the same position is called the angle of rotation.

4. (*i*) Line *l* is the required line of symmetry.



(*ii*)

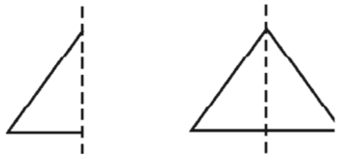


Lines *m* and *n* are the two required lines of symmetry.

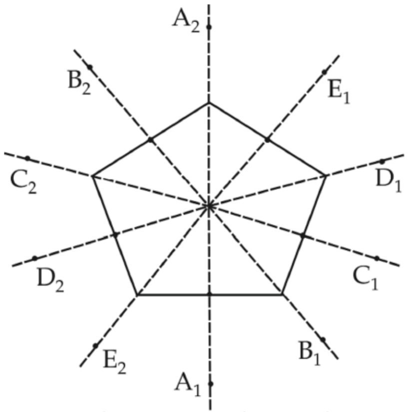
5. Figure (*ii*) is a square which has more than one *i.e.*, four lines of symmetry.

6. (*i*)

(*ii*)

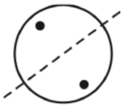


7. A regular pentagon has 5 lines of symmetry, namely A_1A_2, B_1B_2, C_1C_2, D_1D_2 and E_1E_2.

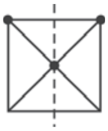


8. (*i*) It is a scalene triangle, so there is no line of symmetry.

(*ii*) There is one line of symmetry which is shown as dotted line.

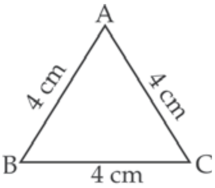


(*iii*) There is one line of symmetry, which is shown as dotted line.

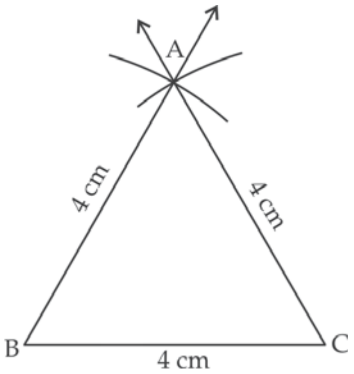


9. The measures of all the three sides of an equilateral triangle are equal.

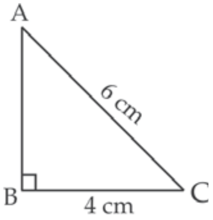
   Here is a rough sketch of the triangle.



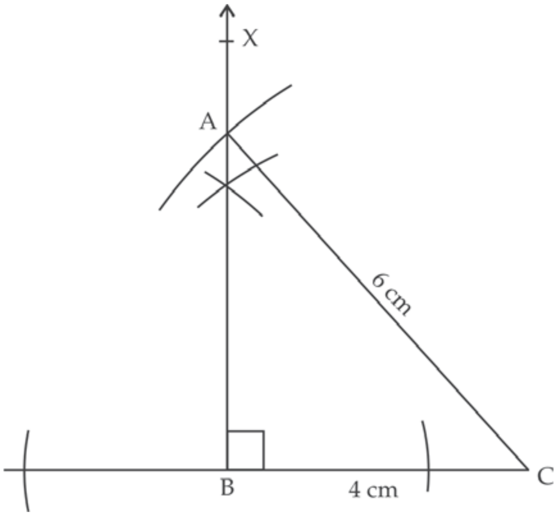
Rough Sketch



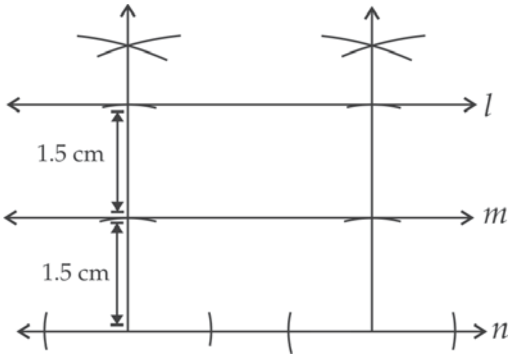
10. Here is a rough sketch of the triangle.



Rough sketch



11.



Here, *l* ∥ *m* ∥ *n.*

WORKSHEET–91

1. Order = 3.

2.

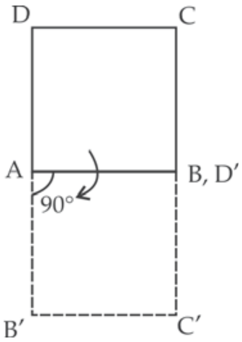
Object	Centre of of rotation	Order of rotation	Angle of rotation
(*i*) circle	Centre of the circle	Infinitely many	Slightly greater than zero
(*ii*) Rhombus	point of intersection of diagonals	2	180°

3. XY + YZ = 3 cm + 4 cm = 7 cm

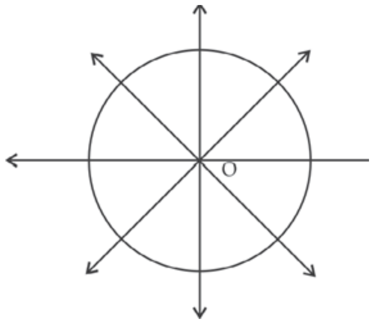
   Yes, ∆XYZ is possible as

   XY + YZ > XZ.

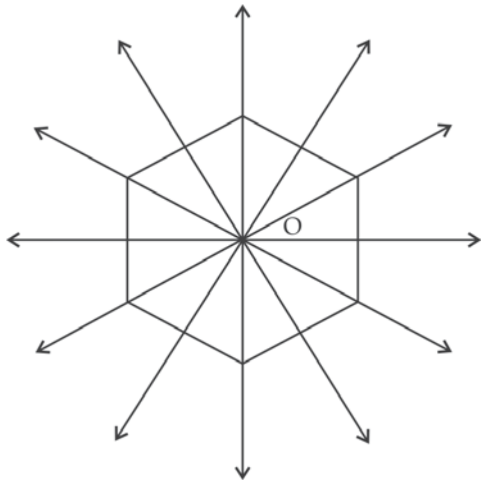
4. ABCD is the original square and AB’ C’ D’ is the required square.



5. (*i*) A circle has infinitely many lines of symmetry.

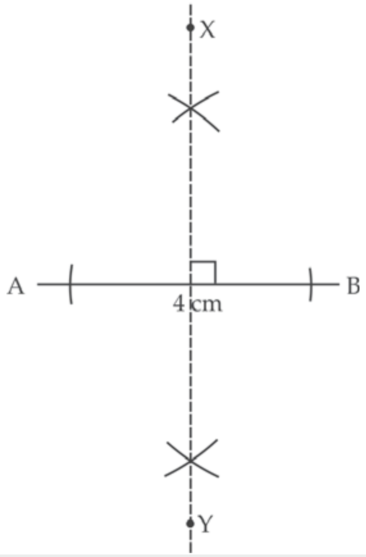


(*ii*) A regular hexagon has 6 lines of symmetry.

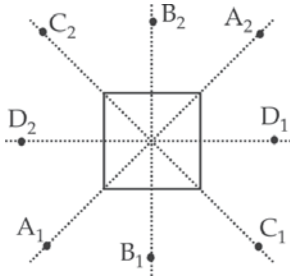


6. (*i*) Order = 1 (*ii*) Order = 3.

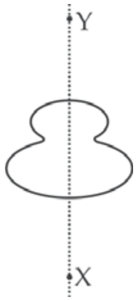
7. The line segment AB and its line of symmetry XY is shown here.



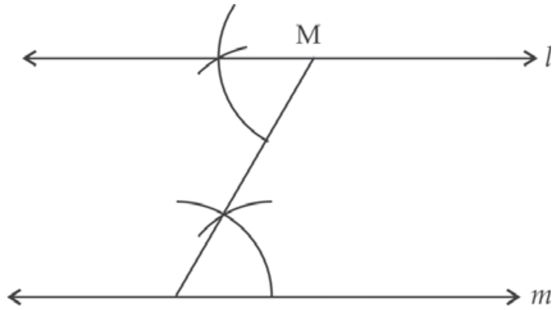
8. (*i*) Lines of symmetry are: A_1A_2, B_1B_2, C_1C_2 and D_1D_2.



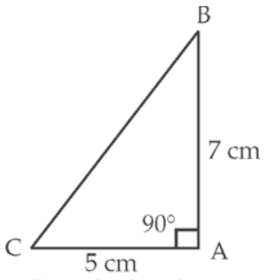
(*ii*) Line of symmetry is XY.



9. Line *l* is parallel to the given line *m*, *i.e.* $l \parallel m$.

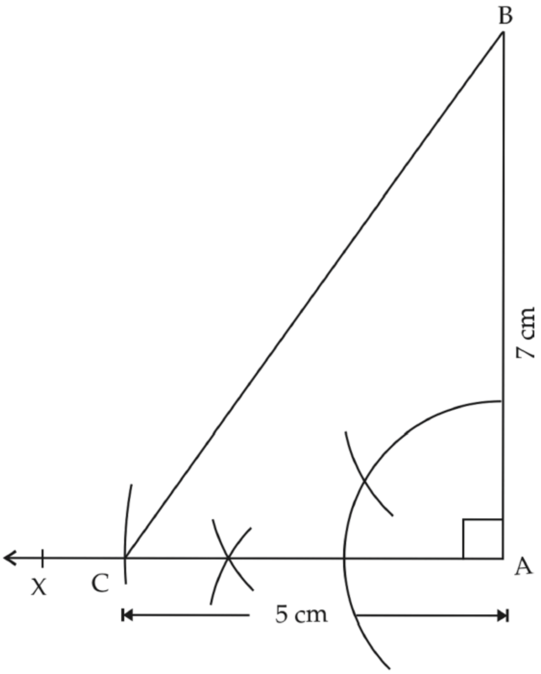


10. Here is a rough sketch of the triangle.



Rough sketch

Construction:



Step 1. Draw a line segment AB = 7 cm.

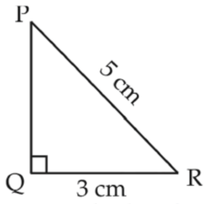
Step 2. Make an angle of 90° at A such that ∠BAX = 90°.

Step 3. Taking A as centre and radius of 5 cm, draw an arc to cut AX at C.

Step 4. Join BC.

Δ ABC is the required triangle.

11. Here is a rough sketch of the triangle.



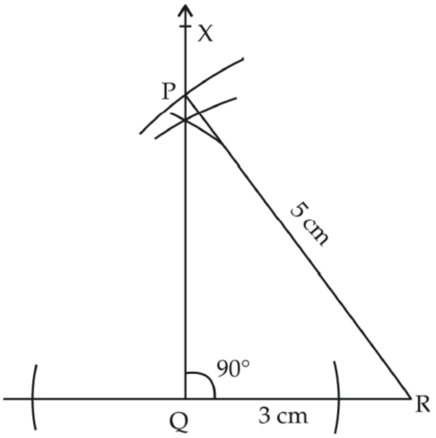
Rough sketch

Construction:

Step 1. Draw a line segment QR = 3 cm.

Step 2. Make an angle of 90° at Q such that ∠RQX = 90°.

Step 3. Taking R as centre and radius of 5 cm, draw an arc to intersect the ray QX at P.



Step 4. Join PR.

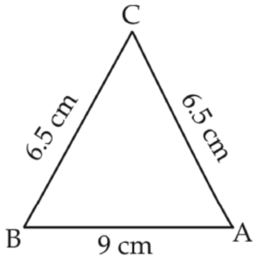
PQR is the required triangle.

WORKSHEET–92

1.  .

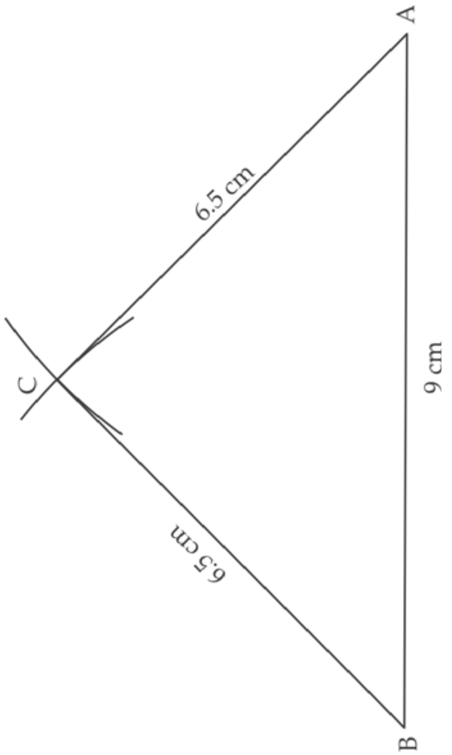
2. Order = 6.

3. Here is a rough sketch of the ΔABC.



Rough sketch

Construction:

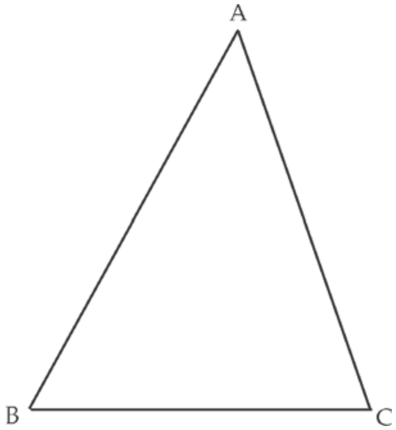


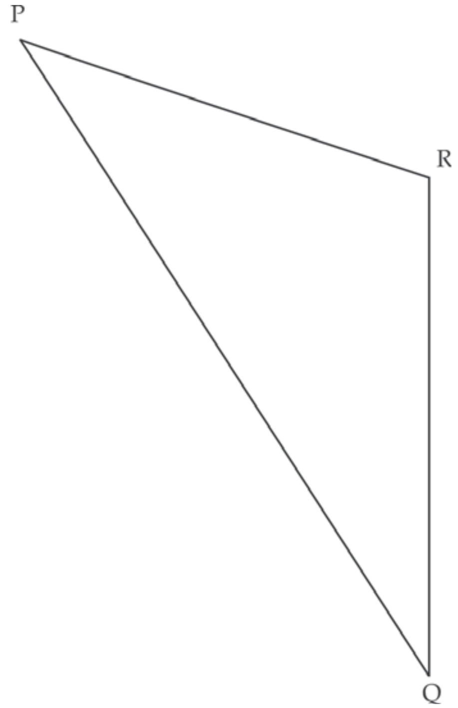
4. (*i*) Number of lines of symmetry = 1.

(*ii*) Number of lines of symmetry = 1.

5. No. According to the angle sum property of a triangle, the total measure of the internal angles is 180°. But, here the sum of only two angles is more than 180° as $\angle E + \angle F = 90° + 110° = 200°$. So, the construction is not possible.

6.





For ΔABC: AB = 5.7 cm, BC = 4.5 cm, CA = 5.3 cm.

Here, BC + CA = 4.5 cm + 5.3 cm

= 9.8 cm.

So, BC + CA > AB.

For ΔPQR: PQ = 10 cm, QR = 6.6 cm, RP = 5.7 cm

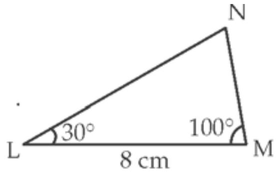
Here, QR + RP = 6.6 cm + 5.7 cm

= 12.3 cm.

So, QR + RP > PQ

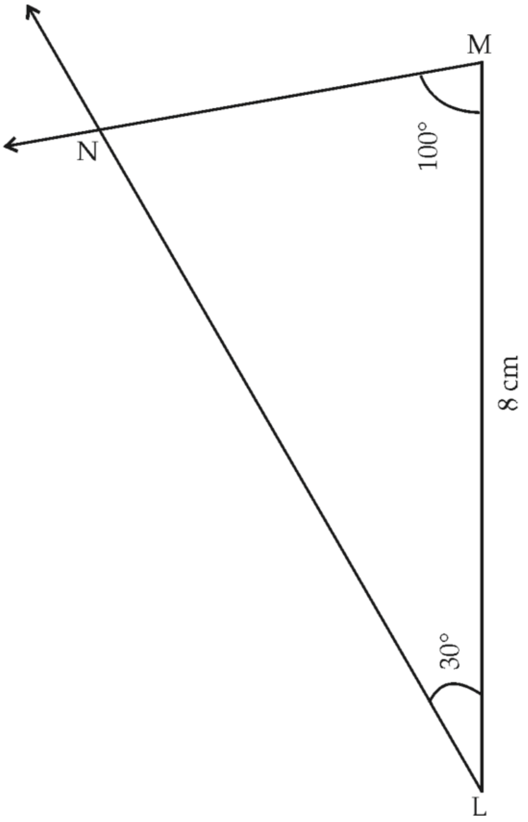
Thus, in each case the sum of two sides is greater than the third side.

7. Here is a rough sketch of the triangle.



Rough sketch

Construction:



8. (*a*) Rectangle (*b*) rhombus.

9. (*i*) Sum of measures of two sides = 12 cm + 1 cm = 13 cm.

Measure of third side = 14 cm

∵ Sum of measures of two sides < Measure of third side

So, triangle is not possible.

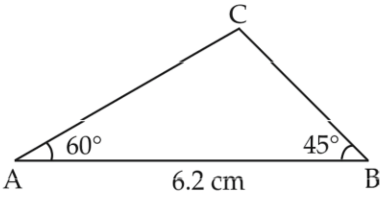
(*ii*) Sum of measures of two sides = 1 m + 3 m = 4 m.

Measure of third side = 8 m

∵ Sum of measures of two sides < Measure of third side

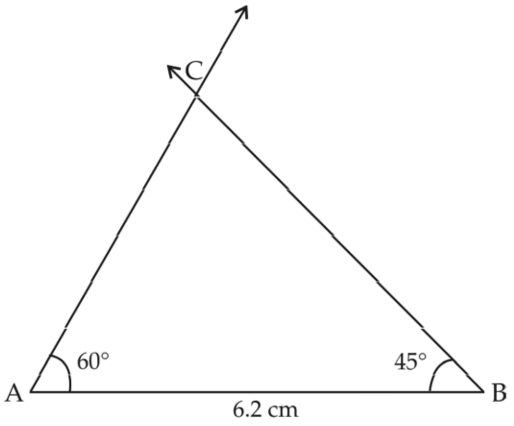
So, triangle is not possible.

10. Here is a rough sketch of the triangle.



Rough sketch

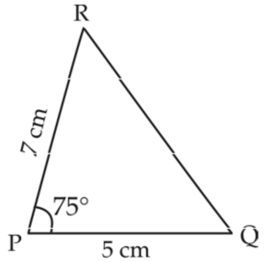
Construction:



11. Shapes (*i*) and (*ii*) are the examples of reflectional symmetry.

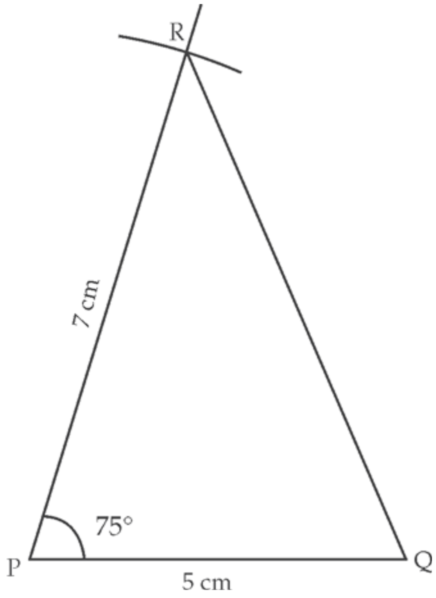
Shape (*ii*) is the example of rotational symmetry.

12. Here is a rough sketch of triangle



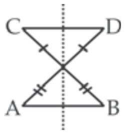
Rough sketch

Construction:

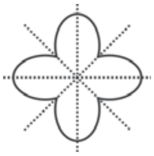


WORKSHEET–93

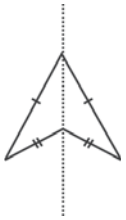
1. H, I, O and X
2. (*i*) One line of symmetry



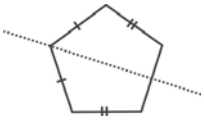
(*ii*) Four lines of symmetry



(*iii*) One line of symmetry

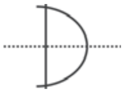


(*iv*) One line of symmetry



3. (*i*) One line of symmetry

(*ii*) One line of symmetry



4. (*i*) Order = 4.

(*ii*) It is a regular pentagon

∴ Order = 5.

5. (*i*) Order = 3.

(*ii*) Order = 1.

6. No, the triangle is not possible.

Reason:

$\angle B + \angle C = 90° + 95° = 185°$.

According to the angle sum property of a triangle, "total measure of the interior angles of a triangle is 180°." Therefore, for the given data, angle sum property of the triangle does not hold.

7. (*i*) Sum of two sides = 8 cm + 6 cm
= 14 cm

Since, the sum of two sides is not greater than third side.

Therefore, the triangle is not possible.

(*ii*) Sum of two sides = 2 cm + 4 cm
= 6 cm

Since the sum of two sides is greater than third side. Therefore, the triangle is possible.

8. Shapes (*i*) and (*ii*) both are examples of reflectional symmetry.

Shape (*i*) is the example of rotational symmetry.

9. Other angles will be 120°, 180°, 240°, 300° and 360°.

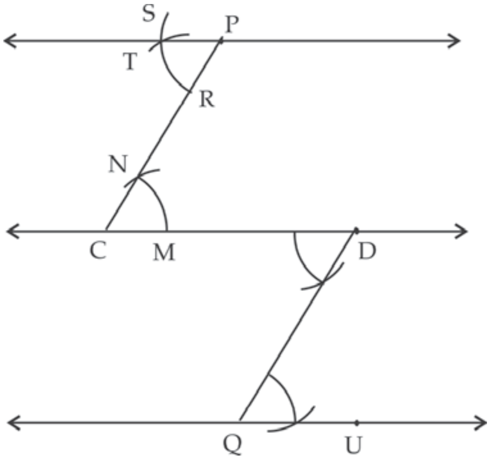
10. Shapes (*i*), (*ii*), (*iv*), (*v*) and (*viii*) have rotational symmetry.

11. You are given a line CD and two points P and Q on either sides of it.

Construction:

Step 1. Join PC

Step 2. Taking C as centre and any convenient radius, draw an arc to intersect CD at M and CP at N.



Step 3. Taking P as centre and same radius as in step 2, draw an arc RS to intersect CP at R.

Step 4. Place the pointed tip of the compasses at M and adjust the opening so that the pencil tip is at N.

Step 5. Taking R as centre and opening same as in step 4, draw an arc to cut the arc RS at T.

Step 6. Join PT and extend it to both sides.

Step 7. Repeat the process from step 1 to step 6 for the point Q. You would find a line QU.

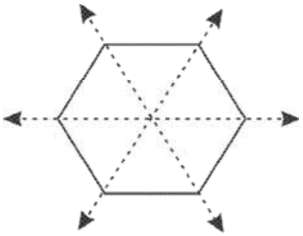
Thus, PT ∥ CD and QU ∥ CD.

WORKSHEET–94

1. One and only one line.

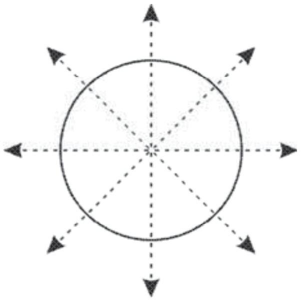
2. No, as $\angle A + \angle B > 180°$

3.



6 lines of symmetry.

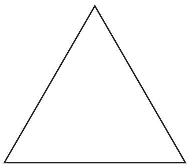
4. Circle



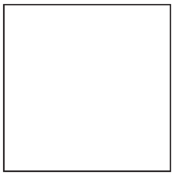
Infinite lines of symmetry.

5. Parallelogram, scalene triangle, quadrilateral.

6.



Equilateral triangle



Square

Equilateral triangle – Lines of symmetry and rotational symmetry = 3

Square = Lines of Symmetry and rotational symmetry = 4

7. (*i*) A, C, D, E, M, T, U, V, W, Y

(*ii*) N, S, Z

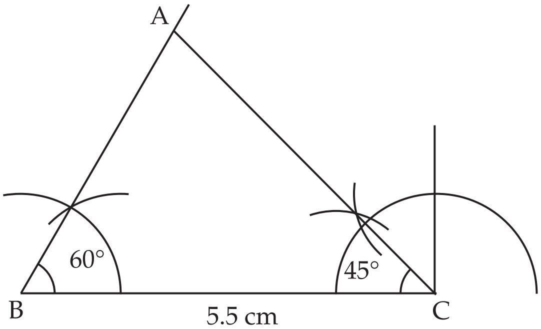
(*iii*) H, I, O, X.

8. No, we have to construct a triangle ABC with AB = 6 cm, BC = 7 cm and AC = 15 cm

We cannot construct ΔABC because 6 + 7 < 15

13 < 15 *i.e.*, AB + BC < AC.

9.



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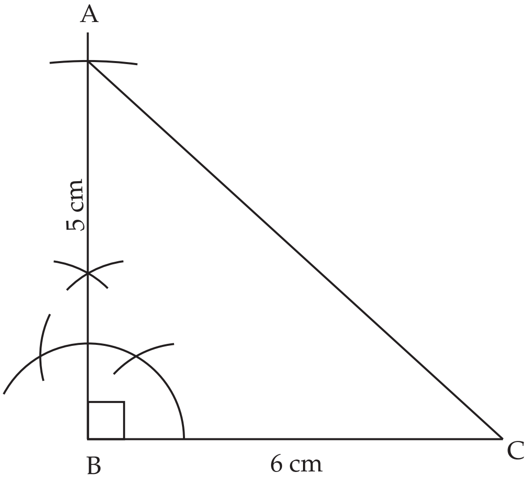
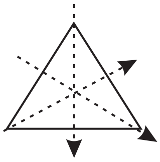
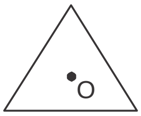


11. (*i*)

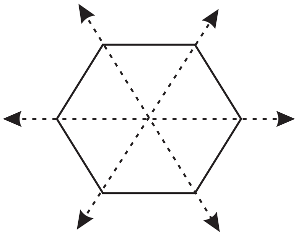


3 lines of symmetry

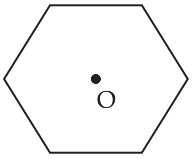


Rotational symmetry of order 3

(*ii*)

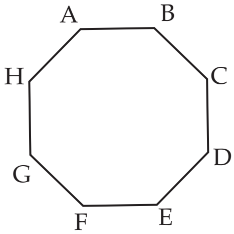


3 lines of symmetry



Rotational symmetry of order 6

(*iii*)



Rotational symmetry of order 8.

(*iv*) *Do yourself*.

❐❐

Chapter

12 PERIMETER AND AREA

WORKSHEET–95

1. (A) Perimeter = 4 × Side

$= 4 \times 4 = 16$ cm.

2. (B) $l = 25$ cm; $b = 6$ cm

Perimeter $= 2 \times (l + b) = 2\,(25 + 6)$

$= 2 \times 31 = 62$ cm.

3. (A) Area = Side × Side

$= 2.1 \times 2.1 = 4.41\ \text{cm}^2$.

4. (D) Length of wire

= Circumference of the pipe

$= 2\pi \times$ Radius

$= 2 \times \frac{22}{7} \times 7 = 44$ cm.

5. (A) We know that the value of π is about 3.141592.

So, the approximate value of π is 3.14.

6. (C) $1\ \text{m}^2 = 1\ \text{m} \times 1\ \text{m}$

$= 100\ \text{cm} \times 100\ \text{cm}$

$= 10000\ \text{cm}^2$.

7. (A) Area of parallelogram

= Base × Height

$= 6 \times 2.2$

$= 13.2\ \text{cm}^2$.

8. (D) Base $= 60\ \text{cm} = \frac{60}{100}\ \text{m} = \frac{6}{10}\ \text{m}$.

Height $= 80\ \text{cm} = \frac{80}{100}\ \text{m} = \frac{8}{10}\ \text{m}$.

Area of ΔPQR $= \frac{1}{2} \times$ Base × Height

$= \frac{1}{2} \times \frac{6}{10} \times \frac{8}{10}$

$= \frac{24}{100} = 0.24\ \text{m}^2$.

9. (A) $r = \frac{d}{2} = \frac{15.4}{2} = 7.7$ cm

Circumference $= 2\pi r = 2 \times \frac{22}{7} \times 7.7$

$= 48.4$ cm.

10. (B)Area of the shaded region

= Area of outer circle – Area of inner circle

$= \pi\,(8)^2 - \pi\,(4)^2$

$= 64\,\pi - 16\,\pi = 48\,\pi$

$= 48 \times 3.14 = 150.72\ \text{m}^2$.

Cost of polishing $= 150.72 \times 3$

= ₹ 452.16.

11. (B) AB = DC = 4 cm

Area of Δ ABD $= \frac{1}{2} \times$ Base × Height

$= \frac{1}{2} \times \text{AB} \times \text{MD}$

$= \frac{1}{2} \times 4 \times 6 = 12\ \text{cm}^2$.

12. (C) Base = 2 cm = 2 × 10 mm.

Height = 1.1 cm = 1.1 × 10 mm

= 11 mm.

Area $= \frac{1}{2} \times$ Base × Height

$= \frac{1}{2} \times 2 \times 10 \times 11 = 110\ \text{mm}^2$.

13. (A) AB = BC = 6 mm

$$\text{Area of the } \Delta ABC = \frac{1}{2} \times AB \times CD$$

$$\therefore \quad CD = \frac{2 \times \text{Area of } \Delta ABC}{AB}$$

$$= \frac{2 \times 13.2}{6} = 4.4 \text{ mm.}$$

14. (C)Area of the $\Delta PQR = \frac{1}{2} \times PQ \times OR$

$$= \frac{1}{2} \times 3 \times 2$$

$$= 3 \text{ cm}^2.$$

15. (A) Area of a parallelogram

= Base × Height.

16. (B) Perimeter of rectangular sheet

= Perimeter of the squared sheet

or 2(length + breadth) = 4 × side

$\therefore$ 2(60 + breadth) = 4 × 40

$$\therefore \quad \text{Breadth} = \frac{160}{2} - 60$$

= 20 cm.

Area of the rectangular sheet

= Length × Breadth

= 60 × 20 = 1200 cm^2.

17. (D) $\text{Length} = \frac{\text{Area}}{\text{Breadth}} = \frac{28}{4} = 7$ cm.

WORKSHEET–96

1. Perimeter of a square = 4 × Side

$\therefore$ 440 = 4 × Side

$$\therefore \quad \text{Side} = \frac{440}{4} = 110 \text{ m.}$$

Area of a square = Side × Side

= 110 × 110

= 12100 m^2.

2. Length of the outer rectangle

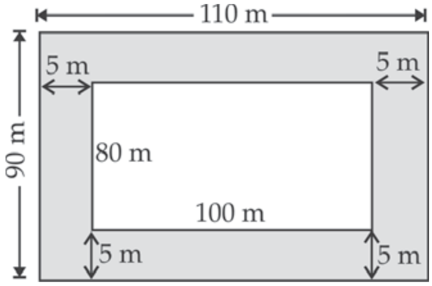
= 100 m + 5 m + 5 m

= 110 m.

Breadth of the outer rectangle

= 80 m + 5 m + 5 m

= 90 m.



Area of the path = Area of the shaded region = Area of the outer rectangle – Area of the inner rectangle

= 110 × 90 – 100 × 80

= 9900 – 8000

= 1900 m^2.

3. Perimeter = 520 m, breadth = 40 m.

We have, perimeter of a rectangle

= 2(length + breadth)

$\therefore$ 520 = 2 × (length + 40)

$\therefore$ Length = 260 – 40 = 220 m

And area = Length × Breadth

= 220 × 40 = 8800 m^2.

4. Area = 84.8 cm^2, base = 4 cm

Area of a parallelogram

= Base × Height

$\therefore$ 84.8 = 4 × height

$$\text{or} \quad \text{height} = \frac{84.8}{4} = 21.2 \text{ cm.}$$

5. $r_1 = 3.5$ cm, $r_2 = 7$ cm

(*i*) Diameter, $d_1 = 2 \times r_1 = 2 \times 3.5$

= 7 cm

Diameter $d_2 = 2 \times r_2$

$= 2 \times 7 = 14$ cm.

(*ii*) Circumference,

$$C_1 = 2\pi r_1 = 2 \times \frac{22}{7} \times 3.5$$

$$= 2 \times 22 \times 0.5 = 22 \text{ cm}$$

Circumference,

$$C_2 = 2\pi\, r_2 = 2 \times \frac{22}{7} \times 7$$

$$= 2 \times 22 = 44 \text{ cm.}$$

(*iii*) Ratio of circumferences

$$= \frac{C_1}{C_2} = \frac{22}{44} = \frac{1}{2}$$

$$= 1 : 2.$$

6. Radius of circle, $r = 28$ cm

The straight edge of the shaded part is the diameter of the circle, which divides the circle into two halves.

∴ Area of the shaded part

$$= \frac{1}{2} \times \text{Area of the circle}$$

$$= \frac{1}{2} \times \pi r^2$$

$$= \frac{1}{2} \times \frac{22}{7} \times 28 \times 28$$

$$= 11 \times 4 \times 28$$

$$= 1232 \text{ cm}^2.$$

Thus, the area of the shaded part is 1232 cm^2.

7. Let the required number of discs be n.

Since the thicknesses of both types of the sheets are same, therefore, their areas must be equal.

∴ Area of n discs

= Area of the rectangular sheet

or $n \times \pi \times (\text{radius})^2 = \text{Length} \times \text{Breadth}$

or $n \times \frac{22}{7} \times 14 \times 14 = 56 \times 33$

or $n = \frac{56 \times 33}{22 \times 2 \times 14}$

or $n = \frac{56}{28} \times \frac{33}{22}$

or $n = 2 \times \frac{3}{2} = 3$

Thus, the required number of discs is 3.

8. Side = 60 m

(*i*) Area = Side × Side = 60 × 60

$= 3600$ m^2.

(*ii*) Since the wire is fenced four times,

∴ Length of the wire

= 4 × Perimeter of land

= 4 × (4 × Side)

= 16 × Side

= 16 × 60 = 960 m.

Cost of fencing

= Length × Rate of 1 m of wire

= 960 × 25 = 24000

Therefore, the cost of fencing is ₹ 24,000.

(*iii*) Total cost of the land

= Area of the land × Cost of 1 m^2

= 3600 × 10500 [Using part (*i*)]

= 36 × 105 × 10000

= 3780 × 10000

= 37800000.

Therefore, the total cost of the land is ₹ 3,78,00,000.

WORKSHEET–97

1. Square. If we increase the perimeter of a square, then its side increases and so its area increases.

2. Area of a square = Side × Side

$\therefore \quad 49 = \text{Side} \times \text{Side}$

or $\quad 7 \times 7 = \text{Side} \times \text{Side}$

$\therefore \quad \text{Side} = 7$ cm.

3. Breadth = 4.2 cm

By question, length = 2 × Breadth

$= 2 \times 4.2 = 8.4$ cm

Perimeter $= 2 \times (l + b)$

$= 2 \times (8.4 + 4.2)$

$= 2 \times 12.6$

$= 25.2$ cm.

Thus, perimeter of the rectangle is 25.2 cm.

4. Side of the square field = 12.5 m

Perimeter of the field = 4 × Side

$= 4 \times 12.5$

$= 5$ m.

Since Romi runs 3 times around the square field.

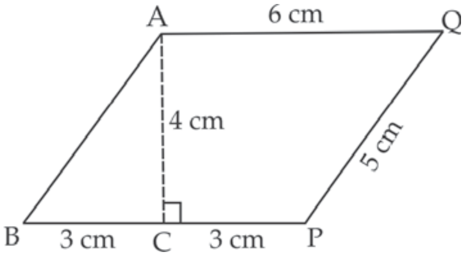
$\because$ Distance covered by Romi

$= 3 \times$ Perimeter

$= 3 \times 50 = 150$ m

Thus, the distance covered by Romi is 150 metres.

5. In ΔABC, $\angle C = 90°$



$\therefore \quad AB^2 = BC^2 + CA^2$

(Pythagoras property)

$= 3^2 + 4^2 = 9 + 16 = 25 = 5 \times 5$

$\therefore \quad AB = 5$ cm

Now, perimeter = AB + BP + PQ + AQ

$= 5 + 6 + 5 + 6$

$= 22$ cm.

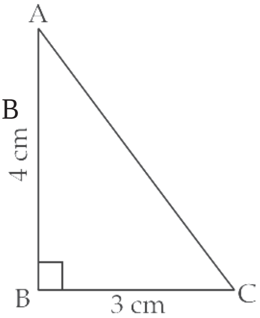
Thus, the perimeter of the figure is 22 cm.

6. (*i*) Area of ΔABC

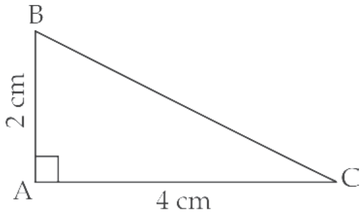
$= \frac{1}{2} \times BC \times AB$

$= \frac{1}{2} \times 3 \times 4$

$= 6$ cm^2.



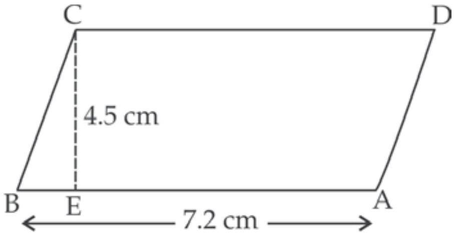
(*ii*)



Area of $\Delta ABC = \frac{1}{2} \times AC \times AB$

$= \frac{1}{2} \times 4 \times 2 = 4$ cm^2.

7.



Area of parallelogram ABCD

= Base × Height

= AB × CE

$= 7.2 \times 4.5$

$= \frac{72 \times 45}{100} = \frac{3240}{100}$

$= 32.40 \text{ cm}^2$.

8. Let $b = x$, then, $l = 3 \times b = 3 \times x = 3x$

Perimeter $= 2 \times (l + b)$

$\therefore$ $26.4 = 2 \times (3x + x)$

or $\frac{264}{10} = 2 \times 4x$

$\therefore$ $\frac{264}{10 \times 8} = x$

or $x = \frac{33}{10} = 3.3$

$\therefore$ $3x = 3 \times 3.3 = 9.9$

So, the length of the room is 9.9 m and the breadth is 3.3 m.

9. (*i*) $l = 15$ cm, $b = 5$ cm

Perimeter $= 2 \times (l + b) = 2 \times (15 + 5)$

$= 2 \times 20 = 40$ cm.

Thus, perimeter of the rectangle is 40 cm.

(*ii*) $l = 8$ cm, $b = 2.2$ cm

Perimeter $= 2 \times (l + b) = 2 \times (8 + 2.2)$

$= 2 \times 10.2 = 20.4$ cm.

Thus, perimeter of the rectangle is 20.4 cm.

10. (*i*) Perimeter of a square $= 4 \times$ Side

$= 4 \times 15$

$= 60$ cm.

Thus, perimeter of the square is 60 cm.

(*ii*) Perimeter of a square $= 4 \times$ Side

$= 4 \times 0.9$

$= 4 \times \frac{9}{10}$

$= \frac{36}{10} = 3.6$ cm.

Thus, perimeter of the square is 3.6 cm.

11. Let $b = x$ (say)

Then, $l = 3 \times b = 3x$

Here, perimeter $= 2 \times (l + b)$

Given Perimeter $= 64$ m

$\therefore$ $= 2(3x + x) = 64$

or $= 8x = 64$

$\therefore$ $x = \frac{64}{8} = 8$

$\therefore$ $3x = 3 \times 8 = 24$.

Thus, the length of the room is 24 m and the breadth is 8 m.

WORKSHEET–98

1. Perimeter of square $= 4 \times$ Side

$= 4 \times 42.5 = 170$ m

Distance covered by Saloni

$= 8 \times$ Perimeter of the field

$= 8 \times 170$

$= 1360$ m.

2. Let breadth $= x$, then length $= 3x$

Perimeter $= 2 \times$ (length + breadth)

$\therefore$ $164 = 2 \times (3x + x)$

or $\frac{82}{4} = x$

or $x = 20.5$

$\therefore$ $3x = 3 \times 20.5 = 61.5$.

Therefore, length of the hall is 61.5 m and the breadth is 20.5 m.

3. $r = 40$ cm

Area $= \pi r^2 = 3.14 \times 40 \times 40$

$= 314 \times 16 = 5024 \text{ cm}^2$.

4. Area of circle $= \pi r^2 = \frac{22}{7} \times (7.7)^2$

$= \frac{22}{7} \times 7.7 \times 7.7$

$= 186.34 \text{ cm}^2$.

Area of square = Side × Side = 7×7
$= 49 \text{ cm}^2$.

Therefore, the circle has more area.

5. Perimeter = $4 \times$ Side

$\therefore$ $36 = 4 \times$ Side

$\therefore$ Side = $\frac{36}{4} = 9$ cm.

Area of square = Side × Side = 9×9
$= 81 \text{ cm}^2$.

6. (*i*) $r = \frac{d}{2} = \frac{1.4}{2}$ cm

$$C = 2\pi r = 2 \times 3.14 \times \frac{1.4}{2}$$
$$= 3.14 \times 1.4$$
$$= 4.396.$$

Thus, the circumference is 4.396 cm.

(*ii*) $r = \frac{d}{2} = \frac{29}{2}$

$$C = 2\pi r = 2 \times 3.14 \times \frac{29}{2}$$
$$= 3.14 \times 29 = 91.06$$

Thus, the circumference is 91.06 mm.

7. (*i*) $C = \pi d.$

$\Rightarrow$ $4.2 = 3.14 \times d$

$\Rightarrow$ $d = \frac{4.2}{3.14} = \frac{420}{314}$

$\Rightarrow$ $d = 1.337$

$\Rightarrow$ $d = 1.34$ cm.

(*ii*) $C = \pi d$

$\Rightarrow$ $252 = 3.14 \times d$

$\Rightarrow$ $d = \frac{252}{3.14} = \frac{25200}{314}$
$= 80.254 = 80.25$ mm.

8. (*i*) $C = 2\pi r$

$\Rightarrow$ $77 = 2 \times 3.14 \times r$

$\Rightarrow$ $\frac{7700}{628} = r$

$\therefore$ $r = 12.261$

$\therefore$ $r = 12.26$ cm.

(*ii*) $C = 2\pi r$

$\Rightarrow$ $126 = 2 \times 3.14 \times r$

$\therefore$ $\frac{12600}{628} = r$

$\therefore$ $r = 20.063$

$\therefore$ $r = 20.06$ mm.

9. R = 14 m, $r = 2.8$ mm

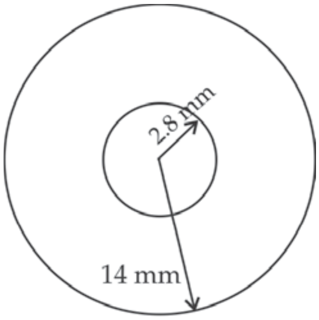


Fig: Washer

Area of washer

= Area of the outer circle – Area of the inner circle

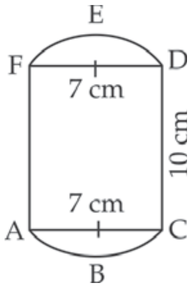
$= \pi R^2 - \pi r^2$

$= \pi (R^2 - r^2)$

$= \frac{22}{7} \times (14^2 - 2.8^2)$

$= \frac{22}{7} \times 188.16 = 591.36 \text{ mm}^2.$

10. (*i*) The figure contains one rectangle and two semicircles of diameter 7 cm.



Perimeter = Curve ABC + CD + Curve DEF + FA

$= \pi r + CD + \pi r + CD$ [∵ CD = FA]

$= 2\pi r + 2\ CD$

$= 2 \times \dfrac{22}{7} \times \dfrac{7}{2} + 2 \times 10$

$= 22 + 20 = 42$ cm.

(*ii*) The figure contains a square and 4 semicircles of diameter 14 cm each.

Perimeter = 4 × length of curved part of one semicircle

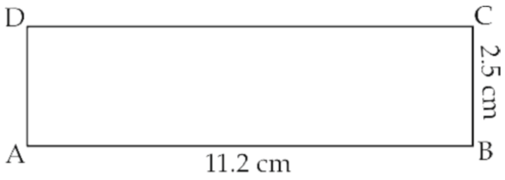
$= 4 \times \pi \times \dfrac{d}{2}$

$= 4 \times \dfrac{22}{7} \times \dfrac{14}{2} = 88$ cm.

WORKSHEET–99

1. Area = AB × BC

$= 11.2 \times 2.5 = 28 \text{ cm}^2$.

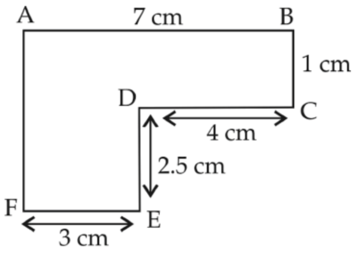


2. Circumference = πd

$= 3.14 \times 1.8$

$= 5.652 \text{ cm}^2$.

3.



AF = BC + DE

= 1 + 2.5 = 3.5 cm

Perimeter = AB + BC + CD + DE + EF + AF

= 7 + 1 + 4 + 2.5 + 3 + 3.5

= 21 cm.

4. (*i*) Area $= a^2 = (12.6)^2 = 12.6 \times 12.6$

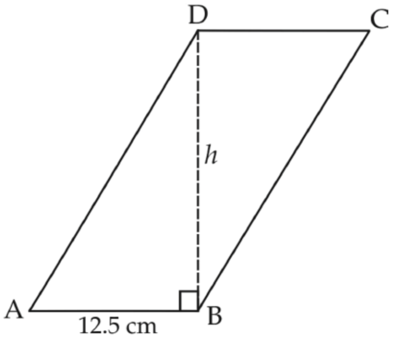
$= 158.76 \text{ cm}^2$

(*ii*) Area $= a^2 = 4^2 = 4 \times 4 = 16 \text{ cm}^2$.

5. Base = AB = 12.5 cm

Height = BD = h (say)

Area = AB × h



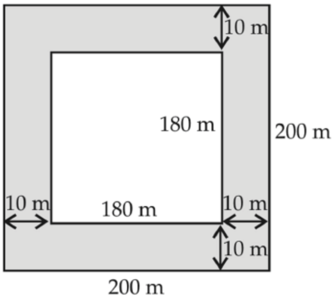
∴ $500 = 12.5 \times h$

∴ $h = \dfrac{500}{12.5} = \dfrac{5000}{125} = 40$ cm.

Thus, height of the parallelogram is 40 cm.

6. Side of inner square

= 200 m – 10 m – 10 m = 180 m



Area of the path

= Area of the shaded region

= Area of the outer square

– Area of the inner square

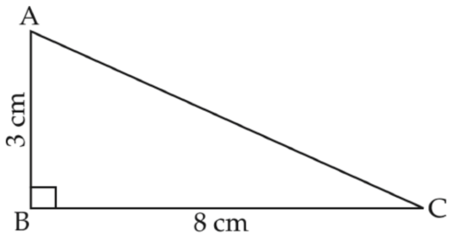
$= 200^2 - 180^2$

$= 200 \times 200 - 180 \times 180$

$= 40000 - 32400$

$= 7600 \text{ m}^2$.

7. (*i*)



$$\text{Area} = \frac{1}{2} \times \text{Base} \times \text{Height}$$

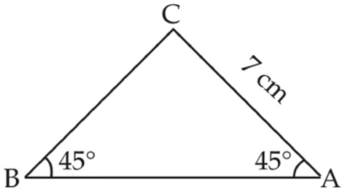
$$= \frac{1}{2} \times BC \times AB$$

$$= \frac{1}{2} \times 8 \times 3 = 12 \text{ cm}^2.$$

(*ii*) In ΔABC,

$\angle A = \angle B$

$\therefore \quad BC = AC = 7$ cm



Further, $\angle A + \angle B + \angle C = 180°$

$\therefore \quad \angle C = 180° - 45° - 45°$

$= 90°$

So ΔABC is a right-angled triangle.

$\therefore$ Area of ΔABC

$$= \frac{1}{2} \times \text{Base} \times \text{Height}$$

$$= \frac{1}{2} \times AC \times BC$$

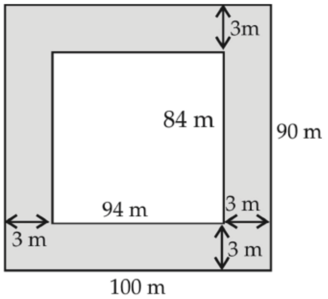
$$= \frac{1}{2} \times 7 \times 7 = \frac{49}{2}$$

$= 24.5 \text{ cm}^2$.

8. Length of the inner rectangle

$= 100 \text{ m} - 3 \text{ m} - 3 \text{ m}$

$= 94$ m.



Breadth of the inner rectangle

$= 90 \text{ m} - 3 \text{ m} - 3 \text{ m}$

$= 84$ m.

Area of the path

= Area of the shaded region

= Area of the outer rectangle

– Area of the inner rectangle

$= 100 \times 90 - 94 \times 84$

$= 9000 - 7896 = 1104 \text{ m}^2$.

Thus, area of the path is 1104 m^2.

9. Breadth $= 0.25 \text{ m} = 0.25 \times 100$ cm

$= 25$ cm

Area of a rectangle = Length × Breadth

$\therefore \quad 2500 = \text{Length} \times 25$

$$\therefore \quad \text{Length} = \frac{2500}{25} = 100 \text{ cm}.$$

Perimeter of the sheet

$= 2 \times (\text{length} \times \text{breadth})$

$= 2 \times (100 + 25)$

$= 2 \times 125 = 250$ cm.

10. Length of fencing

$= 20.8 + 12.5 + 12.5$

$= 45.8$ m.

Cost of fencing

= Length × Rate per metre.

$$= 45.8 \times 125 = \frac{458 \times 125}{10}$$

$$= \frac{57250}{10} = ₹\ 5725$$

Thus, the cost of fencing is ₹ 5725.

11. (*i*) Radius of the circle, $r_1 = 35$ cm. The shaded part of the circle is its quadrant.

∴ Area of the shaded region

$$= \frac{1}{4} \times \pi r_1^2$$

$$= \frac{1}{4} \times \frac{22}{7} \times 35 \times 35$$

$$= \frac{11}{2} \times 5 \times 35$$

$$= \frac{1925}{2} = 962.5 \text{ cm}^2.$$

(*ii*) Radius of the circle, $r_2 = 7$ cm

The shaded part of the circle is its quadrant.

∴ Area of the shaded part

$$= \frac{1}{4} \times \pi\ r_2^2$$

$$= \frac{1}{4} \times \frac{22}{7} \times 7 \times 7$$

$$= \frac{11}{2} \times 7 = \frac{77}{2} = 38.5 \text{ cm}^2.$$

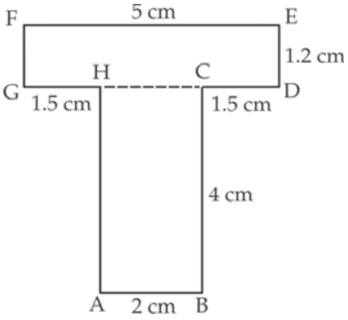
WORKSHEET–100

1. Join HC. ABCH is a rectangle

∴ HA = BC = 4 cm

GDEF is also a rectangle

∴ FG = DE = 1.2 cm



Perimeter

= AB + BC + CD + DE + EF + FG + GH + HA

= 2 + 4 + 1.5 + 1.2 + 5 + 1.2 + 1.5 + 4

= 20.4 cm.

Area of the shape

= Area of the rectangle ABCH + Area of the rectangle GDEF

= 4 × 2 + 5 × 1.2

$= 8 + 6 = 14 \text{ cm}^2.$

2. Area of square = side^2

$$\therefore \quad 2.25 = \text{Side} \times \text{Side}$$

$$\text{or} \quad \frac{225}{100} = \text{Side} \times \text{Side}$$

$$\text{or} \quad \frac{15}{10} \times \frac{15}{10} = \text{Side} \times \text{Side}$$

$$\therefore \quad \text{Side} = \frac{15}{10} \text{ m.}$$

Perimeter of square = 4 × Side

$$= 4 \times \frac{15}{10} = 6 \text{ m.}$$

3. $b = 15$ cm, Area = 60 cm^2, $h = ?$

$$\text{Area} = \frac{1}{2}\ bh$$

$$\therefore \quad 60 = \frac{1}{2} \times 15 \times h$$

$$\therefore \quad h = \frac{60 \times 2}{15} = 8$$

Thus, the altitude is 8 cm.

4. Area of a trapezium =

$$\frac{\text{Sum of parallel sides} \times \text{Distance between them}}{2}$$

$$= \frac{(13+9)\times 9}{2} = \frac{22\times 9}{2}$$

$$= 99 \text{ cm}^2.$$

5. $r = 2.1$ m

$$\text{Circumference} = 2\pi\, r = 2 \times \frac{22}{7} \times 2.1$$

$$= \frac{2 \times 22 \times 21}{7 \times 10}$$

$$= \frac{2 \times 22 \times 3}{10} = \frac{132}{10}$$

$$= 13.2 \text{ cm}^2.$$

6.

$$\frac{r_1}{r_2} = \frac{2}{3}$$

$$\frac{C_1}{C_2} = \frac{2\pi r_1}{2\pi r_2} = \frac{r_1}{r_2} = \frac{2}{3}$$

Thus, the ratio of the circumferences is 2 : 3.

7. Forming a new closed shape from any closed shape, the perimeter remains unchanged.

∴ Perimeter of the square = Perimeter of the circle

or $\quad 4 \times \text{Side} = 2\pi r$

$$\therefore \quad \text{Side} = \frac{2}{4} \times \frac{22}{7} \times 42$$

$$= 11 \times 6$$

$$= 66 \text{ cm.}$$

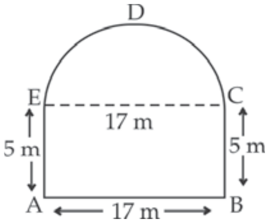
Thus, the side of the square is 66 cm.

8. ABCE is a rectangle.

∴ $\quad$ AE = BC = 5 m

And $\quad$ CE = AB = 17 m

Since CDE is a semicircle and CE is its diameter.



$$\therefore \text{ CDE} = \frac{1}{2}\pi \times \text{CE} = \frac{22}{2 \times 7} \times 17$$

$$= \frac{187}{7} \text{ m.}$$

Now, perimeter of the figure

= AB + BC + CDE + EA

$$= 17 + 5 + \frac{187}{7} + 5$$

$$= 27 + \frac{187}{7} = \frac{376}{7} = 53.71 \text{ m.}$$

9. (*i*) PQ = Side = 1.5 cm

Perimeter of the square PQRS

= 4 × Side = 4 × PQ

= 4 × 1.5 = 6 cm.

Area of the square PQRS

= Side × Side = PQ × PQ

$= 1.5 \times 1.5 = 2.25 \text{ cm}^2.$

(*ii*) PQ = Side = 12 mm

Perimeter of square PQRS

= 4 × Side = 4 × PQ

= 4 × 12 = 48 mm

Area of square PQRS

= Side × Side = PQ × PQ

$= 12 \times 12 = 144 \text{ mm}^2.$

10. (*i*) Area of rectangle

= Length × Breadth

$= 24 \times 14 = 336 \text{ cm}^2.$

(*ii*) Area of square $= \text{Side}^2 = 22^2$

$= 22 \times 22 = 484 \text{ cm}^2.$

Clearly, area of the square is greater.

Differences in areas

= Area of the square – Area of the rectangle

$= 484 - 336 = 148 \text{ cm}^2.$

Thus, area of the square is 148 cm^2 more than that of the rectangle.

11. $l = 80$ m, $b = 35$ m

(*i*) Area of the playground

$= l \times b = 80 \times 35$

$= 2800 \text{ m}^2$

Cost of levelling

= Area × cost of per square metre

$= 2800 \times 1.50 = 280 \times 15$

$= 4200.$

Thus, the cost of levelling the playground is ₹ 4200.

(*ii*) Perimeter of the playground

$= 2 \times (l + b) = 2 \times (80 + 35)$

$= 2 \times 115 = 230$ m.

Distance walked by a boy

= 2 × Perimeter

$= 2 \times 230 = 460$ m.

Time taken by the boy

$$= \frac{\text{Distance walked}}{\text{Speed}}$$

$$= \frac{460}{1.5} = \frac{4600}{15} = \frac{920}{3}$$

= 306.67 seconds

or 5.11 minutes.

WORKSHEET – 101

1. Perimeter = 8 cm + 6 cm + 3 cm

= 17 cm.

2. Circumference $= 2\pi r = 2 \times \frac{22}{7} \times 1.4$

$= 44 \times 0.2 = 8.8$ cm.

3. Circumference of the pipe,

$C = 2\pi r = 2 \times \frac{22}{7} \times 100$

$= \frac{4400}{7}$ cm.

(*i*) Length of the tape to wrap once

$= C \times 1 = \frac{4400}{7} \times 1$

= 628.57 cm.

(*ii*) Length of the tape to wrap twice

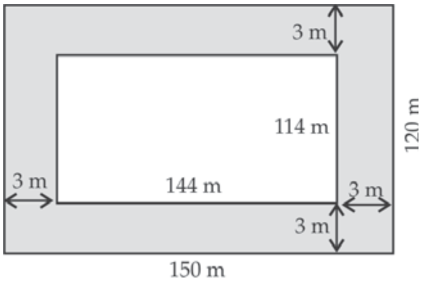
$= C \times 2 = \frac{4400}{7} \times 2$

$= \frac{8800}{7} = 1257.14$ cm.

4. Length of the inner rectangle

= 150 m – 3 m – 3 m

= 144 m.



Width of the inner rectangle

= 120 m – 3 m – 3 m

= 114 m.

Area of the path

= Area of the shaded region

= Area of the outer rectangle – Area of inner rectangle

$= 150 \times 120 - 144 \times 114$

$= 18000 - 16416$

$= 1584 \text{ m}^2.$

5. Length of fencing = 28.8 + 18.5 + 18.5

= 65.8 m

Cost of fencing = Length of fencing × Rate per metre

$= 65.8 \times 125$

$= 8225$

Thus, the cost of fencing is ₹ 8225.

6. $r = 14$ cm

Perimeter of each semicircular disc

$$= \text{Diameter} + \frac{\text{Circumference}}{2}$$

$$= 2r + \pi r = (2 + \pi) \times r$$

$$= \left(2 + \frac{22}{7}\right) \times 14 = 28 + 44$$

$$= 72 \text{ cm.}$$

7. Area of the lawn $= l \times b$

$\therefore$ $1250 = 50 \times b$

$\therefore$ $b = \frac{1250}{50} = 25$ m.

Now, perimeter of the lawn

$$= 2 \times (l + b)$$

$$= 2 \times (50 + 25)$$

$$= 2 \times 75 = 150 \text{ m.}$$

8. Base = 2.5 cm, area = 100 cm^2.

Area of a parallelogram

= Base × Height

$\therefore$ 100 = 2.5 × Height

$\therefore$ $\text{Height} = \frac{100}{2.5} = \frac{1000}{25}$

= 40 cm.

Thus, the height of the parallelogram is 40 cm.

9. Circumference of the pillow cover

$= \pi \times$ Diameter

$= 3.14 \times 1.4 = 4.396$ m

$\therefore$ Length of the lace required

= Circumference of the cover

= 4.396 m

Cost = Length of the lace × rate per metre

= 4.396 × 20 = ₹ 87.92.

10. $r = \frac{d}{2} = \frac{49}{2}$ cm

Area of semicircle

$$= \frac{1}{2}\pi r^2 = \frac{1}{2} \times \frac{22}{7} \times \left(\frac{49}{2}\right)^2$$

$$= \frac{11}{7} \times \frac{49}{2} \times \frac{49}{2}$$

$$= \frac{11}{4} \times 7 \times 49 = \frac{3773}{4}$$

$$= 943.25 \text{ cm}^2$$

Length of the boundary

$$= d + \pi r = 49 + \frac{22}{7} \times \frac{49}{2}$$

$$= 49 + 11 \times 7 = 49 + 77$$

$$= 126 \text{ cm.}$$

11. (*i*) There are four quadrants in a circle of radius $\left(\frac{40}{2} \text{ cm}\right) = 20$ cm, one at each corner of a square with side length 40 cm.

Area of square

= Side × Side = 40 × 40

= 1600 cm^2.

Area of 1 quadrant

$$= \frac{1}{4}\pi\,(\text{radius})^2$$

$$= \frac{1}{4} \times \frac{22}{7} \times 20 \times 20$$

$$= \frac{2200}{7} \text{ cm}^2.$$

Sum of areas of 4 quadrants

= 4 × Area of 1 quadrant

$$= 4 \times \frac{2200}{7} = \frac{8800}{7} \text{ cm}^2.$$

Now, area of the shaded portion

$$= 1600 - \frac{8800}{7}$$

$$= 800\left(2 - \frac{11}{7}\right) = 800 \times \frac{3}{7}$$

$$= \frac{2400}{7} = 342.86 \text{ cm}^2.$$

(*ii*) Area of the circle with centre O

$$= \pi \times (\text{radius})^2$$
$$= \pi \times 7 \times 7$$
$$= 49\pi \text{ cm}^2.$$

Area of the circle with centre at O'.

$$= \pi \times (\text{radius})^2$$
$$= \pi \times 1.4 \times 1.4$$
$$= 1.96\ \pi \text{ cm}^2.$$

Sum of the areas of both the circles

$$= 49\ \pi + 1.96\ \pi$$

$$= 50.96 \times \frac{22}{7} = 160.16 \text{ cm}^2.$$

Area of the square having sides 20 cm $= (\text{side})^2 = 20 \times 20$
$= 400 \text{ cm}^2$.

Now, area of the shaded portion

$$= 400 - 160.16$$
$$= 239.84 \text{ cm}^2.$$

WORKSHEET–102

1. Perimeter of the figure

$= 1.5$ cm $+ 2.5$ cm $+ 3.5$ cm
$= 7.5$ cm.

2. Area of a circle $= \pi r^2$

$$\Rightarrow \quad 12474 = \frac{22}{7} \times r^2$$

$$\Rightarrow \quad r^2 = \frac{12474 \times 7}{22}$$

$$\Rightarrow \quad r^2 = 567 \times 7$$

$$= 81 \times 7 \times 7$$

or $\quad r^2 = 9 \times 9 \times 7 \times 7$

$\therefore \quad r = 9 \times 7 = 63$ cm.

3. Circumference of the circle

= Perimeter of the square

or $\quad 2\pi r = 4 \times \text{Side}$

$$\therefore 2 \times \frac{22}{7} \times r = 4 \times 11$$

$$\therefore \quad r = \frac{4 \times 11 \times 7}{2 \times 22} = 7 \text{ cm}.$$

Now, area of the circle

$$= \pi r^2 = \frac{22}{7} \times 7 \times 7$$

$$= 154 \text{ cm}^2.$$

4. $\quad \pi r^2 = 15400$

or $\quad \frac{22}{7} \times r^2 = 15400$

$$\therefore \quad r^2 = \frac{15400 \times 7}{22} = 700 \times 7$$

$$= 7 \times 10 \times 10 \times 7$$

or $\quad r^2 = 7^2 \times 10^2$

or $\quad r^2 = (7 \times 10)^2$

$\therefore \quad r = 7 \times 10 = 70$ m

$$\text{Circumference} = 2\pi r = 2 \times \frac{22}{7} \times 70$$

$$= 440 \text{ m}.$$

5. $\quad r = \frac{14}{2} = 7$ cm

Area of the shaded portion

= Area of the rectangle
– Area of the semicircle

$$= l \times b - \frac{1}{2}\pi r^2$$

$$= 14 \times 9 - \frac{1}{2} \times \frac{22}{7} \times 7 \times 7$$

$= 126 - 77 = 49 \text{ cm}^2$.

Thus, the area of the shaded portion is 49 cm^2.

6. Area of a square = Side × Side

$\therefore$ 49 = Side × Side

or 7×7 = Side × Side

or $7^2 = (\text{Side})^2$

$\therefore$ Side = 7 cm.

7. Perimeter of square = 4 × Side

$\therefore$ 144 = 4 × Side

$$\therefore \quad \text{Side} = \frac{144}{4} = 36 \text{ cm}$$

Area of square = Side × Side

$= 36 \times 36$

$= 1296 \text{ cm}^2$.

8. Area of the outer cross-section

$= \pi \times (\text{Radius})^2$

$= \pi \times 7^2 = 49\pi$.

Area of the inner cross-section

$= \pi \times (\text{Radius})^2$

$= \pi \times (3)^2 = 9\pi$.

Area of the cross-section of the pipe

$= 49\pi - 9\pi$

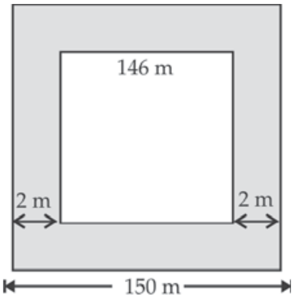
$= 40\pi = 40 \times 3.14$

$= 125.60 \text{ cm}^2$.

9. Side of the inner square

= 150 m – 2 m – 2 m

= 146 m.



Area of the road

= Area of the outer square – Area of the inner square

$= 150 \times 150 - 146 \times 146$

$= 22500 - 21316$

$= 1184 \text{ m}^2$.

Cost of constructing the road

= Area of the road × Cost per square metre

= 1184 × 3 = ₹ 3552

Thus, the cost of constructing the road is ₹ 3552.

10. Area of the door $= 132 \times 200 \text{ cm}^2$

$= 26400 \text{ cm}^2$.

$= 2.64 \text{ m}^2$

$[10000 \text{ cm}^2 = 1 \text{ m}^2]$

Area of the whole wall

$= 250 \times 200 \text{ cm}^2$

$= 50000 \text{ cm}^2$.

$= 5 \text{ m}^2$

Area of the wall for painting

= Area of the whole wall – Area of the door

$= 5 - 2.64 = 2.36 \text{ m}^2$.

Cost of painting the wall

= 2.36 × 2.50 = ₹ 5.90.

11. (*i*) Area of parallelogram

= Base × Height

$\therefore$ 36 = 4 × Height

$$\therefore \quad \text{Height} = \frac{36}{4} = 9 \text{ cm}.$$

Thus, the height of the parallelogram is 9 cm.

(*ii*) Area of parallelogram

= Base × Height

$$\therefore \quad 16.38 = 15.6 \times \text{Height}$$

$$\therefore \quad \text{Height} = \frac{16.38}{15.6} = \frac{1638}{1560}$$

$$= 1.05 \text{ cm}$$

Thus, the height of the parallelogram is 1.05 cm.

WORKSHEET–103

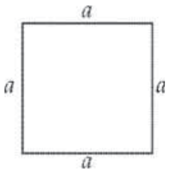
1. Perimeter of square = $4a$

Area of square = a^2

According to question,

$$4a = a^2$$

$$4 = a \therefore a = 4$$



∴ Each side of the square = 4 cm.

2. Area of rectangle = 18 cm^2

Let the length and breadth of the rectangle a and b.

$$ab = 18 \text{ cm}^2$$

If $a = 1$, then $b = 18$

If $a = 2$, then $b = 9$

If $a = 3$, then $b = 6$

∴ Possible dimensions are 1 cm × 18 cm, 2 cm × 9 cm, 3 cm × 6 cm.

3. Diameter = 21 cm (Given)

$$\text{Radius} = \frac{21}{2} \text{ cm}$$

Perimeter of semicircle = $\pi r + d$

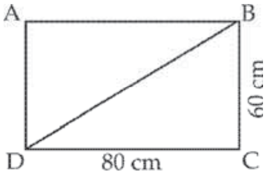
$$= \frac{22}{7} \times \frac{21}{2} + 21$$

$$= 33 \text{ cm} + 21 \text{ cm} = 54 \text{ cm}.$$

4. BD = $\sqrt{(80)^2 + (60)^2}$

BD = 100 cm

Length covered in one rotation = πd



$$= \frac{22}{7} \times 1.4 \; [\because d = 1.4 \text{ cm (Given)}]$$

$$= \frac{22}{7} \times \frac{14}{10} = \frac{22}{5} \text{ cm}$$

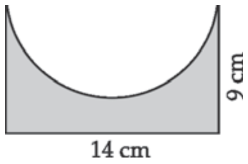
Number of rotations required to cover 100 cm

$$= \frac{100}{\frac{22}{5}} = \frac{100}{1} \times \frac{5}{22} = \frac{500}{22}$$

$$= 22.73$$

∴ No. of full rotations = 22 cm.

5. Area of rectangle = 14 × 9 = 126 cm^2



Perimeter = $2 \times 9 + 14 + \pi r$

$$= 18 + 14 + \frac{22}{7} \times 7 (\because r = 7 \text{ cm})$$

$$= 18 + 14 + 22 = 54 \text{ cm}$$

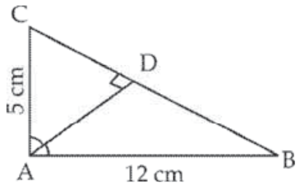
Area of shaded region = Area of rectangle – Area of semicircle

$$= l \times b - \frac{1}{2}\pi r^2$$

$$= 14 \times 9 - \frac{1}{2} \times \frac{22}{7} \times 7 \times 7$$

$$= 126 - 77 = 49 \text{ cm}^2.$$

6. In the given right triangle CAB,



AB = 12 cm, CA = 5 cm

$$CB = \sqrt{CA^2 + AB^2}$$

$$CB = \sqrt{5^2 + 12^2} = \sqrt{25 + 164}$$

$$CB = \sqrt{169} = 13 \text{ cm}$$

Area of the right triangle (CAB)

$$= \frac{1}{2} \times AB \times AC$$

$$= \frac{1}{2} \times 12 \times 5 = 30 \text{ cm}^2$$

$$\text{Area of triangle} = \frac{1}{2} \times b \times h$$

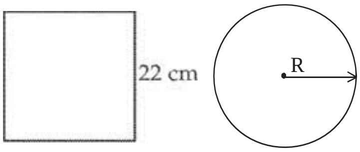
$$30 = \frac{1}{2} \times AD \times 13$$

$$60 = AD \times 13$$

$$AD = \frac{60}{13} \text{ cm.}$$

7. Area of square $= 22 \times 22 \text{ cm}^2$

$= 484 \text{ cm}^2$



Perimeter of square = 4 × side

$= 4 \times 22 = 88$ cm

Perimeter of square will be

= circumference of circle

$$88 = 2\pi r$$

$$88 = 2 \times \frac{22}{7} \times r$$

$$88 = \frac{44}{7} \times r$$

$$r = 88 \times \frac{7}{44}$$

$$r = 14 \text{ cm}$$

Now, area of circle $= \pi r^2$

$$= \frac{22}{7} \times 14 \times 14$$

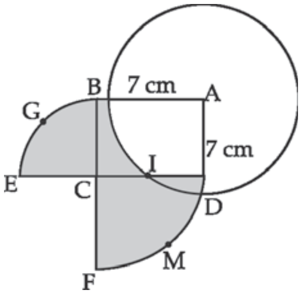
$$= 44 \times 14 = 616 \text{ cm}^2$$

Now, difference in area $= 616 - 484$

$= 132 \text{ cm}^2$ more area.

8. Area of shaded part

= Ar(EGBC) + Ar(CFMD) + Ar(BCDA) + Ar(BIDA)



$$= \frac{\pi r^2}{4} + \frac{\pi r^2}{4} + r^2 - \frac{\pi r^2}{4}$$

$$= \frac{\pi r^2}{4} + r^2$$

$$= \frac{\pi (7)^2}{4} + 7^2 \qquad (\because r = 7 \text{ cm})$$

$$= 7^2\left(\frac{\pi}{4} + 1\right) = 49\left(\frac{\frac{22}{7}}{4} + 1\right)$$

$$= 49\left(\frac{22}{28} + 1\right) = 49\left(\frac{22+28}{28}\right) = 49 \times \frac{50}{28}$$

$$= \frac{350}{4} = 87.5 \text{ cm}^2$$

$$\text{Perimeter} = \frac{\pi r}{2} + \frac{\pi r}{2} + \frac{\pi r}{2} + 2r$$

$$= \frac{3\pi r}{2} + 2r = \frac{3 \times \frac{22}{7} \times 7}{2} + 2 \times 7$$

$$= \frac{66}{2} + 14 = 33 + 14 = 47 \text{ cm.}$$

Chapter

13 ALGEBRAIC EXPRESSIONS

WORKSHEET–104

1. (B) $11xy$ and $-6y$ have different algebraic factors.

2. (D) The coefficient of x is $-y^2$.

3. (B) The polynomial $a^2 + b^2$ has two terms and hence it is a binomial.

4. (C) $(8x^2 + 4x^2) + (-6x - 4x + 3x) + 5$

$$= 12x^2 - 7x + 5.$$

5. (A)

$$\begin{array}{r} 3x + 7 \\ +\ 4x - 5 \\ \hline 7x + 2 \end{array}$$

6. (C)

$$\begin{array}{rrr} 8xy & -\ 4x & +\ y \\ 18xy & -\ 6x & +\ 2y \\ - & + & - \\ \hline -\ 10xy & +\ 2x & -\ y \end{array}$$

7. (D)

$$\begin{array}{rrrr} & 7pq & -\ 6p & +\ 8q \\ + & 3pq & -\ 12p & +\ 9q \\ \hline & 10pq & -\ 18p & +\ 17q \end{array}$$

8. (A)

$$\begin{array}{rrr} 3a^2 & & +\ 2 \\ +\ a^2 & -\ 2a & +\ 7 \\ \hline 4a^2 & -\ 2a & +\ 9 \end{array} \qquad \begin{array}{rrr} -\ a^2 & +\ 2a & +\ 3 \\ +\ 4a^2 & & -\ 2 \\ \hline 3a^2 & +\ 2a & +\ 1 \end{array}$$

Now,

$$\begin{array}{rrr} 4a^2 & -\ 2a & +\ 9 \\ 3a^2 & +\ 2a & +\ 1 \\ - & - & - \\ \hline a^2 & -\ 4a & +\ 8 \end{array}$$

9. (A)

$$\begin{array}{rrr} 2x^2 & +\ 3xy & \\ x^2 & +\ 2xy & +\ y^2 \\ - & - & - \\ \hline x^2 & +\ xy & -\ y^2 \end{array}$$

10. (A) $p + 8 = 2 + 8 = 10.$

11. (A) $m - 2 = 2 - 2 = 0.$

12. (D) The expression 5 is independent of x. So, for $x = 2$, the expression will remain 5.

13. (C) At $x = -1$,

$$x^3 - 6x^2 + 5 = (-1)^3 - 6(-1)^2 + 5$$
$$= -1 - 6 + 5 = -2.$$

14. (C) $a^3 - b^3 = 1^3 - 1^3 = 1 - 1 = 0.$

15. (A) $2x^2 + x - m = 5$

$\Rightarrow \quad 2(0)^2 + 0 - m = 5$ (Putting $x = 0$)

$\therefore \quad m = -5.$

16. (D) Constant term = 6.

17. (C) x^3 and $7x^3$ has same literal factor as x^3.

18. (A) $a^2 + b^2 + ab = 2^2 + (-2)^2 + 2(-2)$

$$= 4 + 4 - 4 = 4.$$

19. (B) The exponent of b in $a^2 - b^3 + 8$ is 3.

20. (A) $2(x^2 - x + y) + 3(x + y)$

$$= 2x^2 - 2x + 2y + 3x + 3y$$
$$= 2x^2 + x + 5y.$$

21. (A) $(y^2 - 1)$ is not a factor of $2z^2 - 2$ and $(z^2 - 1)$ is not a factor of $2y^2 - 2$.

22. (B) Area of a rectangle

= Length × Breadth

= l m × b m

= lb m^2.

23. (D) $P + 2Q - R$

$= m^2 - n^2 + 2(n + m) - (2m + 2n + m^2)$

$= m^2 - n^2 + 2n + 2m - 2m - 2n - m^2$

$= (m^2 - m^2) - n^2 + (2n - 2n) + (2m - 2m)$

$= -n^2$.

WORKSHEET – 105

1. Numerical coefficient of $3x^4$ is 3

Numerical coefficient of $-y^3$ is -1

Numerical coefficient of z^3 is 1

Numerical coefficient of $2xyz$ is 2

Numerical coefficient of -9 is -9.

2. (*i*)

$$\begin{array}{rrr} 3m^2 & +\ 8m & -\ 4 \\ +\ 6m^2 & -\ \ m & +\ 7 \\ \hline 9m^2 & +\ 7m & +\ 3 \end{array}$$

(*ii*)

$$\begin{array}{rrr} a^2 & +\ 2ab & \\ & -\ 3ab & -\ d^2 \\ \hline a^2 & -\ \ ab & -\ d^2 \end{array}$$

3. (*i*) $3mn^2 + 4m^2n^2 + (-5mn^2) + (-mn^2)$

$= 3mn^2 + 4m^2n^2 - 5mn^2 - mn^2$

$= (3mn^2 - 5mn^2 - mn^2) + 4m^2n^2$

$= (3mn^2 - 6mn^2) + 4m^2n^2$

$= 4m^2n^2 - 3mn^2$

$= mn^2\,(4m - 3)$.

(*ii*) $(x - 9) + (3x - 8) + (x - 1)$

$= x - 9 + 3x - 8 + x - 1$

$= (x + 3x + x) + (-9 - 8 - 1)$

$= 5x - 18$.

4. Perimeter of the given figure

$= (4a - 3b) + (5a - 4b)$

$\quad + (4a - 3b) + (5a - 4b)$

$= (4a + 5a + 4a + 5a)$

$\quad + (-3b - 4b - 3b - 4b)$

$= 18a - 14b = 2(9a - 7b)$ units.

5.

$$\begin{array}{rrrr} x^2 & +\ 4y^2 & -\ 6xy & \\ x^2 & -\ \ y^2 & +\ 2xy & \\ & +\ \ y^2 & & +\ 6 \\ +\ x^2 & & -\ 4xy & \\ \hline 3x^2 & +\ 4y^2 & -\ 8xy & +\ 6 \end{array}$$

Subtract $-2x^2 + y^2 - xy + x$ from $3x^2 + 4y^2 - 8xy + 6$.

$$\begin{array}{rrrrr} 3x^2 & +\ 4y^2 & -\ 8xy & & +\ 6 \\ -\ 2x^2 & +\ \ y^2 & -\ \ xy & +\ x & \\ + & - & + & - & \\ \hline 5x^2 & +\ 3y^2 & -\ 7xy & -\ x & +\ 6\,. \end{array}$$

6. We first add $8b^2 - 3c^2$ and $2b^2 + bc - 2c^2$ as

$$\begin{array}{rrr} 8b^2 & & -\ 3c^2 \\ 2b^2 & +\ bc & -\ 2c^2 \\ \hline 10b^2 & +\ bc & -\ 5c^2 \end{array} \qquad \ldots (i)$$

Then, we add $2b^2 - 2bc - c^2$ and $c^2 + 2bc - b^2$ as

$$\begin{array}{rrr} 2b^2 & -\ 2bc & -\ c^2 \\ -\ b^2 & +\ 2bc & +\ c^2 \\ \hline b^2 & & \end{array} \qquad \ldots (ii)$$

Now, we subtract the sum (*i*) from the sum (*ii*) as

$$\begin{array}{rrr} b^2 & & \\ 10b^2 & +\ bc & -\ 5c^2 \\ - & - & + \\ \hline -\ 9b^2 & -\ bc & +\ 5c^2 \end{array}$$

7. (*i*) $4x - (-8y - 3x) = 4x + 8y + 3x$

$= (4x + 3x) + 8y$

$= 7x + 8y$.

(*ii*) $-(49 - a^2) - 9a^2 = -49 + a^2 - 9a^2$

$= (a^2 - 9a^2) + (-49)$

$= -8a^2 - 49$.

8. (*i*) Terms of algebraic expression $a^2 - b^2 - 2ab$ are: $a^2, - b^2$ and $- 2ab$

(*ii*) The algebraic expression is $9a^2b - 4ab^2 + abc + 4c$

(*iii*) (*a*) Coefficient of x in mx is m.

(*b*) Coefficient of x in $-\dfrac{2}{3}xp$ is $-\dfrac{2}{3}p$.

(*iv*) $- z = (-1)z$

The coefficient of z in $- z$ is -1.

(*v*) The literal factor of $\dfrac{- 8xy}{9z}$ is $\dfrac{xy}{z}$.

WORKSHEET–106

1. Let A should be added. Then

$$A + m^2 + mn + n^2 = 3m^2 + 4mn$$

$$\therefore \quad A = 3m^2 + 4mn - m^2 - mn$$

$$= 2m^2 + 3mn$$

$$= m(2m + 3n).$$

2. Let S should be subtracted. Then,

$$3x^2 + 9y^2 + 10 + 12xy - S$$

$$= - x^2 - y^2 + 12 + 8xy$$

or $3x^2 + 9y^2 + 10 + 12xy + x^2 + y^2 - 12 - 8xy = S$

or $4x^2 + 10y^2 + 4xy - 2 = S$

i.e., $S = 4x^2 + 10y^2 + 4xy - 2.$

3. $6x - 3y^2 - 8y + y - 3x$

$$= (6x - 3x) - 3y^2 + (- 8y + y)$$

$$= 3x - 3y^2 - 7y.$$

4.

$$\begin{array}{rrr} 30p^2 & + 40q^2 & - 12pq \\ - 15p^2 & - 30q^2 & + 72pq \\ + & + & - \\ \hline 45p^2 & + 70q^2 & - 84pq. \end{array}$$

5. (*i*) $2x + x = 3x.$

(*ii*) $7y - 3y = 4y.$

(*iii*) $8m + 8m = 16m.$

(*iv*) $12y - 12y = 0.$

6. (*i*) $10x - 4x^2 - 2x^2$

Here, $- 4x^2$ and $- 2x^2$ are the like terms.

$$\therefore \quad 10x - 4x^2 - 2x^2$$

$$= 10x + (- 4x^2 - 2x^2)$$

$$= 10x + (- 6x^2)$$

$$= 10x - 6x^2.$$

(*ii*) $17ab - 7ba + 2bc$

Here, $17ab$ and $- 7ba$ are the like terms.

$$\therefore \quad 17ab - 7ba + 2bc$$

$$= (17ab - 7ba) + 2bc$$

$$= (17ab - 7ab) + 2bc$$

$$(\because ab = ba)$$

$$= 10ab + 2bc.$$

7. We first add $4x - y + 12$ and $- y + 12$ as

$$\begin{array}{r} 4x - y + 12 \\ - y + 12 \\ \hline 4x - 2y + 24 \end{array}$$

Then we subtract $6x - y - 20$ from $4x - 2y + 24$ as

$$\begin{array}{rrr} 4x & - 2y & + 24 \\ 6x & - \ y & - 20 \\ - & + & + \\ \hline - 2x & - \ y & + 44. \end{array}$$

8. (*i*) $3a + 5 -13 - 4a = (3a - 4a) + (5 - 13)$

$$= - a + (- 8)$$

$$= - a - 8.$$

(*ii*) $5x - 3y^2 - 8y + y - 4x$

$= (5x - 4x) + (-3y^2) + (-8y + y)$

$= x - 3y^2 - 7y.$

9. (*i*) $a - (a - b) - b - (b - a)$

$= a - a + b - b - b + a$

$= (a - a + a) + (b - b - b)$

[∵ $a, -a, a$ are like terms as well as $b, -b, -b$ are like terms.]

$= a - b.$

(*ii*) $(4a^2 + 5a - 4) - (8a - a^2 - 5)$

$= 4a^2 + 5a - 4 - 8a + a^2 + 5$

$= (4a^2 + a^2) + (5a - 8a) + (-4 + 5)$

[∵ $4a^2$ and a^2 are like terms; $5a$ and $-8a$ are like terms; -4 and 5 are like terms]

$= 5a^2 - 3a + 1.$

10. We first add $8 + 2x$ and $6 - 6x + 3x^2$ as

$$\begin{array}{l} 8+2x \\ 6-6x+3x^2 \\ \hline 14-4x+3x^2 \end{array} \qquad \ldots(i)$$

Then, we add $3x^2 - 6x$ and $-2x^2 + 2x - 5$ as

$$\begin{array}{l} 3x^2-6x \\ -2x^2+2x-5 \\ \hline x^2-4x-5 \end{array} \qquad \ldots(ii)$$

Now we subtract the sum (2) from the sum (*i*) as

$$\begin{array}{cccc} 3x^2 & -4x & +14 \\ x^2 & -4x & -5 \\ - & + & + \\ \hline 2x^2 & & +19 \end{array}$$

Thus, the result is $2x^2 + 19$.

WORKSHEET–107

1. (*i*) Substituting $x = 2$ in $2x - 3$, we get

$2x - 3 = 2(2) - 3 = 4 - 3 = 1.$

(*ii*) Substituting $x = 2$ in $4x^2 - x - 6$, we get

$4x^2 - x - 6 = 4(2)^2 - (2) - 6$

$= 4 \times 4 - 2 - 6$

$= 16 - 8 = 8.$

2. (*i*) Substituting $a = 2$ and $b = -1$ in $a^2 - b^2 - 4$, we get

$a^2 - b^2 - 4 = (2)^2 - (-1)^2 - 4$

$= 4 - 1 - 4 = -1.$

(*ii*) Substituting $a = 2$ and $b = -1$ in $a - b^2 - a^2b^2$, we get

$a - b^2 - a^2b^2 = 2 - (-1)^2 - (2)^2(-1)^2$

$= 2 - (1) - (4)(1)$

$= 2 - 1 - 4 = -3.$

3. (*i*) Substituting $p = 2$, $a = -1$, $b = -2$ and $q = 0$

in $5p - 5q - 5 + a - b$, we get

$5p - 5q - 5 + a - b$

$= 5(2) - 5(0) - 5 + (-1) - (-2)$

$= 10 - 0 - 5 - 1 + 2 = 6.$

(*ii*) in $pq + ab + pa$, we get

$pq + ab + pa$

$= (2)(0) + (-1)(-2) + (2)(-1)$

$= 0 + 2 - 2 = 0.$

4. $3p^2 + p - a = 8$

or $3(1)^2 + (1) - a = 8$ (∵ $p = 1$)

or $3 + 1 - a = 8$

or $4 - a = 8$

or $-a = 8 - 4$

(Transposing 4 to the right)

or $-a = 4$

∴ $a = -4.$

5. Perimeter of triangle

$= \text{Sum of the measures of sides.}$

$= 3x + 1 + 4x + 2 + 5x$

$= (3x + 4x + 5x) + (1 + 2)$

$= 12x + 3.$

6. Total money spent by Reeta

= Money spent on toys + Money spent on books

$= 4x + 3y + 7x - 3y$

$= (4x + 7x) + (3y - 3y)$

$= 11x + 0 = ₹\ 11x.$

7. The remaining length of the wire

$= (7x - 3) - (2x - 1)$

$= 7x - 3 - 2x + 1$

$= (7x - 2x) + (-3 + 1)$

$= (5x - 2)$ m.

8. $\because\ x = 0$ and $y = -2$

$\therefore\ 4x^2y + 2xy^2 - 2xy + 8$

$= 4(0)^2(-2) + 2(0)(-2)^2 - 2(0)(-2) + 8$

$= 0 - 0 - 0 + 8 = 8.$

9. (*i*)

$$\begin{array}{r} 6x^2y \phantom{{}-9} \\ 2x^2y - \ \ 9 \\ \underline{3x^2y + 10} \\ 11x^2y + \ \ 1. \end{array}$$

(*ii*)

$$\begin{array}{r} y^2 - z^2 - 3 \\ y^2 - z^2 - 3 \\ \underline{-y^2 - z^2 + 3} \\ y^2 - 3z^2 - 3. \end{array}$$

10. (*i*) $8(b - a) = 8b - 8a$

$6(b - a) = 6b - 6a$

Subtract $8b - 8a$ from $6b - 6a$ as

$$\begin{array}{r} 6b - 6a \\ 8b - 8a \\ \underline{- \quad\ +\ \ } \\ -2b + 2a \end{array}$$

$-2b + 2a = 2(a - b).$

(*ii*) Subtract $24ab - 10b - 15a$ from $40ab + 16b + 18a$ as

$$\begin{array}{r} 40ab + 16b + 18a \\ 24ab - 10b - 15a \\ \underline{- \qquad + \qquad +\ \ } \\ 16ab + 26b + 33a. \end{array}$$

WORKSHEET–108

1. Since a and b are the algebraic factors of each of the given terms. Therefore, the given terms are like.

2. (*i*) Product of a and $b = a \times b = ab$

Subtracting 7 from ab, we get $ab - 7$.

So, the required algebraic expression is $ab - 7$.

(*ii*) Difference of x and $y = x - y$

One-third of $x - y = \frac{1}{3}(x - y)$

So, the required expression is

$\frac{1}{3}(x - y).$

3. (*i*) Terms of the expression $4x - 3y$ are $4x$ and $-3y$.

(*ii*) Terms of the expression $8 - x + y$ are $8, -x$ and y.

(*iii*) Terms of the expression $y^2x - y$ are y^2x and $-y$.

(*iv*) Terms of the expression $2z - 5xz$ are $2z$ and $-5xz$.

4. Groups of the like terms are given below:

(*a*) $13x, -25x, x, -12x$

(*b*) $-25y, 12y, y$

(*c*) 13, – 25, 1

5. $a(b-6) = ab - 6a$

$b(6-a) = 6b - ab$

Now subtract $ab - 6a$ from $6b - ab$.

$$\begin{array}{rrr} 6b & -\ ab & \\ & +\ ab & -\ 6a \\ & - & + \\ \hline 6b & -\ 2ab & +\ 6a. \end{array}$$

6. We first add $2x - y + 12$ and $-x - 20$ as

$$\begin{array}{rrr} 2x & -\ y & +\ 12 \\ -\ x & & -\ 20 \\ \hline x & -\ y & -\ 8 \end{array}$$

Now subtract $4x - y + 20$ from $x - y - 8$ as

$$\begin{array}{rrr} x & -\ y & -\ 8 \\ +\ 4x & -\ y & +\ 20 \\ - & + & - \\ \hline -\ 3x & & -\ 28 \end{array}$$

Thus, the result is $-3x - 28$

7. As $2x + 4y$ has two terms, it is a binomial.

8. $7x - 2x + 3y - x + 10y - 4x + 2y$

$= (7x - 2x - x - 4x) + (3y + 10y + 2y)$

[Grouping like terms]

$= (7x - 7x) + (15y)$

$= 0 + 15y = 15y.$

9. Let A should be added. Then

$A + 2x^2 + y^2 - xy = 4x^2 - 3y^2$

$\therefore \quad A = 4x^2 - 3y^2 - 2x^2 - y^2 + xy$

$= (4x^2 - 2x^2) + (-3y^2 - y^2) + xy$

$= 2x^2 - 4y^2 + xy.$

10. Perimeter of a triangle is the sum of measures of its sides.

$$\begin{array}{rr} m & +\ 2n \\ 3m & +\ 3n \\ 2m & -\ 6n \\ \hline 6m & -\ n \end{array}$$

Therefore, the perimeter of the triangle is $(6m - n)$ units.

11. (*i*)

$$\begin{array}{rrrr} 4x^2 & -\ 7x^2y & +\ 7y^2 & -\ 2xy \\ -\ x^2 & +\ x^2y & -\ 8y^2 & \\ \hline 3x^2 & -\ 6x^2y & -\ y^2 & -\ 2xy. \end{array}$$

(*ii*)

$$\begin{array}{rrr} 4x & -\ 12 & -\ 9z \\ 3x & -\ 3 & -\ 4z \\ \hline 7x & -\ 15 & -\ 13z. \end{array}$$

WORKSHEET–109

1. Numerical coefficient of the term $0.1x$ is 0.1.

Numerical coefficient of the term $0.01y^2$ is 0.01.

2. Product of x and $y = x \times y = xy$.

Four times of $xy = 4xy$.

Adding 7 to $4xy$, we get $4xy + 7$.

Hence, the required algebraic expression is $4xy + 7$.

3. Terms in $ab + 2b^2 - 3a^2$ are ab, $2b^2$ and $-3a^2$.

Factors of ab are 1, a and b.

Factors of $2b^2$ are 2, b and b.

Factors of $-3a^2$ are – 3, a and a.

4. Groups of like terms are given below:

(*a*) $13xy, -7xy, 12xy$

(*b*) $7x, -200x, -5x, -3x$

(*c*) $8y, -7y, 4y$

(*d*) $-x^2y^2, 12x^2y^2$

5. $p - (p - q) - p - (q - p) + q - (p - 2q)$

$= p - p + q - p - q + p + q - p + 2q$

$= (p - p - p + p - p) + (q - q + q + 2q)$

$= (2p - 3p) + (4q - q)$

$= - p + 3q.$

6. Subtract $25ab - 12b - 6a$ from $30ab - 14b + 2a$ as

$$\begin{array}{rrr} 30ab & -\ 14b & +\ 2a \\ 25ab & -\ 12b & -\ 6a \\ - & + & + \\ \hline 5ab\ - & 2b & +\ 8a. \end{array}$$

7. Substituting $n = -3$ in $n^2 - 5n^3 + 2n + 3$, we get

$n^2 - 5n^3 + 2n + 3$

$= (-3)^2 - 5(-3)^3 + 2(-3) + 3$

$= 9 - 5(-27) - 6 + 3$

$= 9 + 135 - 6 + 3$

$= (9 + 135 + 3) - 6$

$= 147 - 6 = 141.$

8. Substituting $a = 3$ and $b = -1$ in $a^3 - b^3$, we get

$a^3 - b^3 = (3)^3 - (-1)^3$

$= 27 - (-1) = 27 + 1 = 28.$

9. We know that lengths of all sides of an equilateral triangle are equal.

$\therefore$ Sum of the sides of the given triangle

$= (2x + 3y - 8) + (2x + 3y - 8)$
$+ (2x + 3y - 8)$

$= (2x + 2x + 2x) + (3y + 3y + 3y)$
$+ (-8 - 8 - 8)$

$= 6x + 9y - 24.$

10. Perimeter of a square $= 4 \times$ Side

$= 4 \times (8x + 4y)$

$= 32x + 16y.$

11. $3x^2y - 12xy^2 + 8y^2 - 7xy$

$= 3x^2y + 8y^2 - 12xy^2 - 7xy$

$= 3x^2y + 4(2 - 3x)y^2 - 7xy$

Now the coefficient of y^2 in the expression is same as the coefficient of y^2 in $4(2 - 3x)y^2$, which is $4(2 - 3x)$.

12. Add $4ab$, $a + b - 3ab$ and $7ab - b$ as

$$\begin{array}{r} 4ab \\ a + b - 3ab \\ - b + 7ab \\ \hline a \qquad + 8ab \end{array}$$

Thus, the result is $a + 8ab$.

WORKSHEET–110

1. Substituting $x = 2$ in $\frac{8x}{3} - 5$, we get

$$\frac{8x}{3} - 5 = \frac{8 \times 2}{3} - 5 = \frac{16}{3} - 5$$

$$= \frac{16 - 15}{3} = \frac{1}{3}.$$

2. $2y^2 - 5 - 2y + y^2 - 3y + 6 - y^2 - 4y - y^2 + 2$

$= (2y^2 + y^2 - y^2 - y^2)$
$+ (-2y - 3y - 4y) + (-5 + 6 + 2)$

$= (3y^2 - 2y^2) + (-9y) + (-5 + 8)$

$= y^2 - 9y + 3.$

3.

Polynomial	Degree
$m^2n^3 + mn^2 + 4$	5
$ab + bc + ca$	2

4. cab^2, b^2ac and acb^2 have same factors which are c, a, b and b.

a^2bc, c^2ab and abc have different factors

Therefore, cab^2, b^2ac and acb^2 are like terms.

5. Add $9p + 3q$, $4p - q$ and $2p - 2q$ as

$$\begin{array}{l} 9p + 3q \\ 4p - q \\ 2p - 2q \\ \hline 15p \end{array}$$

Therefore, the total cost is ₹ $15p$.

6. Substituting $p = 3$, $a = -1$, $b = -2$ and $q = 0$.

(*i*) In $30 - 3p - 3b + p^2$, we get

$$\begin{aligned} 30 - 3p - 3b + p^2 &= 30 - 3(3) - 3(-2) + (3)^2 \\ &= 30 - 9 + 6 + 9 \\ &= 30 + 6 - 9 + 9 = 36. \end{aligned}$$

(*ii*) In $3pq + 4ab + pa$, we get

$$\begin{aligned} 3pq + 4ab + pa &= 3(3)(0) + 4(-1)(-2) + 3(-1) \\ &= 0 + 4 \times 2 - 3 \\ &= 8 - 3 = 5. \end{aligned}$$

7. Amount left with Reeshu

$$\begin{aligned} &= ₹\,(18x^2 + 3x - 3) - ₹\,(6x^2 - 2x - 1) \\ &= ₹\,(18x^2 + 3x - 3 - 6x^2 + 2x + 1) \\ &= ₹\,(18x^2 - 6x^2 + 3x + 2x - 3 + 1) \\ &= ₹\,(12x^2 + 5x - 2). \end{aligned}$$

8. (*i*) $40ab + 16b + 18a - (24ab - 10b - 15a)$

$$\begin{aligned} &= 40ab + 16b + 18a - 24ab + 10b + 15a \\ &= (40ab - 24ab) + (16b + 10b) + (18a + 15a) \\ &= 16ab + 26b + 33a. \end{aligned}$$

(*ii*) $30p^2 + 40q^2 - 12pq - (63pq - 30q^2 - 15p^2)$

$$\begin{aligned} &= 30p^2 + 40q^2 - 12pq - 63pq + 30q^2 + 15p^2 \\ &= (30p^2 + 15p^2) + (40q^2 + 30q^2) + (-12pq - 63pq) \\ &= 45p^2 + 70q^2 - 75pq. \end{aligned}$$

9. (*i*) Add $c^2 + 2cd$ and $-3cd - d^2$ as

$$\begin{array}{r} c^2 + 2cd \qquad \\ - 3cd - d^2 \\ \hline c^2 - cd - d^2 \end{array}$$

(*ii*) Add $x^2 - y^2$, $2x^2 - 3xy + 4y^2$ and $3y^2 - 5xy - x^2$ as

$$\begin{array}{rrr} x^2 & - \;\; y^2 & \\ 2x^2 & + 4y^2 & - 3xy \\ -\;\; x^2 & + 3y^2 & - 5xy \\ \hline 2x^2 & + 6y^2 & - 8xy \end{array}$$

10. (*i*) Sum of p and $q = p + q$.

One-fourth of $(p + q) = \frac{1}{4}(p + q)$

Therefore, algebraic expression is $\frac{1}{4}(p + q)$.

(*ii*) Product of s and $t = s \times t = st$.

Subtracting 20 from st, we get

$st - 20$.

Therefore, algebraic expression is $st - 20$.

(*iii*) Sum of x and $y = x + y$.

Product of x and $y = x \times y = xy$.

Subtracting $(x + y)$ from xy, we get

$$\begin{aligned} xy - (x + y) &= xy - x - y \\ &= xy - (x + y). \end{aligned}$$

Therefore, algebraic expression is $= xy - (x + y)$.

WORKSHEET–111

1. $17x$, $-5x$ and x are like terms

2. $x = -2$ (Given)

$$\begin{aligned} 5x - 2 &= 5 \times (-2) - 2 \\ &= -10 - 2 = -12 \end{aligned}$$

3. $b = 2$ (Given)

$100 + 20b + b^2$

$= 100 + 20 \times 2 + 2^2$
$= 100 + 40 + 4$
$= 144.$

4. $p = -3, q = 1$ (Given)

$p^2 - 2pq + q^2$
$= (p - q)^2$
$(\because (a - b)^2 = a^2 - 2ab + b^2)$
$= (-3 - 1)^2 = (-4)^2$
$= (-4) \times (-4) = 16$

5. According to question

$a - b + ab - (ab - a - b)$
$= a - b + ab - ab + a + b$
$= 2a$

$0 - 2a = -2a.$

6. $a + b - 3$, $b - a + 3$ and $a - b + 3$

According to question,

$a + b - 3 + b - a + 3 + a - b + 3$
$= a + b + 3.$

$$\begin{array}{r} a + b - 3 \\ -a + b + 3 \\ a - b + 3 \\ + \quad + \quad + \\ \hline a + b + 3 \end{array}$$

7. Sum of $x - y$, $y - z$ and $z - x$

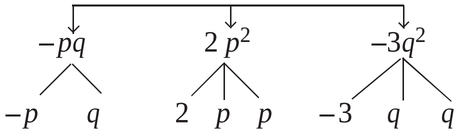
$= x - y + y - z + z - x = 0$

Subtract 0 from 1

$= 1 - 0 = 1.$

8. $-15xz^2$, coefficient $= -15x$

9. $[-pq + 2p^2 - 3q^2]$



10. $xy - [yz - zx - \{yx - (3y - xz) - (xy - zy)\}]$

$= xy - [yz - zx - \{yx - 3y + xz - xy + zy\}]$

$= xy - (yz - zx - yx + 3y - xz + xy - zy)$

$= xy - yz + zx + yx - 3y + xz - xy + zy$

$= xy - 3y + 2zx.$

11. $2xy - 5\{-xy + (4 - 3xy - 2)\}$

$= 2xy - 5\{-xy + (4 - 3xy + 2)\}$

$= 2xy - 5\{-xy + (6 - 3xy)\}$

$= 2xy - 5\{-xy + 6 - 3xy\}$

$= 2xy + 5xy - 30 + 15xy$

$= 22xy - 30.$

12. Sum of $x^2 + 3y^2 - 6xy$, $2x^2 - y^2 + 8xy + y^2 + 8$ and $x^2 - 4xy$

$= x^2 + 3y^2 - 6xy + 2x^2 - y^2 + 8xy + y^2 + 8 + x^2 - 4xy$

$= 4x^2 + 3y^2 - 2xy + 8$ ...(*i*)

Sum of $-3x^2 + 4y^2 + 3$ and $4y^2 - 5$

$= -3x^2 + 4y^2 + 3 + 4y^2 - 5$

$= -3x^2 + 8y^2 - 2$ ...(*ii*)

Subtract (*ii*) from (*i*),

$4x^2 + 3y^2 - 2xy + 8 + 3x^2 - 8y^2 + 2$

$= 7x^2 - 5y^2 - 2xy + 10.$

Chapter

14

EXPONENTS AND POWERS

WORKSHEET–112

1. (D) $100000 = 10 \times 10 \times 10 \times 10 \times 10$

$= 10^5$.

2. (C)10^6 is read as '10 raised to the power 6'.

3. (A) In m^n, m is the base and n is the exponent.

4. (A) $128 = 2 \times 2 \times 2 \times 2 \times 2 \times 2 \times 2$

$= 2^7$.

2	128
2	64
2	32
2	16
2	8
2	4
2	2
	1

5. (B)$(-3)^3 \times (-5)^5$

$= (-3) \times (-3) \times (-3) \times (-5) \times (-5) \times (-5) \times (-5) \times (-5)$

$= 84375$.

6. (C) $(a \times a) \times (b \times b \times b) \times (c \times c \times c \times c)$

$= a^2 \times b^3 \times c^4$

7. (A) $3600 = 2 \times 2 \times 2 \times 2 \times 3 \times 3 \times 5 \times 5$

$= 2^4 \times 3^2 \times 5^2$

2	3600
2	1800
2	900
2	450
3	225
3	75
5	25
5	5
	1

8. (B) Let us take option (B).

$2^8 = 2 \times 2 \times 2 \times 2 \times 2 \times 2 \times 2 \times 2$

$= 256$

$8^2 = 8 \times 8 = 64$

$\because 256 > 64 \quad \therefore 2^8 > 8^2$.

9. (D) $3^2 \times 3^5 = 3^{2+5} = 3^7$.

10. (C) $10^{12} \div 10^3 = \frac{10^{12}}{10^3} = 10^{12-3} = 10^9$.

11. (D) $(x^5)^y = x^{5 \times y} = x^{5y}$.

12. (C) $-\frac{2 \times 5^5 \times 7^3}{5^2 \times 7} = -2 \times \frac{5^5}{5^2} \times \frac{7^3}{7}$

$= -2 \times 5^{5-2} \times 7^{3-1}$

$= -2 \times 5^3 \times 7^2$.

13. (B) $\frac{36 \times 6^2 \times t^7}{12^3 \times t^4} = \frac{36 \times 6 \times 6 \times t^{(7-4)}}{12 \times 12 \times 12}$

$= \frac{3t^3}{4}$.

14. (B) $(-1)^{\text{even number}} = 1$

$(-1)^{\text{odd number}} = -1$.

15. (A) $1000000 = 10 \times 10 \times 10 \times 10 \times 10 \times 10$

$= 10^6$.

$\therefore$ Standard form of 1000000

$= 1.0 \times 10^6$.

16. (C) $602800000000000 \text{ m}^3$

$= 6028 \times (10 \times 10 \times 10 \times 10 \times 10 \times 10 \times 10 \times 10 \times 10 \times 10 \times 10) \text{ m}^3$

$= \frac{6028}{1000} \times 1000 \times 10^{11} \text{ m}^3$

$= 6.028 \times (10 \times 10 \times 10) \times 10^{11} \text{ m}^3$

$= 6.028 \times 10^3 \times 10^{11} \text{ m}^3$

$= 6.028 \times 10^{14} \text{ m}^3$.

17. (A) $8^{15} \div 8^{10} = \frac{8^{15}}{8^{10}} = 8^{15-10} = 8^5$.

18. (B) $5^x \times 5^6 = 5^{x+6} = 5^{6+x}$.

19. (D) Let us take option (D).

RHS $= (xy)^3 = (x^3y^3) = x^3 \times y^3 =$ LHS.

20. (B) $675 = 3 \times 3 \times 3 \times 5 \times 5$

$$= 3^3 \times 5^2$$

$$= 3^3 \times (-1)^2\, 5^2$$

$$= 3^3 \times (-1 \times 5)^2$$

$$= 3^3 \times (-5)^2.$$

3	675
3	225
3	75
5	25
5	5
	1

21. (A) $\because\ (2^{-1} - 3^{-1})^{-1}$

$$= \frac{1}{2^{-1}-3^{-1}} = \frac{1}{\frac{1}{2}-\frac{1}{3}} = \frac{1}{\frac{3-2}{6}} = 6.$$

And $(2^{-1} + 3^{-1})^{-1}$

$$= \frac{1}{2^{-1}+3^{-1}} = \frac{1}{\frac{1}{2}+\frac{1}{3}} = \frac{1}{\frac{3+2}{6}}$$

$$= \frac{6}{5}$$

$\therefore (2^{-1} - 3^{-1})^{-1} + (2^{-1} + 3^{-1})$

$$= 6 + \frac{6}{5} = \frac{30+6}{5} = \frac{36}{5}.$$

22. (B) Let the required number be x. Then

$x \times 2^{-1} = 1$ or $x \times \frac{1}{2} = 1$

$\therefore$ $x = 1 \times 2 = 2$.

23. (D) $4 \times 2^{x+2} = 2$ or $2^{x+2} = \frac{2}{4} = \frac{1}{2}$

or $2^{x+2} = 2^{-1}$

Comparing exponents of 2 on both the sides, we get

$x + 2 = -1$

$\therefore$ $x = -1 - 2 = -3$.

WORKSHEET–113

1. (*i*) In 6^3, 6 is the base and 3 is the exponent. Expanded form of 6^3.

$$= 6 \times 6 \times 6 = 216$$

$$= 2 \times 100 + 1 \times 10 + 6 \times 1$$

$$= 2 \times 10^2 + 1 \times 10^1 + 6 \times 10^0$$

(*ii*) In 8^2, 8 is the base and 2 is the Exponent.

Expanded form of 8^2

$$= 8 \times 8 = 64$$

$$= 6 \times 10^1 + 4 \times 10^0.$$

2. (*i*) $m \times m = m^2$.

(*ii*) $4 \times 4 \times x \times x = (4 \times 4) \times (x \times x)$

$$= 4^2 \times x^2.$$

3. (*i*) $\frac{x^6}{x^3} \times x^5 = x^{6-3} \times x^5$

$$= x^3 \times x^5 = x^{3+5} = x^8.$$

(*ii*) $(2^0 + 3^0) \times 4^0 = (1 + 1) \times 1$

($\because$ $a^0 = 1$ for $a \neq 0$)

$$= 2 \times 1 = 2^1.$$

4. (*i*) $a^3 \times b^3 = (a \times b)^3 = (ab)^3$.

(*ii*) $3^4 \times 5^4 = (3 \times 5)^4 = 15^4$.

5 (*i*) $20068 = 2 \times 10000 + 0 \times 1000 + 0 \times 100 + 6 \times 10 + 8 \times 1$

$$= 2 \times 10^4 + 0 + 0 + 6 \times 10^1 + 8 \times 10^0$$

$$= 2 \times 10^4 + 6 \times 10^1 + 8 \times 10^0.$$

(*ii*) $176428 = 1 \times 100000 + 7 \times 10000 + 6 \times 1000 + 4 \times 100 + 2 \times 10 + 8 \times 1$

$$= 1 \times 10^5 + 7 \times 10^4 + 6 \times 10^3 + 4 \times 10^2 + 2 \times 10^1 + 8 \times 10^0.$$

6. (*i*) $2^5 = 2 \times 2 \times 2 \times 2 \times 2 = 32$

(*ii*) $9^3 = 9 \times 9 \times 9 = 729$

(*iii*) $8^4 = 8 \times 8 \times 8 \times 8 = 4096.$

7. (*i*) $2^2 \times 3^2 = 4 \times 9 = 36.$

(*ii*) $\left(\frac{3}{4}\right)^3 = \frac{3}{4}\times\frac{3}{4}\times\frac{3}{4} = \frac{3\times3\times3}{4\times4\times4} = \frac{27}{64}.$

(*iii*) $3^2 \times 10^4 = 3 \times 3 \times 10 \times 10 \times 10 \times 10$

$= 9 \times 10000 = 90000.$

8. (*i*) $(-1)^3 = (-1) \times (-1) \times (-1)$

$= 1 \times (-1) = -1.$

(*ii*) $(-4)^2 \times (-5)^2 = 16 \times 25 = 400.$

(*iii*) $(-2)^3 \times (-3)^2 = (-2)^3 \times (3)^2$

$= -8 \times 9 = -72.$

9. (*i*) $\frac{1}{8} = \frac{1}{2\times2\times2} = \frac{1}{2^3} = 1 \times 2^{-3} = 2^{-3}$

$= \left(\frac{1}{2}\right)^3$

$$\begin{array}{r|l} 2 & 64 \\ \hline 2 & 32 \\ \hline 2 & 16 \\ \hline 2 & 8 \\ \hline 2 & 4 \\ \hline 2 & 2 \\ \hline & 1 \end{array}$$

(*ii*) $\frac{-1}{64} = \frac{-1}{2^6} = -1 \times 2^{-6}$

$= -2^{-6.}$

(*iii*) $\frac{49}{81} = \frac{7\times7}{3\times3\times3\times3}$

$= \frac{7^2}{3^4} = 7^2 \times 3^{-4}.$

$$\begin{array}{r|l} 3 & 81 \\ \hline 3 & 27 \\ \hline 3 & 9 \\ \hline 3 & 3 \\ \hline & 1 \end{array}$$

10. (*i*) $x \times x^3 \times x^{10} = x^1 \times x^3 \times x^{10}$

$= x^{1+3+10} = x^{14}.$

(*ii*) $(7^2)^3 = 7^{2\times3} = 7^6.$

(*iii*) $(20^{16} \div 20^{13}) \times 20^3 = 20^{16-13} \times 20^3$

$= 20^3 \times 20^3$

$= 20^{3+3} = 20^6.$

WORKSHEET–114

1. (*i*) $4985.5 = 4.9855 \times 1000$

$= 4.9855 \times 10^3.$

(*ii*) $4450000 = 4.450000 \times 1000000$

$= 4.45 \times 10^6.$

2. (*i*) Population $= 640800$

$= 6.40800 \times 10^5$

$= 6.408 \times 10^5.$

(*ii*) The literate population of India

$= 37000000 = 3.7000000 \times 10^7$

$= 3.7 \times 10^7.$

3. (*i*) 59853×10^3

$= 59853 \times 1000 = 59853000$

$= 5 \times 10000000 + 9 \times 1000000$

$+ 8 \times 100000 + 5 \times 10000 + 3$

$\times 1000$

$= 5 \times 10^7 + 9 \times 10^6 + 8 \times 10^5$

$+ 5 \times 10^4 + 3 \times 10^3.$

(*ii*) 7644×10^{-5}

$= (7 \times 1000 + 6 \times 100 + 4 \times 10$

$+ 4 \times 1) \times 10^{-5}$

$= (7 \times 10^3 + 6 \times 10^2 + 4 \times 10^1 + 4 \times$

$10^0) \times 10^{-5}$

$= 7 \times 10^{3-5} + 6 \times 10^{2-5} + 4 \times 10^{1-5}$

$+ 4 \times 10^{0-5}$

$= 7 \times 10^{-2} + 6 \times 10^{-3} + 4 \times 10^{-4}$

$+ 4 \times 10^{-5}.$

4. (*i*) $x \times x \times x \times x \times a \times a$

$= (x^1 \times x^1 \times x^1 \times x^1) \times (a^1 \times a^1)$

$= x^{1+1+1+1} \times a^{1+1} = x^4 \times a^2 = x^4a^2.$

(*ii*) $4 \times 4 \times 4 \times 6 \times 6 \times 6$

$= (4^1 \times 4^1 \times 4^1) \times (6^1 \times 6^1 \times 6^1)$

$= 4^{1+1+1} \times 6^{1+1+1} = 4^3 \times 6^3$

$= (4 \times 6)^3 = 24^3$.

5. (*i*) $2^3 \times 5 = (2 \times 2 \times 2) \times 5 = 8 \times 5 = 40$.

(*ii*) $3^2 \times 10^2 = (3 \times 3) \times (10 \times 10)$

$= 9 \times 100 = 900$.

6. (*i*) $\left(\frac{2}{5}\right)^4 = \frac{2^4}{5^4} = \frac{2 \times 2 \times 2 \times 2}{5 \times 5 \times 5 \times 5} = \frac{16}{625}$

$= \frac{1 \times 10 + 6 \times 1}{6 \times 100 + 2 \times 10 + 5 \times 1}$

$= \frac{1 \times 10^1 + 6 \times 10^0}{6 \times 10^2 + 2 \times 10^1 + 5 \times 10^0}$.

(*ii*) $\left(\frac{4}{5}\right)^3 = \frac{4^3}{5^3} = \frac{4 \times 4 \times 4}{5 \times 5 \times 5} = \frac{64}{125}$

$= \frac{6 \times 10 + 4 \times 1}{1 \times 100 + 2 \times 10 + 5 \times 1}$

$= \frac{6 \times 10^1 + 4 \times 10^0}{1 \times 10^2 + 2 \times 10^1 + 5 \times 10^0}$.

7. $7^2 \times a^2 \times 2a^5 = 49 \times a^2 \times 2 \times a^5$

$= (49 \times 2) \times (a^2 \times a^5)$

$= 98 \times a^{2+5} = 98a^7$.

8. $8000000 = 8 \times 10 \times 10 \times 10 \times 10 \times 10 \times 10$

$= 8 \times 10^6$.

9. $200072 = 2 \times 100000 + 0 \times 10000 + 0 \times 1000 + 0 \times 100 + 7 \times 10 + 2 \times 1$

$= 2 \times 10^5 + 0 + 0 + 0 + 7 \times 10^1 + 2 \times 10^0$

$= 2 \times 10^5 + 7 \times 10^1 + 2 \times 10^0$.

10. (*i*) $\frac{121}{169} = \frac{11 \times 11}{13 \times 13} = \frac{11^2}{13^2} = \left(\frac{11}{13}\right)^2$.

(*ii*) $\frac{-1}{36} = -\frac{1}{2 \times 2 \times 3 \times 3}$

$= -\frac{1}{2^2 \times 3^2} = -\frac{1}{(2 \times 3)^2}$

$= -\frac{1}{6^2} = -\left(\frac{1}{6}\right)^2$.

(*iii*) $\frac{16}{625} = \frac{2 \times 2 \times 2 \times 2}{5 \times 5 \times 5 \times 5}$

$= \frac{2^4}{5^4} = \left(\frac{2}{5}\right)^4$.

5	625
5	125
5	25
5	5
	1

11. (*i*) $3 \times 10^3 + 10^1 + 4 \times 10^0$

$= 3 \times 1000 + 10 + 4 \times 1$ $(\because 10^0 = 1)$

$= 3000 + 10 + 4 = 3014$.

(*ii*) $4 \times 10^5 + 3 \times 10^2 + 2 \times 10 + 10^0$

$= 4 \times 100000 + 3 \times 100 + 2 \times 10 + 1$

$= 400000 + 300 + 20 + 1 = 400321$.

WORKSHEET–115

1. $(-3)^3 = (-3) \times (-3) \times (-3)$

$= -(3 \times 3 \times 3) = -27$

2. $3 \times 3 \times 3 \times x \times x \times x = 3^3 \times x^3$.

3. In b^5, b is the base and 5 is the exponent.

4. $256 = 2 \times 2 \times 2 \times 2 \times 2 \times 2 \times 2 \times 2$

$= 2^8$.

2	256
2	128
2	64
2	32
2	16
2	8
2	4
2	2
	1

5. $2^5 = 2 \times 2 \times 2 \times 2 \times 2 = 32$

$4^2 = 4 \times 4 = 16$

$\because \quad 32 > 16$

$\therefore \quad 2^5 > 4^2$

Thus, 2^5 is greater.

6. $x^3y^2 = x \times x \times x \times y \times y \qquad \ldots(i)$

$y^2x^3 = y \times y \times x \times x \times x$

or $y^2x^3 = x \times x \times x \times y \times y \qquad \ldots(ii)$

From equations (*i*) and (*ii*), it is clear that x^3y^2 and y^2x^3 are same.

7. $72 = 2 \times 2 \times 2 \times 3 \times 3$

$= 2^3 \times 3^2$.

2	72
2	36
2	18
3	9
3	3
	1

8. (*i*) $4^3 \times 2^3$ is in exponential form.

Let us convert it into expanded form.

$4^3 \times 2^3 = 4 \times 4 \times 4 \times 2 \times 2 \times 2$

$= 64 \times 8 = 512$

$= 5 \times 100 + 1 \times 10 + 2 \times 1$

$= 5 \times 10^2 + 1 \times 10^1 + 2 \times 10^0$.

(*ii*) $p^5 \div q^5$ is in exponential form.

Let us convert it into expanded form.

$$p^5 \div q^5 = \frac{p^5}{q^5} = \left(\frac{p}{q}\right)^5$$

$$= \frac{p}{q} \times \frac{p}{q} \times \frac{p}{q} \times \frac{p}{q} \times \frac{p}{q}.$$

9. $$\left(\frac{4}{13}\right)^2 = \frac{4}{13} \times \frac{4}{13} = \frac{2 \times 2}{13} \times \frac{2 \times 2}{13}$$

$$= \frac{2 \times 2 \times 2 \times 2}{13 \times 13}.$$

10. $4650000 = 4.650000 \times 10^6$

$= 4.65 \times 10^6$.

11. $$\frac{64}{9} = \frac{2 \times 2 \times 2 \times 2 \times 2 \times 2}{3 \times 3}$$

$$= \frac{2^6}{3^2}.$$

2	64
2	32
2	16
2	8
2	4
2	2
	1

12. (*i*) $3^2 = 3 \times 3 = 9;\ 2^3 = 2 \times 2 \times 2 = 8$

$\because \quad 9 > 8 \quad \therefore \quad 3^2 > 2^3$

So, 3^2 is greater.

(*ii*) $2^5 = 2 \times 2 \times 2 \times 2 \times 2 = 32;$

$5^2 = 5 \times 5 = 25$

$\because \quad 32 > 25 \qquad \therefore \quad 2^5 > 5^2$

So, 2^5 is greater.

13. (*i*) $2^4 \times 3^4$

$= (2 \times 2 \times 2 \times 2) \times (3 \times 3 \times 3 \times 3)$

$= 16 \times 81 = 1296$.

(*ii*) $(-3) \times (-2)^3 = (-3) \times (-2) \times (-2) \times (-2)$

$= 6 \times 4 = 24$.

WORKSHEET–116

1. Let the required rational number be x. Then,

$$x \times \left(\frac{2}{3}\right)^{-1} = \frac{-3}{2} \quad \text{or} \quad x \times \frac{3}{2} = \frac{-3}{2}$$

$$\therefore \qquad x = \frac{-3}{2} \times \frac{2}{3} = -1.$$

2. $500 = 2 \times 2 \times 5 \times 5 \times 5$

$= 2^2 \times 5^3$.

2	500
2	250
5	125
5	25
5	5
	1

3. (*i*) $p \times p \times p \times p \times p$

$$= p^{1+1+1+1+1} = p^5.$$

(*ii*) $(-3) \times (-3) \times (-3) \times (-3)$

$$= (-3)^4 = (-1 \times 3)^4 = (-1)^4 \times 3^4$$

$$= 1 \times 3^4 \quad [\because\ (-1)^{\text{even number}} = 1]$$

$$= 3^4.$$

4. $a^3b^2 = a \times a \times a \times b \times b \qquad \ldots (i)$

$a^2b^3 = a \times a \times b \times b \times b \qquad \ldots (ii)$

$b^2a^3 = b \times b \times a \times a \times a$

$= a \times a \times a \times b \times b \qquad \ldots (iii)$

$b^3a^2 = b \times b \times b \times a \times a$

$= a \times a \times b \times b \times b \qquad \ldots (iv)$

From equations (*i*), (*ii*), (*iii*) and (*iv*), it is clear that they all are not same.

5. (*i*) $\dfrac{(-2)^7}{(-2)^{12}}$

$$= (-2)^{7-12} = (-2)^{-5} = \frac{1}{(-2)^5}$$

$$= \frac{1}{(-2)\times(-2)\times(-2)\times(-2)\times(-2)}$$

$$= \frac{1}{4\times4\times(-2)} = \frac{1}{16(-2)}$$

$$= \frac{1}{-32} = \frac{-1}{32}.$$

(*ii*) $(-4)^6 \div (-4)^8 = (-4)^{6-8} = (-4)^{-2}$

$$= \frac{1}{(-4)^2} = \frac{1}{(-4)\times(-4)}$$

$$= \frac{1}{16}.$$

6. (*i*) $x^3 = \dfrac{125}{343} = \dfrac{5\times5\times5}{7\times7\times7} = \dfrac{5^3}{7^3}$

or $x^3 = \left(\dfrac{5}{7}\right)^3 \quad \therefore\ x = \dfrac{5}{7}$

(*ii*) $(x^2)^3 = \dfrac{1}{64}$

2	64
2	32
2	16
2	8
2	4
2	2
	1

or $x^{2\times3} = \dfrac{1}{2\times2\times2\times2\times2\times2}$

or $x^6 = \dfrac{1}{2^6}$ or $x^6 = \left(\dfrac{1}{2}\right)^6$

$\therefore \quad x = \dfrac{1}{2}.$

7. (*i*) $(-2)^2 \times 3^4$

$$= (-2)\times(-2)\times3\times3\times3\times3$$

$$= 4 \times 81 = 324.$$

(*ii*) $(-1)^2 \times (-2)^3 \times (-5)$

$$= (-1)\times(-1)\times(-2)\times(-2)\times(-2)\times(-5)$$

$$= 1 \times 4 \times 10 = 40.$$

(*iii*) $\left(\dfrac{2}{3}\right)^2 \times \left(\dfrac{1}{2}\right)^2$

$$= \frac{2}{3}\times\frac{2}{3}\times\frac{1}{2}\times\frac{1}{2} = \frac{2\times2}{2\times2}\times\frac{1}{3\times3}$$

$$= 1 \times \frac{1}{9} = \frac{1}{9}.$$

8. (*i*) Substituting $x = \dfrac{-2}{5}$ in $(5x)^3$, we get

$$(5x)^3 = \left(5\times\frac{-2}{5}\right)^3 = (-2)^3$$

$$= (-2)\times(-2)\times(-2)$$

$$= 4 \times (-2) = -8.$$

(*ii*) Substituting $a = 2$ and $b = -1$, in $(-ab)$, we get

$(-ab) = -(2) \times (-1) = 2.$

9. (*i*) $8^3 = 8 \times 8 \times 8 = 64 \times 8 = 512.$

(*ii*) $\left(\frac{-3}{7}\right)^3 = \frac{-3}{7} \times \frac{-3}{7} \times \frac{-3}{7}$

$= \frac{(-3)\times(-3)}{7\times 7} \times \frac{-3}{7}$

$= \frac{9}{49} \times \frac{-3}{7} = \frac{-27}{343}.$

10. (*i*) $625 = 5 \times 5 \times 5 \times 5$

$= 5^4.$

5	625
5	125
5	25
5	5
	1

(*ii*) $3125 = 5 \times 5 \times 5 \times 5 \times 5$

$= 5^5.$

5	3125
5	625
5	125
5	25
5	5
	1

WORKSHEET – 117

1. Substituting $x = -1$, $a = 2$ and $y = 1$ in $x^5y^2a^3$, we get

$x^5y^2a^3 = (-1)^5 \times (1)^2 \times (2)^3$

$= -1 \times 1 \times 8 = -8.$

$[\because (-1)^{\text{odd number}} = -1]$

2. (*i*) $(-2 \times 10^3)^2 = (-2)^2 \times (10^3)^2$

$= (-2) \times (-2) \times 10^{3 \times 2}$

$= 4 \times 10^6$

$= 4 \times 1000000$

$= 4000000.$

(*ii*) $3^7 \times \left(\frac{1}{3}\right)^7 = 3^7 \times \frac{1^7}{3^7} = 1^7 = 1.$

3. (*i*) $185000 = 185 \times 1000$

$= 1.85 \times 100 \times 1000$

$= 1.85 \times 10^5.$

(*ii*) $400000 = 4.00000 \times 100000$

$= 4.0 \times 10^5.$

4. $4^3 = 4 \times 4 \times 4 = 64$ and $5^2 = 5 \times 5 = 25$

$\because \quad 64 \neq 25$

Therefore, 4^3 is not equal to 5^2.

5. (*i*) -216

$= -(2 \times 2 \times 2 \times 3 \times 3 \times 3)$

$= -(2^3 \times 3^3)$

$= -(2 \times 3)^3$

$= -6^3$

$= (-6)^3.$

2	216
2	108
2	54
3	27
3	9
3	3
	1

(*ii*) $\frac{-1}{243} = \frac{-1}{3 \times 3 \times 3 \times 3 \times 3}$

$= \frac{(-1)^5}{3^5}$

$= \left(\frac{-1}{3}\right)^5.$

3	243
3	81
3	27
3	9
3	3
	1

6. $(-5)^6 \div (-5)^8 = \frac{(-5)^6}{(-5)^8} = (-5)^{6-8}$

$= (-5)^{-2} = \frac{1}{(-5)^2}$

$= \frac{1}{(-5)\times(-5)} = \frac{1}{25}.$

7. $a^0 = 1$ for $a \neq 0$

(*i*) $3^0 + 4^0 + 5^0 = 1 + 1 + 1 = 3.$

(*ii*) $(9^0 - 7^0) \times (9 + 7) = (1 - 1) \times 16$

$= 0 \times 16 = 0.$

8. (*i*) $\frac{(3^3)^2 \times 5^2}{9^2 \times 5} = \frac{3^{3\times 2} \times 5^2}{(3 \times 3)^2 \times 5} = \frac{3^6 \times 5^2}{(3^2)^2 \times 5}$

$= \frac{3^6 \times 5^2}{3^4 \times 5} = \frac{3^6}{3^4} \times \frac{5^2}{5}$

$= 3^{6-4} \times 5^{2-1} = 3^2 \times 5$

$= 9 \times 5 = 45.$

(*ii*) $(19^0 - 17^0) \times (19 + 17) = (1 - 1) \times 36$

$[\because a^0 = 1 \text{ for } a \neq 0]$

$= 0 \times 36 = 0.$

9. (*i*) $\dfrac{(-4)^5}{(-4)^7} = (-4)^{5-7} = (-4)^{-2} = \dfrac{1}{(-4)^2}$

$= \dfrac{1}{(-4)\times(-4)} = \dfrac{1}{16}.$

(*ii*) $\left(\dfrac{-x}{y}\right)^6 = \left\{(-1)\times\dfrac{x}{y}\right\}^6 = (-1)^6 \times \left(\dfrac{x}{y}\right)^6$

$= \left(\dfrac{x}{y}\right)^6$

$[\because (-1)^{\text{even number}} = 1]$

$= \dfrac{x^6}{y^6}.$

10. (*i*) $\dfrac{5^8 \times b^7}{(25)^3 \times b^4} = \dfrac{5^8 \times b^7}{(5^2)^3 \times b^4} = \dfrac{5^8}{5^6} \times \dfrac{b^7}{b^4}$

$= 5^{8-6} \times b^{7-4}$

$= 5^2 \times b^3 = 5 \times 5 \times b^3$

$= 25b^3.$

(*ii*) $(29^0 - 23^0) \times 16^0$

$= (1-1) \times 1 \qquad (\because a^0 = 1 \text{ for } a \neq 0)$

$= 0 \times 1 = 0.$

WORKSHEET – 118

1. (*i*) $(-6) \times (-6) \times (-6) \times (-6)$

$= (-1 \times 6)^4$

$= (-1)^4 \times 6^4$

$= 1 \times 6^4 \qquad [\because (-1)^{\text{even number.}} = 1]$

$= 6^4.$

(*ii*) $x \times x \times x \times x \times x$

$= x^{1+1+1+1+1} = x^5.$

2. (*i*) $(-2)^4 \times (-2)^{11} = (-2)^{4+11} = (-2)^{15}$

(*ii*) $(-7)^2 \times (-7)^{11} \times (-7)$

$= (-7)^{2+11+1} = (-7)^{14} = (-1 \times 7)^{14}$

$= (-1)^{14} \times 7^{14} = 7^{14}.$

3. (*i*) $4^x \times 4^2 = 4^{x+2}.$

(*ii*) $3^{4a} \times 3^{3a} = 3^{4a+3a} = 3^{7a}.$

4. (*i*) $(4^2)^4 = 4^{2\times4} = 4^8 = (2\times2)^8$

$= (2^2)^8 = 2^{2\times8} = 2^{16} = 65536.$

(*ii*) $(5^2)^5 = 5^{2\times5} = 5^{10} = 9765625.$

5. $\left(\dfrac{24}{11}\right)^3 \times \left(\dfrac{11}{8}\right)^3 = \left(\dfrac{24}{11}\times\dfrac{11}{8}\right)^3$

$[\because a^3 \times b^3 = (a \times b)^3]$

$= 3^3 = 3 \times 3 \times 3 = 27.$

6. Substituting $x = \dfrac{-1}{8}$ in $(8x)^3$, we get

$(8x)^3 = \left[8\times\left(\dfrac{-1}{8}\right)\right]^3 = \left(\dfrac{-8}{8}\right)^3 = (-1)^3$

$= -1 \qquad [\because (-1)^{\text{odd number.}} = -1].$

7. (*i*) $(8^0 - 7^0) \times (8+7) = (1-1) \times 15$

$(\because a^0 = 1 \text{ for } a \neq 0)$

$= 0 \times 15 = 0.$

(*ii*) $4^0 + 3^0 + 1^0 = 1 + 1 + 1 = 3.$

8. (*i*) 154034

$= 1 \times 100000 + 5 \times 10000 + 4 \times 1000 + 0 \times 100 + 3 \times 10 + 4 \times 1$

$= 1 \times 10^5 + 5 \times 10^4 + 4 \times 10^3 + 0 + 3 \times 10^1 + 4 \times 10^0$

$= 1 \times 10^5 + 5 \times 10^4 + 4 \times 10^3 + 3 \times 10^1 + 4 \times 10^0$

(*ii*) 5400500

$= 5 \times 1000000 + 4 \times 100000 + 0 \times 10000 + 0 \times 1000 + 5 \times 100 + 0 \times 10 + 0 \times 1$

$= 5 \times 10^6 + 4 \times 10^5 + 0 + 0 + 5 \times 10^2 + 0 + 0$

$= 5 \times 10^6 + 4 \times 10^5 + 5 \times 10^2.$

9. (*i*) $(2^3)^5 \times (2^7)^2 = 2^{3 \times 5} \times 2^{7 \times 2}$

$= 2^{15} \times 2^{14} = 2^{15 + 14}$

$= 2^{29}.$

(*ii*) $\left[\left(\frac{-2}{5}\right)^2 \times \left(\frac{2}{5}\right)^4\right]^3$

$$= \left[\left(-1 \times \frac{2}{5}\right)^2 \times \left(\frac{2}{5}\right)^4\right]^3$$

$$= \left[\left\{(-1)^2 \times \frac{2}{5}\right\}^2 \times \left(\frac{2}{5}\right)^4\right]^3$$

$$= \left[\left(\frac{2}{5}\right)^2 \times \left(\frac{2}{5}\right)^4\right]^3 = \left[\left(\frac{2}{5}\right)^{2+4}\right]^3$$

$$= \left[\left(\frac{2}{5}\right)^6\right]^3 = \left(\frac{2}{5}\right)^{6 \times 3} = \left(\frac{2}{5}\right)^{18}.$$

10. (*i*) $\frac{4^6}{4^4} = 4^{6-4} = 4^2 = 4 \times 4 = 16.$

(*ii*) $\left(\frac{-1}{4}\right)^4 \div \left(\frac{-1}{4}\right)^2 = \frac{\left(\frac{-1}{4}\right)^4}{\left(\frac{-1}{4}\right)^2} = \left(\frac{-1}{4}\right)^{4-2}$

$$= \left(\frac{-1}{4}\right)^2 = \frac{-1}{4} \times \frac{-1}{4}$$

$$= \frac{1}{16}.$$

11. (*i*) $\frac{5^8 \times b^7}{(25)^2 \times b^5} = \frac{5^8}{(5^2)^2} \times \frac{b^7}{b^5}$

$$= \frac{5^8}{5^{2 \times 2}} \times b^{7-5} = \frac{5^8}{5^4} \times b^2$$

$= 5^{8-4} \times b^2 = 5^4 \times b^2$

$= 5 \times 5 \times 5 \times 5 \times b^2$

$= 25 \times 25 \times b^2 = 625\, b^2.$

(*ii*) $\frac{\left(\frac{3}{5}\right)^3 \times \left(\frac{1}{7}\right)^3}{\left(\frac{3}{5}\right)^2 \times \left(\frac{1}{7}\right)^4} = \frac{\left(\frac{3}{5}\right)^3}{\left(\frac{3}{5}\right)^2} \times \frac{\left(\frac{1}{7}\right)^3}{\left(\frac{1}{7}\right)^4}$

$$= \left(\frac{3}{5}\right)^{3-2} \times \left(\frac{1}{7}\right)^{3-4} = \left(\frac{3}{5}\right)^1 \times \left(\frac{1}{7}\right)^{-1}$$

$$= \frac{3}{5} \times \frac{7}{1} = \frac{21}{5} = 4\frac{1}{5}.$$

WORKSHEET – 119

1. Base = – 5, Exponent = 7

2. $3^4 = 3 \times 3 \times 3 \times 3 = 81$

$4^3 = 4 \times 4 \times 4 = 64$

$81 > 64$

$(3)^4 > (4)^3$

Thus, 3^4 is greater.

3. $1^0 + 2^0 + 3^0$

$1 + 1 + 1 = 3$ $[\because (\text{Any number})^0 = 1]$

4. $x \times x \times x \times x \times y \times y \times y \times z \times z \times z \times z \times z$

$x^{1+1+1+1} \times y^{1+1+1} \times z^{1+1+1+1+1}$

$x^4 \times y^3 \times 2^5.$

5. $729 = 3 \times 3 \times 3 \times 3 \times 3 \times 3$

$= 3^6$

3	729
3	243
3	81
3	27
3	9
3	3
	1

6. (*i*) $(-1)^n = (-1)^{\text{odd}} = -1$

$\{\because (-1)^3 = -1\}$

(*ii*) $(-1)^n = (-1)^{\text{even}} = 1 \{\because (-1)^2 = 1\}$

7. True.

LHS $2^0 \times 3^0 \times 6^0$

$1 \times 1 \times 1$ $\{\because (\text{Any number})^0 = 1\}$

RHS

$(2 + 3 + 6)^0$

$(11)^0 = 1$

LHS = RHS

8. $570 = 2 \times 2 \times 3 \times 3 \times 3 \times 5$

$= 2^2 \times 3^3 \times 5$

2	540
2	270
3	135
3	45
3	15
5	5
	1

9. $5648 = 5 \times 1000 + 6 \times 100 + 4 \times 10 + 8$

$= 5 \times 10^3 + 6 \times 10^2 + 4 \times 10^1 + 8$

10. $2 \times 10^6 + 3 \times 10^4 + 5 \times 10^3 + 4 \times 10^0$

$= 2000000 + 30000 + 5000 + 4 \times 1$

$(\because 10^0 = 1)$

$= 2035004$

11. $(2^{25} \div 8^6) \times 2^{-7}$

$\{2^{25} \div (2^3)^6\} \times 2^{-7}$

$(2^{25} \div 2^{18}) \times 2^{-7}$

$2^{25-18} \times 2^{-7}$

$2^7 \times 2^{-7}$

$$2^7 \times \frac{1}{2^7} = 1$$

12. False.

$$\left(\frac{5}{11}\right)^3 = 5^3 \div 121^2$$

$$\text{LHS } \left(\frac{5}{11}\right)^3 = \frac{5 \times 5 \times 5}{11 \times 11 \times 11} = \frac{125}{1331}$$

RHS $5^3 \div \{(11)^2\}^2$

$$= 5^3 \div 11^4 = \frac{125}{1461}.$$

13. $3^t \times 27 = 3^{5-t}$

$= 3^t \times 3^3 = 3^{5-t}$

$= 3^{t+3} = 3^{5-t}$

Comparing both sides

$= t + 3 = 5 - t$

$= t + t = 5 - 3$

$= 2t = 2$

$\therefore \quad t = 1.$

14.
$$\frac{2^3 \times 4^2}{128} = 2^k$$

$$= \frac{2^3 \times (2^2)^2}{2^7} = 2^k$$

$$= \frac{2^3 \times 2^4}{2^7} = 2^k$$

$$= \frac{2^{3+4}}{2^7} = 2^k$$

$$= \frac{2^7}{2^7} = 2^k$$

$= 2^{7-7} = 2^k$

$= 2^0 = 2^k$

Comparing both sides

$\because \quad 0 = k$

$\therefore \quad k = 0.$

Chapter

15 VISUALISING SOLID SHAPES

WORKSHEET–120

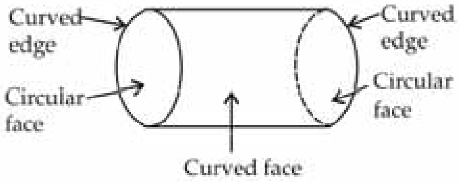
1. (B) A cube can be made by using the net given in the option (B).

2. (B) A cone has only one vertex.

3. (A) Number of curved edges = a = 2

Number of circular faces = b = 2

Number of curved faces = c = 1



4. (B) The right matching is

(a) → (iii), (b) → (i), (c) → (ii).

5. (D) A cube and a cuboid have equal number of edges, *i.e.*, 12.

6. (A) The given figure is of a cone.

7. (C) Cutting horizontally the pipe (see Fig. (i)), the cross section obtained is a circle (see Fig. (ii)).

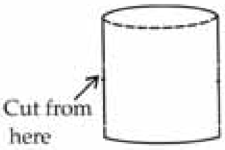


Fig: (i)

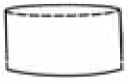


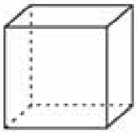
Fig: (ii)

8. (B) A cuboid has 6 faces.

9. (D) Number of cubes

= 4 × 4 × 2 = 32.

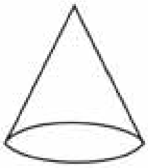
10. (A) A two-dimensional (2-D) sketch of a cube may be as follows:



11. (B) A cube has 8 vertices.

12. (C) A cylinder has a curved face and two flat faces.

13. (B) A 2-D shape of a cone may be as given below:



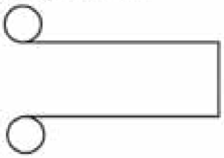
14. (D) The given net corresponds to a cube.

15. (D) A brick is in the form of a cuboid which has 8 vertices.

16. (A) A circular pipe is a cylinder.

WORKSHEET–121

1. Net for a cylinder:



2.

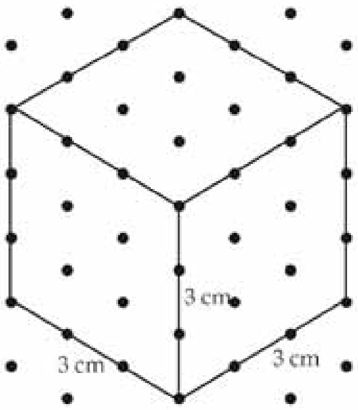


Fig: Cube

3.

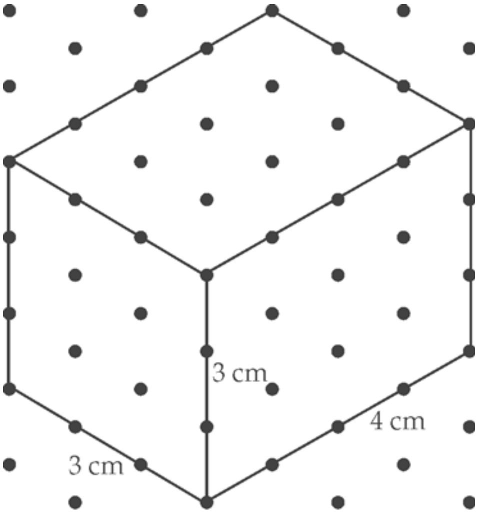
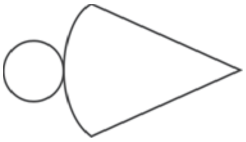


Fig: Cuboid

4. When a horizontal cut is given to a die, a square cross-section is obtained.

5. Net for a cone.



6. (*i*) Rectangle (*ii*) Rectangle.

7.

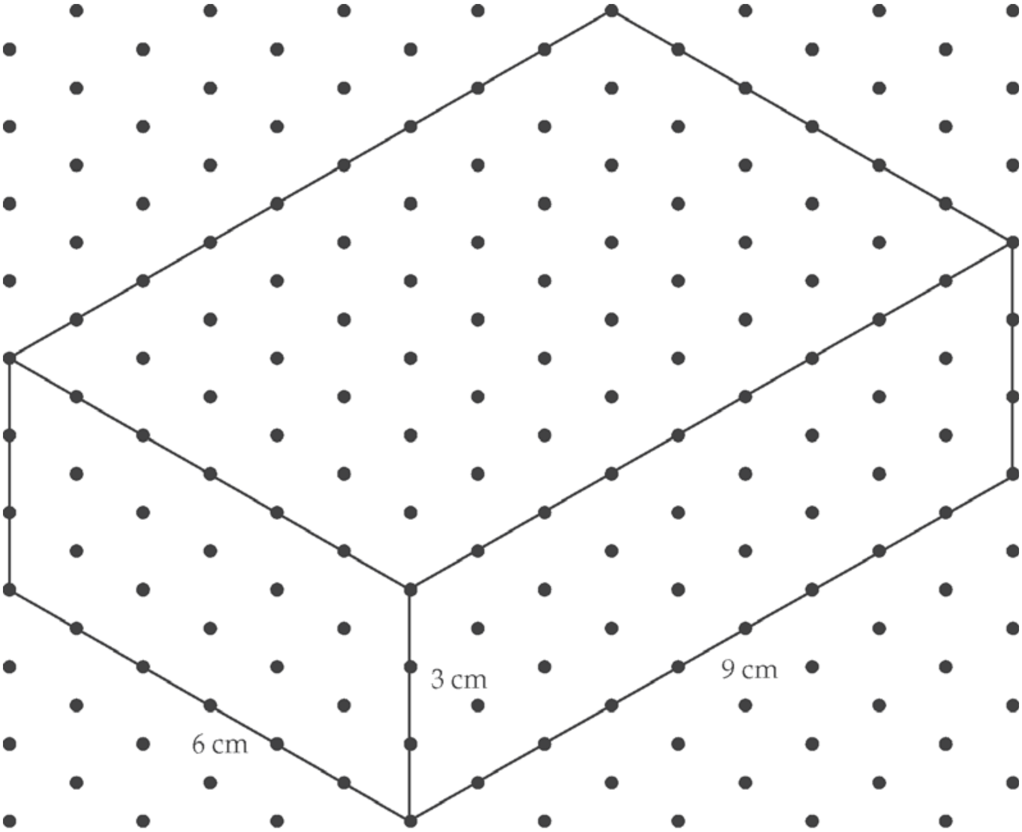


Fig: Cuboid

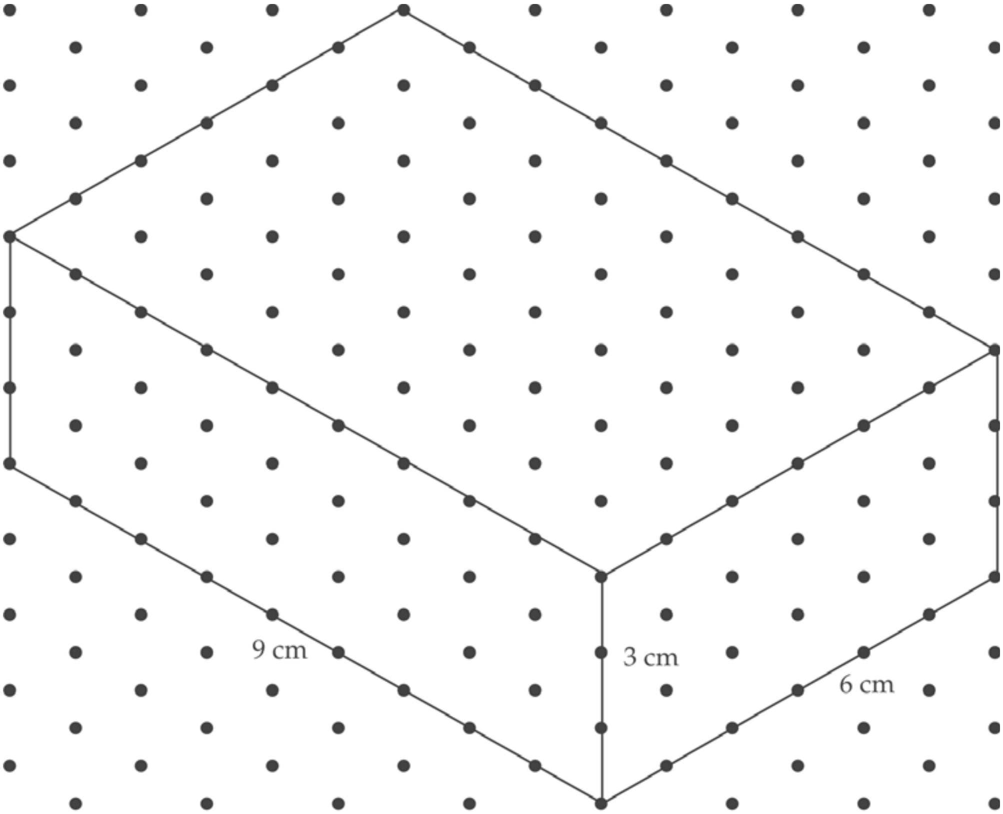


Fig: Cuboid

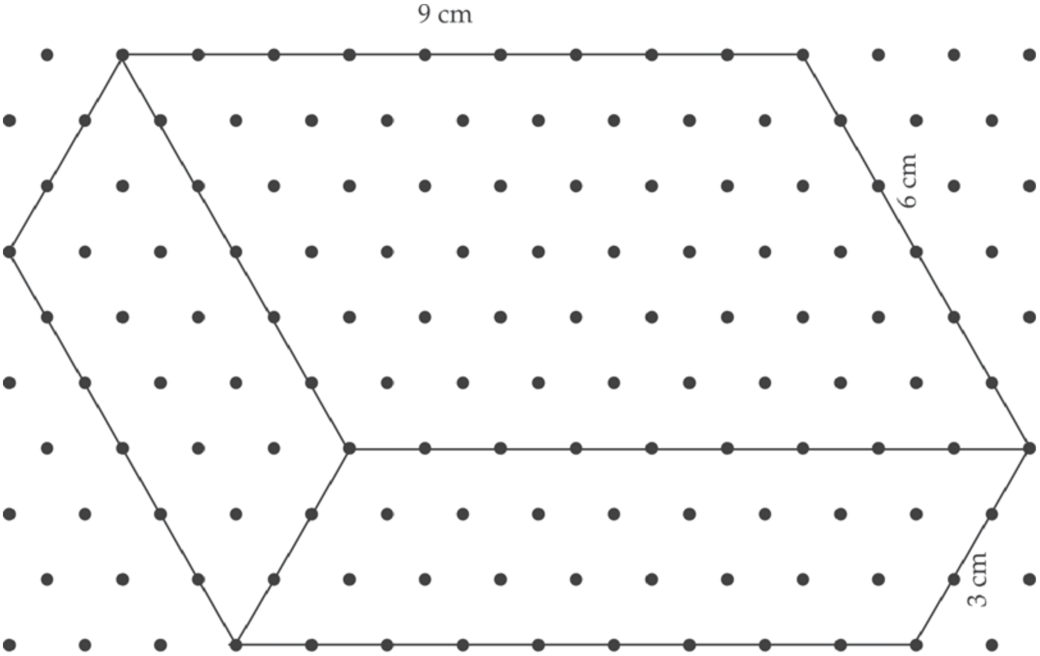


Fig: Cuboid

8. (*i*) Square (*ii*) Rectangle (*iii*) Circle.

9. (*i*) Cube (*ii*) Cone.

10. (*i*) Shape → cone

Number of edges → 1

Number of faces → 2

Number of vertices → 1

(*ii*) Shape → Cuboid

Number of edges → 12

Number of faces → 6

Number of vertices → 8.

WORKSHEET – 122

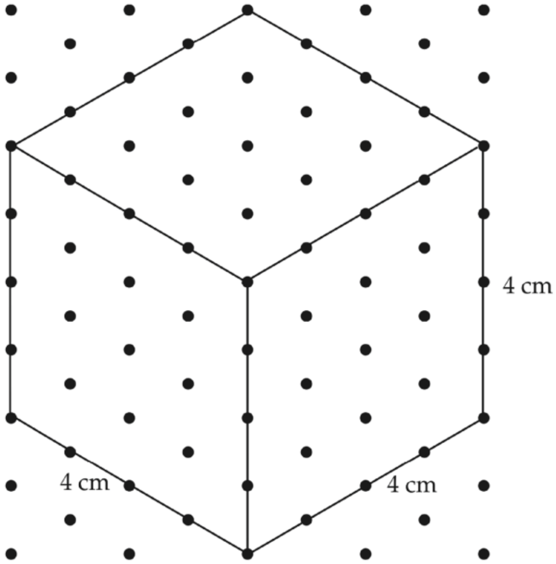
1. Cube

2. Rectangle.

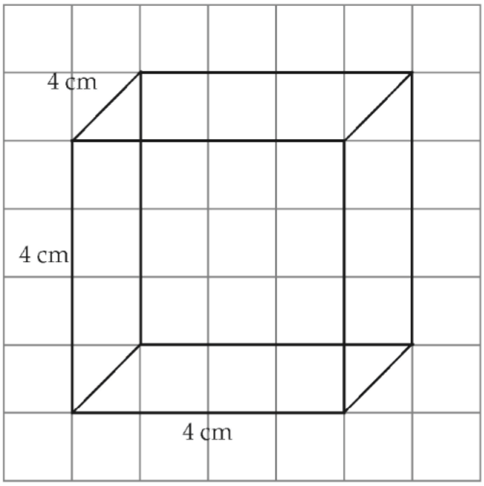
3. (*i*) Cuboid (*ii*) Sphere

4. Circle

5.



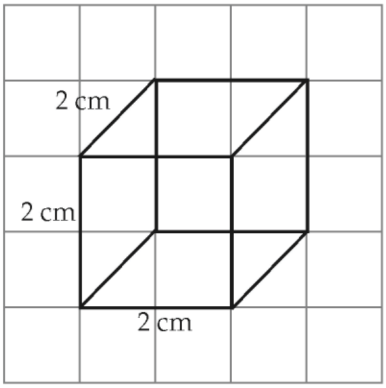
Isometric sketch

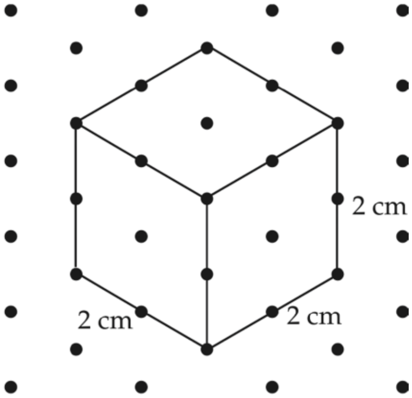


Oblique sketch

6. Four.

7.





8. Number of cubes = 4.

9. A cylinder has three faces

Fig: Cylinder

10.

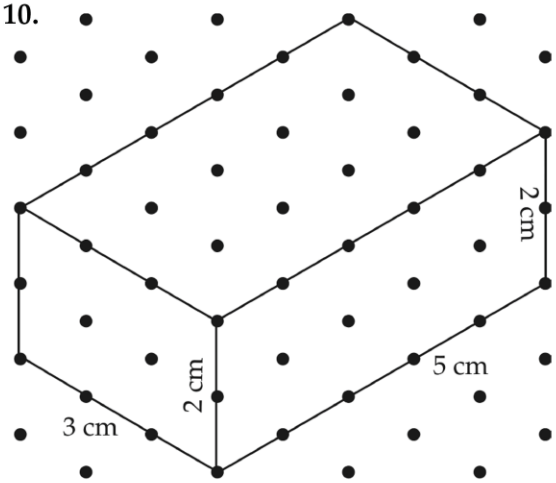


Fig: Cuboid

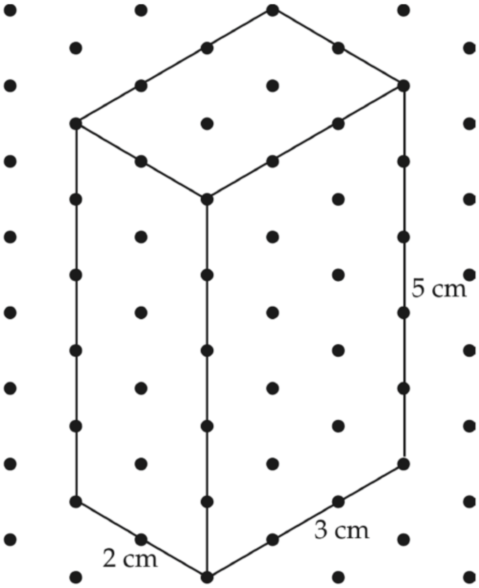
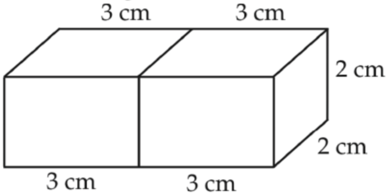


Fig: Cuboid

11.



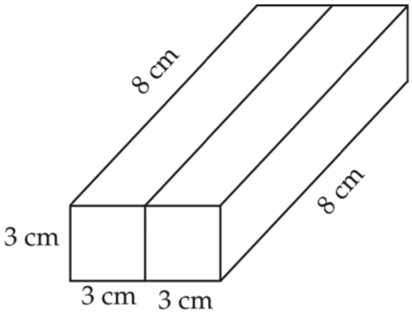
Length of the new figure

= 3 cm + 3 cm = 6 cm

Breadth of the new figure = 2 cm

Height of the new figure = 2 cm.

12.



Length of the new figure = 8 cm

Breadth of the new figure

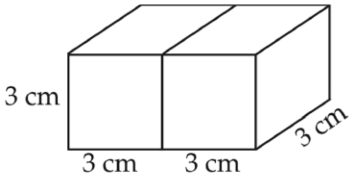
= 3 cm + 3 cm = 6 cm

Height of the new figure = 3 cm.

WORKSHEET–123

1. Square.

2.



Length of the resulting cuboid

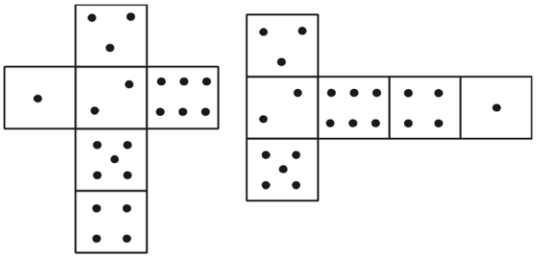
= 3 cm + 3 cm = 6 cm

Breadth of the resulting cuboid = 3 cm

Height of the resulting cuboid = 3 cm.

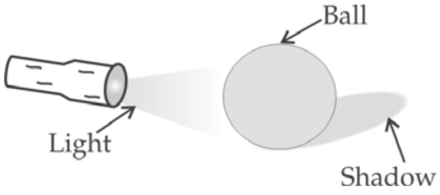
3. (*i*) Cone (*ii*) Cone (*iii*) Cone.

4.



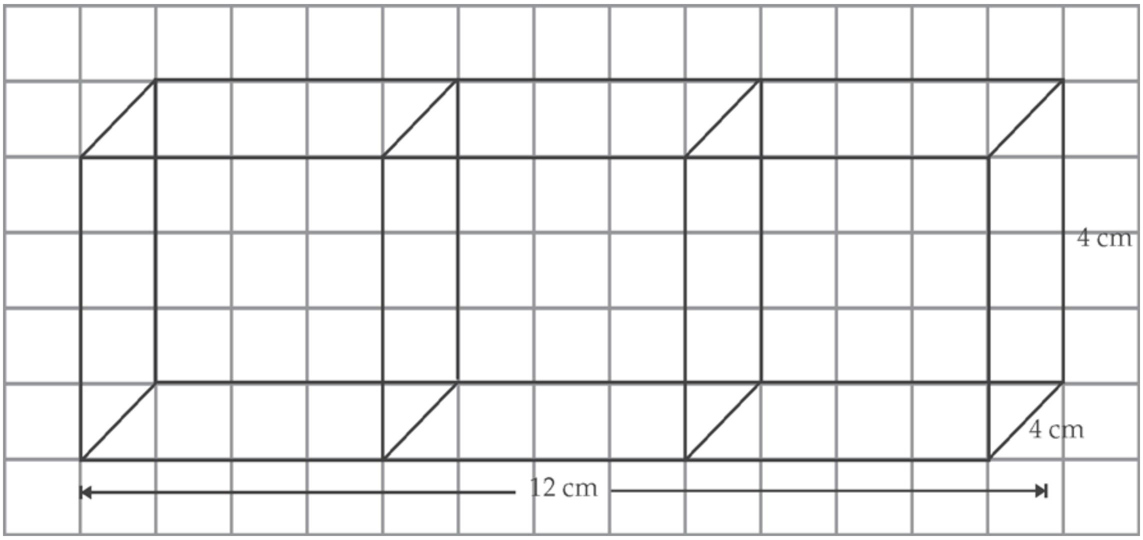
5. (*i*) Circle (*ii*) Triangle

6.



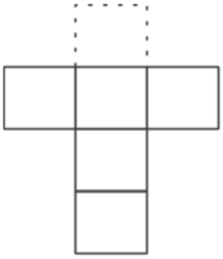
7. (*i*) Cylinder (*ii*) Cone

8. Length = 4 cm + 4 cm + 4 cm
= 12 cm
Breadth = 4 cm
Height = 4 cm



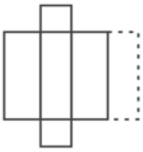
Oblique sketch

9.



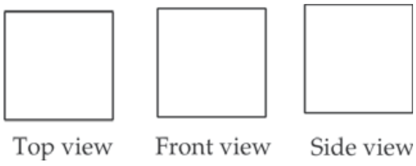
(*i*) Cube

(*ii*) Square prism

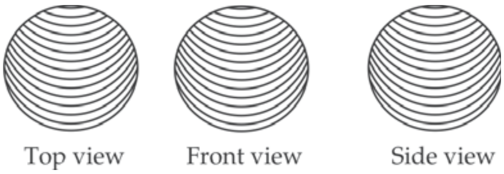


(*iii*) Rectangular

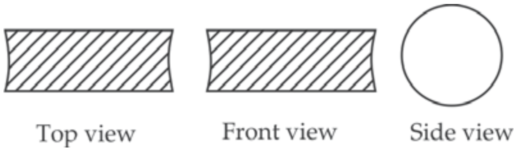
10. (*i*) Cube:



(*ii*) Sphere:



(*iii*) Cylinder:



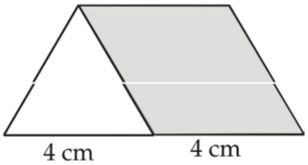
WORKSHEET–124

1. In a cube,
number of faces = 6
number of edges = 12

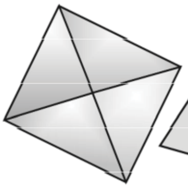
2. (*i*) Squares (*ii*) Triangles.

3. On folding up the given net, you do not get a cube.

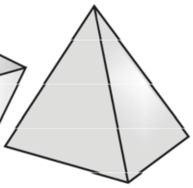
4.



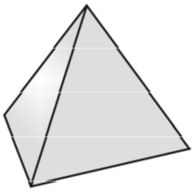
5.



Top view

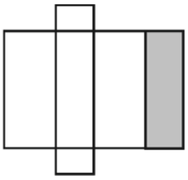


Front view



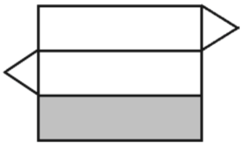
Side view

6. (*i*)



Cuboid

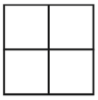
(*ii*)



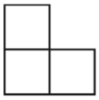
Triangular Prism

7. (*i*) Cone (*ii*) Pyramid

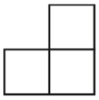
8.



(*i*) Top view



(*ii*) Front view



(*iii*) Side view

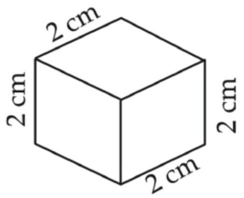
9. (*i*) Tetrahedron (*ii*) Tetrahedron

(*iii*) Cylinder (*iv*) Triangular prism

(*v*) Sphere (*vi*) Cuboid.

WORKSHEET–125

1.



2. (*i*) Cube

(*ii*) Triangular prism.

3. Yes, the given net could form a pyramid.

4. (*i*) Triangles and parallelograms

(*ii*) Circles and rectangle.

5. (*i*) Circle (*ii*) Rectangle

(*iii*) Triangle.

6. (*i*) A vertical cut gives a rectangular cross-section. A horizontal cut gives a circular cross-section.

(*ii*) Both the vertical and horizontal cuts give a squared cross-section.

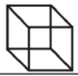
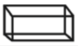
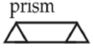
(*iii*) Both the vertical and horizontal cuts give a rectangular cross-section.

7. (*i*) Top view

(*ii*) Front view

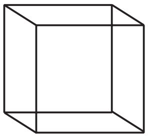
(*iii*) Side view.

8.

S. No.	Shape	No of faces, F.	No. of vertices, V	No. of edges, E	F + V – E
1	Cube 	6	8	12	2
2	Triangular pyramid 	4	4	6	2
3	Cuboid 	6	8	12	2
4	Triangular prism 	5	6	9	2

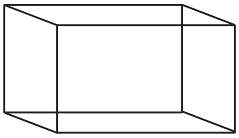
WORKSHEET–126

1. (*i*)



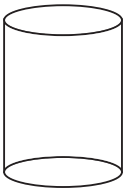
Cube

(*ii*)



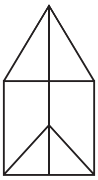
Cuboid

(*iii*)



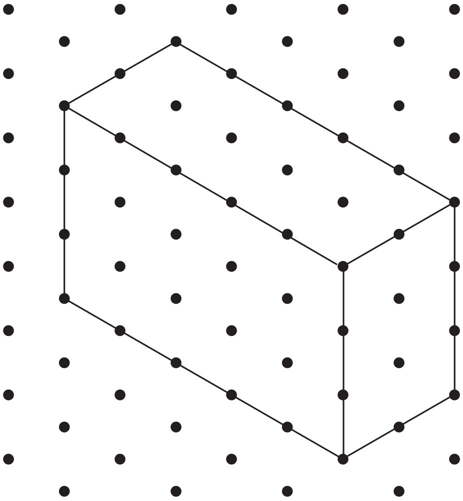
Cylinder

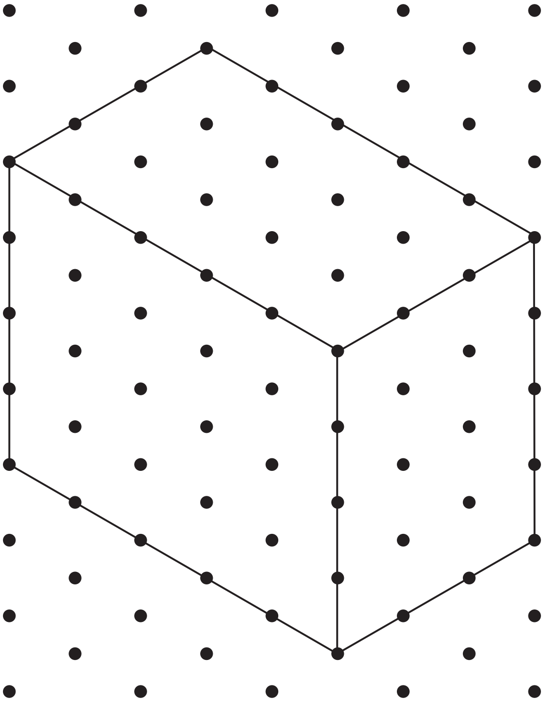
(*iv*)



Prism

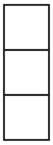
2.



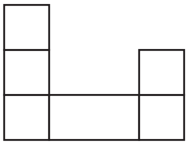


3. (*a*)

Top view

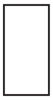


Side view

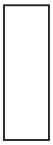


Front view

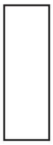
(*b*)



Top view

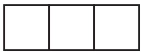


Front view

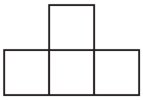


Side view

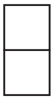
(*c*)



Top view

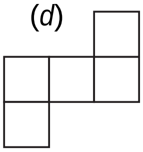


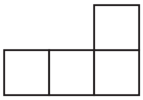
Front view

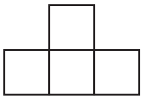


Side view

(*d*)







4. *Do yourself.*

PRACTICE PAPERS

Practice Paper – 1

SECTION-A

1. (C) $6 - (-4) = 6 + 4 = 10$.

2. (C) A mixed fraction is a combination of a whole number and a proper fraction.

3. (B) $44.89 + x = 80.25$

$$x = 80.25 - 44.89$$

$$\therefore \quad = 35.36.$$

4. (A) Mean $= \dfrac{46+45+60+54+70+49}{6}$

$$= \frac{324}{6} = 54.$$

5. (A) One-fourth of $m = \dfrac{m}{4}$

$\because \dfrac{m}{4}$ is 3 more than 7.

$\therefore \dfrac{m}{4} - 3 = 7$ or $\dfrac{m}{4} - 7 = 3$.

6. (B) We get an endless line segment which is called a line.

7. (B) Two line segments are congruent if they have same length.

8. (A) $\dfrac{3\text{ km}}{300\text{ m}} = \dfrac{3000\text{ m}}{300\text{ m}} = 10 : 1$.

9. (C) $\dfrac{5}{-3} = \dfrac{5}{-3} \times \dfrac{4}{4} = \dfrac{20}{-12}$

10. (A) $r = 30$ cm

Area $= \pi r^2$

$$= \frac{22}{7} \times 30 \times 30 = \frac{19800}{7}$$

$$= 2828.57 \approx 2828 \text{ cm}^2.$$

SECTION-B

11. Let the number be x.

Then according to question,

$$3x + 11 = 32$$

(Transposing 11 to RHS)

or $3x = 32 - 11 = 21$

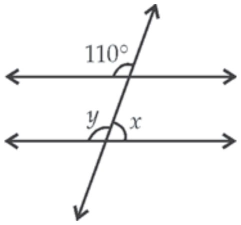
$\therefore \quad x = \dfrac{21}{3} = 7.$

12. $y = 110°$

(Corresponding angles)

$x + y = 180°$

(Linear pair of angles)



or $x + 110° = 180°$

$\therefore \quad x = 180° - 110° = 70°.$

13. An exterior angle of a triangle is equal to the sum of two opposite interior angles.

$\therefore \quad x = 30° + 50° = 80°.$

14. Sum of the given angles

$$= 40° + 60° + 80° = 180°$$

Yes, the triangle is possible.

15. Ratio $= \dfrac{3\text{ km}}{300\text{ m}} = \dfrac{3 \times 1000\text{ m}}{300\text{ m}} = \dfrac{3000}{300}$

$$= \frac{10}{1} = 10 : 1.$$

16. $\because$ Cost of 8 books = ₹ 240

$\therefore$ Cost of 1 book = ₹$\dfrac{240}{8}$ = ₹ 30

∴ Cost of 15 books = ₹ 30 × 15
= ₹ 450.

17. Number of present students = 32 – 8
= 24

Required percentage

$$= \frac{\text{Number of present students}}{\text{Total number of students}} \times 100$$

$$= \frac{24}{32} \times 100 = \frac{3}{4} \times 100 = 75\%.$$

18. Distance travelled in 1 hour

$$= \text{Speed} = \frac{\text{Distance}}{\text{Time}} = \frac{89.1}{2.2}$$

$$= \frac{891}{22} = 40.5 \text{ km}.$$

Therefore, the bus travels 40.5 km in 1 hour.

SECTION -C

19. Total CP for Renu = 7500 + 500
= ₹ 8000

Loss for Renu = 12% of CP

$$= \frac{12}{100} \times 8000$$

= ₹ 960

SP for Renu = CP – Loss
= 8000 – 960
= ₹ 7040

Now, CP for Deepa = SP for Renu
= ₹ 7040.

Thus, the cost price of the T.V. for Deepa is ₹ 7040.

20. P = ₹ 750.50, T = 3 years, R = 12%

$$I = \frac{PRT}{100} = \frac{750.50 \times 12 \times 3}{100}$$

$$= \frac{75050}{100} \times \frac{36}{100} = \frac{2701800}{10000}$$

= ₹ 270.18

A = P + I = ₹ 750.50 + ₹ 270.18
= ₹ 1020.68.

Thus, the simple interest is ₹ 270.18 and the amount is ₹ 1020.68.

21. Let the given angles be 4A and 6A.

∵ Sum of the two supplementary angles = 180°.

∴ 4A + 6A = 180°

or 10A = 180°

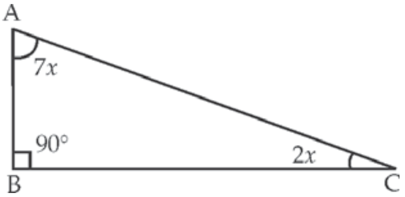
∴ A = 18°

∴ 4A = 4 × 18° = 72°

and 6A = 6 × 18° = 108°.

Thus, the required angles are of 72° and 108°.

22. Let the given angles be $7x$ and $2x$.



In Δ ABC,

$90° + 2x + 7x = 180°$

(Angle sum property of a triangle)

or $90° + 9x = 180°$

∴ $9x = 180° – 90° = 90°$

or $x = \frac{90°}{9} = 10°$

(Dividing both sides by 9)

∴ $7x = 7 \times 10° = 70°$

and $2x = 2 \times 10° = 20°$.

Thus, the angles are of measures 70° and 20° respectively.

23. AB ∥ CD and BC is transversal

∴ ∠B = ∠BCD
= 90°

In ΔABC,

∠A + ∠B + x = 180°

(Angle sum property of a triangle)

or 55° + 90° + x = 180°

or $\quad 145° + x = 180°$

$\therefore \quad x = 180° - 145° = 35°$

Thus, the value of x is 35°.

24. Percentage of marks

$$= \frac{\text{Marks obtained}}{\text{Maximum marks}} \times 100$$

Ravi:

Obtained marks = 850

Maximum marks = 900

$$\therefore \text{Percentage of marks} = \frac{850}{900} \times 100$$

$$= \frac{850}{9}$$

$$= 94.44\%$$

Rohit:

Obtained marks = 540

Maximum marks = 600

$$\therefore \text{ Percentage of marks } = \frac{540}{600} \times 100$$

$$= \frac{540}{6} = 90\%$$

Since Ravi obtained more percentage of marks. Therefore, Ravi's performance is better.

25. $\because \quad \left(\frac{3}{4}\right)^2 = \frac{3}{4} \times \frac{3}{4} = \frac{3\times3}{4\times4} = \frac{9}{16},$

$$\left(\frac{-1}{2}\right)^3 = \left(\frac{-1}{2}\right) \times \left(\frac{-1}{2}\right) \times \left(\frac{-1}{2}\right)$$

$$= \frac{1}{2} \times \frac{1}{2} \times \left(\frac{-1}{2}\right) = \frac{-1}{8}$$

and $\quad 2^3 = 2 \times 2 \times 2 = 8$

$$\therefore \left(\frac{3}{4}\right)^2 \times \left(-\frac{1}{2}\right)^3 \times 2^3$$

$$= \frac{9}{16} \times \left(-\frac{1}{8}\right) \times 8$$

$$= -\frac{9}{16} \times (-1) = -\frac{9}{16}.$$

26. $4.346 - 1.16 + 3.402 - 2.3$

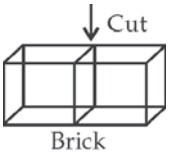
$= 4.346 + 3.402 - 1.16 - 2.3$

$= (4.346 + 3.402) - (1.16 + 2.3)$

$= 7.748 - 3.46$

$= 4.288.$

27.



When we give a vertical cut to a brick, we get a rectangular cross-section.

28. A die has six faces marked with numbers 1 to 6, one number on one face.

All possible outcomes are 1, 2, 3, 4, 5 and 6.

$\therefore$ Total number of possible outcomes = 6

(*i*) Probability

$$= \frac{\text{Number of 3's}}{\text{Total number of possible outcomes}}$$

$$= \frac{1}{6}$$

(*ii*) Probability

$$= \frac{\text{Number of 6's}}{\text{Total number of possible outcomes}}$$

$$= \frac{1}{6}.$$

SECTION-D

29.(*i*) $\quad \frac{-2}{3} = \frac{-2\times4}{3\times4} \qquad \left(\because \frac{12}{3} = 4\right)$

$$= \frac{-8}{12}.$$

(*ii*) $\quad \frac{-4}{7} = \frac{-4\times(-18)}{7\times(-18)} \qquad \left(\because \frac{72}{-4} = -18\right)$

$$= \frac{72}{-126}.$$

(*iii*) $\frac{7}{-3} = \frac{7\times(-1)}{-3\times(-1)} = \frac{-7}{3}.$

(*iv*) Absolute form of $\frac{-8}{24} = \frac{8}{24} = \frac{1}{3}.$

(*v*) $\frac{-5}{-20} = \frac{5}{20}$ $\left(\because \frac{-a}{-b} = \frac{a}{b}\right)$

And $\frac{-1}{5} = \frac{-1\times 4}{5\times 4}$ $\left(\because \frac{20}{5} = 4\right)$

$$= \frac{-4}{20}.$$

30.(*i*) Let the man initially have ₹ x.

$\therefore$ Expenditure = ₹ $\frac{3}{5}x$

Now, according to question

$x = \frac{3}{5}x + 1250$ or $x - \frac{3}{5}x = 1250$

or $\frac{5x-3x}{5} = 1250$ or $\frac{2x}{5} = 1250.$

Multiplying both sides by $\frac{5}{2}$, we get

$$x = 1250 \times \frac{5}{2} = 3125.$$

Therefore, the man initially has ₹ 3125.

(*ii*) $\because$ Cost of 1 litre of petrol

$$= ₹\ 42\frac{1}{5} = ₹\ \frac{42\times5+1}{5} = ₹\ \frac{211}{5}$$

$\therefore$ Cost of $10\frac{1}{2}$ litres of petrol

$$= 10\frac{1}{2} \times ₹\ \frac{211}{5} = ₹\ \left(\frac{21}{2}\times\frac{211}{5}\right)$$

$$= ₹\ \left(\frac{4431}{10}\right) = ₹\ 443.10.$$

31.(*i*) $\frac{2}{3} \times \frac{15}{24} \times 2\frac{4}{5} = \frac{2}{3} \times \frac{5}{8} \times \frac{10+4}{5}$

$$= \frac{2}{3} \times \frac{5}{8} \times \frac{14}{5} = \frac{2}{8} \times \frac{5}{5} \times \frac{14}{3}$$

$$= \frac{1}{4} \times 1 \times \frac{14}{3} = \frac{7}{2\times3} = \frac{7}{6}$$

$$= 1\frac{1}{6}.$$

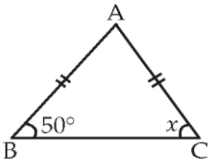
(*ii*) $1\frac{1}{8} \div 2\frac{1}{4} \times 4\frac{1}{3}$

$$= \left(1\frac{1}{8} \div 2\frac{1}{4}\right) \times 4\frac{1}{3} = \left(\frac{9}{8} \div \frac{9}{4}\right) \times \frac{13}{3}$$

$$= \left(\frac{9}{8} \times \frac{4}{9}\right) \times \frac{13}{3} = \frac{1}{2} \times \frac{13}{3} = \frac{13}{6}$$

$$= 2\frac{1}{6}.$$

32.(*i*) In Δ ABC,



AB = AC

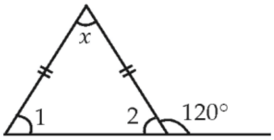
$\therefore$ $x = 50°$

(Angles opposite to equal sides)

(*ii*) $\angle 2 + 120° = 180°$

(Linear pair of angles)

$\therefore$ $\angle 2 = 180° - 120° = 60°.$



Also, $\angle 1 = \angle 2 = 60°$

(Angles opposite to equal sides)

Further, $\angle 1 + x = 120°$

(Exterior angle property)

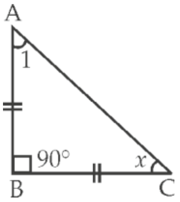
$\therefore$ $x = 120° - \angle 1$

$= 120° - 60°$

$(\because \angle 1 = 60°)$

$= 60°.$

(*iii*) In Δ ABC,



$$AB = BC$$

$\therefore \quad x = \angle 1$

Now, using angle sum property, we get

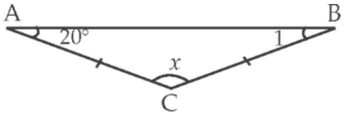
$\angle 1 + x + 90° = 180°$

or $x + x + 90° = 180° \quad (\angle 1 = x)$

or $2x = 180° - 90° = 90°$

$\therefore \quad x = \frac{90°}{2} = 45°.$

(*iv*) In Δ ABC,



$$AC = BC$$

$\therefore \quad \angle 1 = 20°$

Now, using angle sum property, we get

$x + 20° + \angle 1 = 180°$

or $x + 20° + 20° = 180°$

$(\because \angle 1 = 20°)$

$\therefore\ x = 180° - 40° = 140°.$

(*v*) Angles x and 70° are opposite to equal sides of the given triangle,

$\therefore \quad x = 70°.$

33. (*a*) (*i*) The given net is of a right circular cylinder.

(*ii*) The given net is of a right circular cone.

(*b*) (*i*) In ΔACO and ΔDBO,

CO = DO (Given)

$\angle$COA = $\angle$BOD

(Vertically opposite angles)

AO = BO (Given)

So, by SAS congruence criterion, we have

$\Delta ACO \cong \Delta BDO.$

(*ii*) In ΔACO and ΔBDO,

CO = DO (Given)

$\angle$AOC = $\angle$BOD

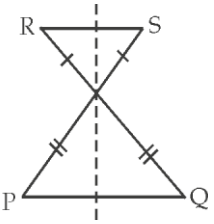
(Vertically opposite angles)

AO = BO (Given)

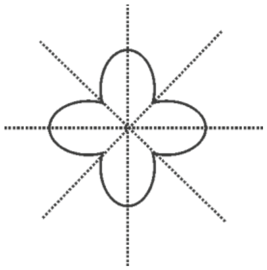
So, by SAS congruence criterion,

ΔACO{ Δ BDO.

34. (*a*) (*i*) This figure has only one line of symmetry passing through the point of intersection of PS and RQ.

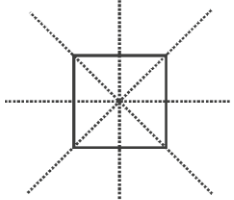


(*ii*)

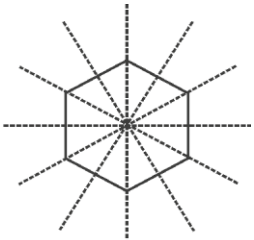


This figure has four lines of symmetry.

(*b*) A square has four lines of symmetry.



Square



Hexagon

A hexagon has six lines of symmetry.

Practice Paper – 2

SECTION-A

1. (C) Additive inverse of – 200 is 200.

2. (C) $5\frac{1}{3} \div 4\frac{4}{3} = \frac{16}{3} \div \frac{16}{3} = 1.$

3. (D) $8 - x = 3.187$

$\therefore \quad x = 8 - 3.187 = 8.000 - 3.187$

$= 4.813.$

4. (B) $x - \frac{3}{2} = 5$ or $x = \frac{3}{2} + 5 = \frac{13}{2}$.

5. (A) A closed figure bounded by three line segments is called a triangle.

6. (C) Measurements of two congruent angles are equal.

$\therefore \quad m\angle p = m\angle q$.

7. (A) $150\% = \frac{150}{100} = \frac{50 \times 3}{50 \times 2} = \frac{3}{2}$.

8. (C) There are infinitely many rational numbers between – 2 and – 1. One of them is $\frac{-3}{2}$.

9. (D) A parallelogram has no lines of symmetry.

10. (A) The expression '$a^2 + b^2$' has 2 terms and so it is a binomial.

SECTION-B

11. (*i*) The given figure is a rhombus. So, it has rotational symmetry of order 2.

(*ii*) The given figure is a regular pentagon. So, it has rotational symmetry of order 5.

12. (*i*) Sum of given angles

$$= 90° + 55° + 35° = 180°.$$

Since the sum is 180°, Therefore, the triangle is possible.

(*ii*) Sum of given angles

$$= 50° + 50° + 61°$$
$$= 161°.$$

Since the sum is not 180°, therefore, the triangle is not possible.

13. In the given figure, ∠AOC and ∠BOC form a linear pair.

$$\therefore \quad \angle AOC + \angle BOC = 180°$$

or $\quad 110° + \angle BOC = 180°$

$$\therefore \angle BOC = 180° - 110° = 70°.$$

14. Decimal Form:

$$6.5\% = \frac{6.5}{100} = \frac{65}{1000} = 0.065.$$

Fractional Form:

$$6.5\% = \frac{6.5}{100} = \frac{65}{1000} = \frac{13}{200}.$$

15. Let the required per cent be x%. Then,

$$x \text{ \% of } 42 = 7$$

or $\quad \frac{x}{100} \times 42 = 7$

$$\therefore \quad x = \frac{7 \times 100}{42} = \frac{100}{6}$$

$$= 16\frac{2}{3}\%.$$

16. $\quad 8y - 9 - 5y = 24$

or $\quad 3y - 9 = 24$

(Transposing – 9 to RHS)

or $\quad 3y = 24 + 9 = 33$

or $\quad y = \frac{33}{3} = 11.$

17. $\quad r = 56$ cm.

Area of the circle $= \pi r^2$

$$= \frac{22}{7} \times 56 \times 56$$
$$= 176 \times 56$$
$$= 9856 \text{ cm}^2.$$

18. ∵ 1500 km covered in 30 litres

∴ 1 km covered in $\frac{30}{1500}$ litres

∴ 1800 km will cover in $\frac{30}{1500} \times 1800$ litres

or $\frac{30 \times 18}{15}$ litres or 36 litres.

Thus, 36 litres of petrol will be needed.

SECTION-C

19. Rearranging the given salaries in the ascending order, we have

₹ 38, ₹ 40, ₹ 42, ₹ 45, ₹ 50, ₹ 50, ₹ 60, ₹ 71, ₹ 82, ₹ 84, ₹ 90.

Number of the salaries = 11

This is an odd number.

$$\therefore \quad \text{Median} = \left(\frac{11+1}{2}\right)^{\text{th}} \text{ term}$$

$$= \left(\frac{12}{2}\right)^{\text{th}} \text{ term}$$

$$= 6^{\text{th}} \text{ term} = ₹\ 50.$$

20. Area = 250 m^2, Base (b) = 50 m, Altitude (h) = ?

$$\text{Area} = \frac{1}{2}bh$$

$$\therefore \quad h = \frac{2 \times \text{Area}}{\text{b}} = \frac{2 \times 250}{50}$$

$$= 2 \times 5 = 10 \text{ m}.$$

Thus, the altitude is 10 metres.

21. Perimeter of a square = 4 × Side

$$\therefore \quad 48 = 4 \times \text{Side}$$

$$\therefore \quad \frac{48}{4} = \text{Side}$$

$$\text{or} \quad 12 = \text{Side}$$

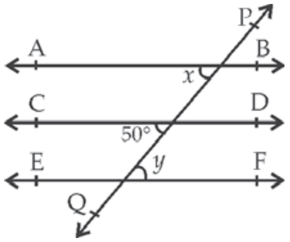
$$\text{Area of the garden} = (\text{side})^2$$

$$= 12 \times 12$$

$$= 144 \text{ m}^2.$$

22. AB ∥ CD and PQ is transversal

$\therefore x = 50°$ (Corresponding angles)



AB ∥ EF and PQ is transversal

$\therefore \quad y = x$

(Alternate interior angles)

$= 50°$ $\quad (\because x = 50°)$

Thus, $\quad x = y = 50°.$

23. SP for each horse = ₹ 324.

CP of the horse which provides gain

$$= \frac{\text{SP} \times 100}{(100+20)}$$

$$= \frac{324 \times 100}{120} = \frac{3240}{12}$$

$$= ₹\ 270.$$

CP for the horse which provides loss

$$= \frac{\text{SP} \times 100}{(100-20)}$$

$$= \frac{324 \times 100}{80} = \frac{3240}{8}$$

$$= ₹\ 405.$$

$$\therefore \quad \text{Total CP} = 270 + 405$$

$$= ₹\ 675$$

Total SP = 2 × 324 = ₹ 648.

Since, total CP is greater than total SP.

So, there is a loss in the whole transation.

$$\therefore \quad \text{Loss} = \text{CP} - \text{SP} = 675 - 648$$

$$= ₹\ 27.$$

24. P = ₹ 300, A = 2 × 300 = ₹ 600, R = 4%

$$\therefore \quad \text{I} = \text{A} - \text{P} = 600 - 300$$

$$= ₹\ 300$$

$$\text{I} = \frac{\text{PRT}}{100} \quad \text{or} \quad \text{I} = \frac{\text{I} \times 100}{\text{PR}}$$

$$\therefore \quad \text{T} = \frac{300 \times 100}{300 \times 4} = \frac{100}{4}$$

$$= 25 \text{ years}.$$

Thus, the money will double itself in 25 years.

25. Ratio of 7 to 11

$$= \frac{7}{11} = \frac{7 \times 3}{11 \times 3} = \frac{21}{33} = 21 : 33$$

Ratio of 21 to 33 = $\frac{21}{33}$ = 21 : 33

Since 7 : 11 = 21 : 33

Therefore, 7, 11, 21, 33 are in proportion.

26. $\because$ Weight of 405 book = 90 kg

$\therefore$ Weight of 1 book = $\frac{90}{405}$ kg

$= \frac{2}{9}$ kg.

$\therefore$ (*i*) Weight of 540 books

$= \frac{2}{9} \times 540$ kg

= 2 × 60 kg = 120 kg.

(*ii*) Required number of books

$$= \frac{50\text{ kg}}{\text{Weight of 1 book}}$$

$$= \frac{50\text{ kg}}{\left(\frac{2}{9}\right)\text{kg}} = \frac{50}{\left(\frac{2}{9}\right)}$$

$$= 50 \times \frac{9}{2} = 25 \times 9$$

= 225.

27. Total CP = 520000 + 80000 = ₹ 600000

SP = ₹ 640000

$\because$ SP > CP $\therefore$ There is a profit.

Profit = 640000 – 600000 = ₹ 40000

$$\text{Profit per cent} = \frac{\text{Profit}}{\text{Total CP}} \times 100$$

$$= \frac{40000}{600000} \times 100$$

$$= \frac{40}{6}\% = 6\frac{2}{3}\%$$

Thus, the profit per cent is $6\frac{2}{3}\%$.

28. Substituting $a = -2$ and $b = 1$ in

(*i*) $a^2 - b^2$, we get

$a^2 - b^2 = (-2)^2 - (1)^2 = 4 - 1 = 3$

Thus, $a^2 - b^2 = 3$.

(*ii*) $a + b$, we get

$a + b = (-2) + 1 = -2 + 1 = -1$

Thus, $a + b = -1$.

SECTION-D

29. Length $l = 100$ m, Breadth $b = 45$ m

(*i*) The playground is in the form of a rectangle.

$\therefore$ Area of the playground

$= l \times b$

= 100 × 45

= 4500 m^2

Cost of levelling

= Area × Cost per m^2

= 4500 × 5.50

= 45 × 550 = 24750.

Thus, the cost of levelling the playground is ₹ 24750.

(*ii*) Perimeter of the playground

$= 2(l + b)$

= 2(100 + 45)

= 290 m.

Distance covered by the boy

= 4 × Perimeter

= 4 × 290 = 1160 m.

Speed = 5.8 m / minute

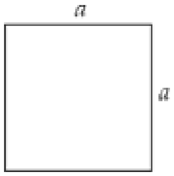
$$\text{Time taken} = \frac{\text{Distance}}{\text{Speed}}$$

$$= \frac{1160}{5.8} = \frac{11600}{58}$$

= 200 minutes.

or 3 hr 20 minutes.

30. Let a be the side of the square and b be the base of the parallelogram.



Square

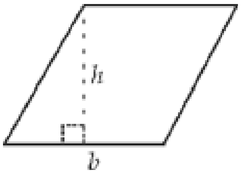
Perimeter of the square = $4 \times a$

But the given perimeter of the square = 250 m

$$\therefore \quad 4a = 250$$

$$\therefore \quad a = \frac{125}{2} \text{ m}$$

Height of the parallelogram h = 50 m



Parallelogram

Area of the parallelogram = Area of the square (Given)

$$\text{or} \quad b \times h = a \times a$$

$$\therefore \quad b \times 50 = \frac{125}{2} \times \frac{125}{2}$$

Dividing both sides by 50, we get

$$\text{or} \quad \frac{b \times 50}{50} = \frac{125 \times 125}{50 \times 2 \times 2}$$

$$\therefore \quad b = \frac{625}{8} = 78.125 \text{ m.}$$

Thus, the measure of the corresponding base of the parallelogram is 78.125 m.

31.(*i*) When you change a closed figure to another closed figure, the perimeter remain unchanged.

Area of the square = 121 cm^2

$$\therefore \quad \text{Side} \times \text{Side} = 11 \times 11$$

$$\therefore \quad \text{Side} = 11 \text{ cm.}$$

Circumference of the circle = Perimeter of the square

$$\text{or} \quad 2\pi r = 4 \times \text{Side}$$

$$\text{or} \quad 2 \times \frac{22}{7} \times r = 4 \times 11$$

$$\therefore \quad r = \frac{4 \times 11 \times 7}{22 \times 2} = 7 \text{ cm.}$$

Area of the circle

$$= \pi r^2 = \frac{22}{7} \times 7 \times 7$$

$$= 22 \times 7 = 154 \text{ cm}^2$$

Thus, area of the circle is 154 cm^2.

(*ii*) Area of the circle = 15400 m^2

$$\text{or} \quad \pi r^2 = 15400$$

$$\therefore \quad r^2 = \frac{15400}{\pi} = \frac{15400}{\left(\frac{22}{7}\right)}$$

$$= \frac{15400 \times 7}{22} = 700 \times 7$$

$$\text{or} \quad r \times r = (7 \times 10) \times (7 \times 10)$$

$$\therefore \quad r = 7 \times 10 = 70 \text{ m}$$

$$\therefore \quad \text{Diameter} = 2 \times r = 2 \times 70$$

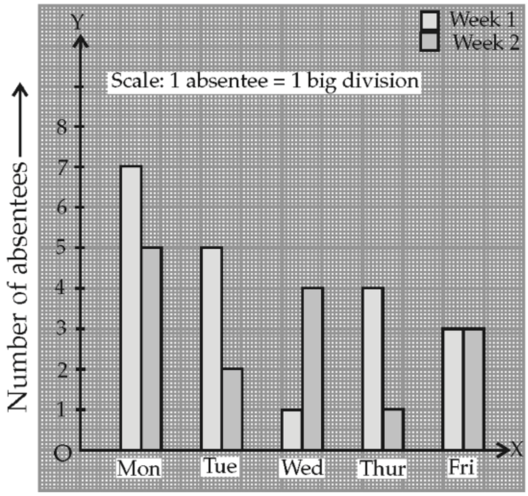
$$= 140 \text{ m.}$$

Thus, the diameter of the circle is 140 metres.

32. To draw a double bar graph, you have to go to the steps:

Step I. Draw a pair of perpendicular lines OX and OY on a graph paper.

Step II. Along the horizontal axis (OX), mark the days of the week, namely Mon, Tue, Wed, Thur and Fri. Along the vertical axis (OY), mark the number of absentees.



Step III. Choose a suitable scale to determine the height of bars. Here take

1 absentee = 1 big division on OY.

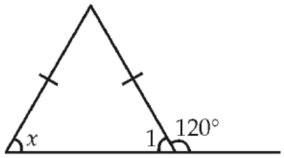
Step IV. First draw the bars for week 1 and then for week 2 by taking equal width of the bars and equal gap between any two consecutive bar pairs.

Step V. Shade the bars of the weeks with different types. Show their shadings on the top right corner of the graph paper.

33.(*i*) 120° and $\angle 1$ form a linear pair.

$\therefore \quad \angle 1 + 120° = 180°$

$\therefore \quad \angle 1 = 180° - 120° = 60°$

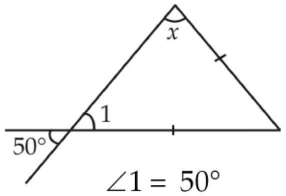


Now, $\qquad x = \angle 1$

(Angles opposite to equal sides)

$= 60°.$

(*ii*) 50° and $\angle 1$ are vertically opposite angles



$\therefore \quad \angle 1 = 50°$

x and $\angle 1$ are opposite to equal sides,

$\therefore \quad x = \angle 1 = 50°.$

(*iii*) $\quad x = y$

(Angles opposite to equal sides)

$x + y = 100°$

(Exterior angle property)

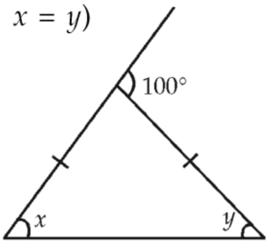
or $x + x = 100°$

$(\because x = y)$

or $\quad 2x = 100°$

$\therefore \quad x = \dfrac{100°}{2}$

$= 50°.$



(*iv*) $60° + x = 180°$

(Linear pair of angles)

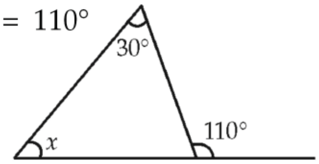
$\therefore \quad x = 180° - 60°$

(Transposing 60° to RHS)

$= 120°.$

(*v*) Using exterior angle property for a triangle, we have

$x + 30° = 110°$



$\therefore \quad x = 110° - 30°$

(Transposing 30° to RHS)

or $\quad x = 80°.$

34.(*i*) Let Raghu's age be x years

Two times of $x = 2 \times x = 2x$

5 more than $2x = 2x + 5$

Consequently, we get

$2x + 5 = 41 \quad$ or $\quad 2x = 41 - 5$

or $\quad 2x = 36 \quad$ or $\quad x = \dfrac{36}{2}$

or $x = 18$

Therefore, Raghu's age is 18 years.

(*ii*) In 1 hour, Bulbul reads $\frac{1}{3}$ part

In $2\frac{1}{6}$ hours she will read $2\frac{1}{6} \times \frac{1}{3}$ part $\frac{13}{6} \times \frac{1}{3}$ part or $\frac{13}{18}$ part.

Thus, Bulbul will read $\frac{13}{18}$ part in $2\frac{1}{6}$ hours.

Practice Paper – 3

SECTION-A

1. (B) $(-50) \div [(-20) + (-5)]$

$= (-50) \div [-20 - 5]$

$= (-50) \div (-25)$

$= 50 \div 25 = 2.$

2. (A) Number of broken eggs

$= \frac{1}{6}$ of 2 dozen

$= \frac{1}{6} \times 12 \times 2 = 4.$

3. (D) $\frac{-3}{-7} = \frac{3}{7}$, which is a positive rational number.

4. (D) Perimeter = 13.34 cm.

$$\begin{array}{r} 4.10 \\ 4.04 \\ +\ 5.20 \\ \hline 13.34 \end{array}$$

5. (A) Rearranging the given data in the descending order, we get

9, 8, 7, 6, 4, 3, 2

n = Number of terms = 7, which is odd number.

$\therefore$ Median = $\left(\frac{n+1}{2}\right)^{th}$ term

$= \left(\frac{7+1}{2}\right)^{th}$ term

$= 4^{th}$ term = 6.

6. (A) $\frac{3}{2}x = 15$ or $\frac{3}{2}x \times \frac{2}{3} = 15 \times \frac{2}{3}$

$\therefore \quad x = 5 \times 2 = 10.$

7. (D) The Pythagoras property holds for a right-angled triangle.

8. (C) Measures of two congruent angles are equal.

$\therefore$ Measure of other angle = 80°.

9. (B) Rectangle is a 2-D figure.

10. (B) Zero is neither a positive nor a negative number.

SECTION-B

11. All integers between – 3 and 3 are:

– 2, – 1, 0, 1, 2.

12. $(-2-5) \times (-6) = (-7) \times (-6) = 42$

$(-2) - 5 \times (-6) = -2 + (-5 \times (-6))$

$= -2 + 30 = 28$

$\because \quad 42 > 28$

$\therefore$ $(-2-5) \times (-6)$ is greater than $(-2) - 5 \times (-6)$.

13. $\frac{2}{9} \div \frac{1}{2} = \frac{2}{9} \times \frac{2}{1} = \frac{4}{9}$

Reciprocal of $\frac{2}{9} \div \frac{1}{2}$ = Reciprocal of $\frac{4}{9}$

$= \frac{9}{4}$.

14. $\because \quad 1 = \frac{1}{3} + \frac{1}{3} + \frac{1}{3}$

$\therefore \quad 3 = \left(\frac{1}{3}+\frac{1}{3}+\frac{1}{3}\right) \times 3$

= (3 one-thirds) × 3

= 9 one-thirds

Thus, there are 9 one-thirds in 3.

15. $\because \quad xyz = yzx = zxy$

$\therefore \quad 6xyz - 10yzx + 12zxy$

$= 6xyz - 10xyz + 12xyz.$

$= 18xyz - 10xyz$

$= 8xyz.$

16. $6x + 14 = 16$

Subtracting 14 from both sides, we get $6x = 2$.

Dividing both sides by 6, we get

$$x = \frac{2}{6} = \frac{1}{3}.$$

Thus, $x = \frac{1}{3}$.

17. $36 : 81 = \frac{36}{81} = \frac{9 \times 4}{9 \times 9} = \frac{4}{9} = 4 : 9.$

18. CP = SP + Total loss = ₹ 18 + ₹ 2

= ₹ 20.

$$\text{Loss per cent} = \frac{\text{Total loss}}{\text{CP}} \times 100$$

$$= \frac{2}{20} \times 100$$

$$= \frac{100}{10} = 10.$$

Thus, the loss per cent is 10%.

SECTION-C

19. $\text{Cost of 1 chair} = \frac{\text{Cost of 15 chairs}}{15}$

$$= \frac{5532.30}{15} = \frac{55323}{150}$$

= ₹ 368.82

Cost of 21 chairs

= 21 × Cost of 1 chair

= 21 × 368.82

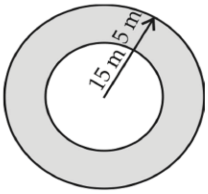
$$= \frac{21 \times 36882}{100} = \frac{774522}{100}$$

= ₹ 7745.22.

Thus, the cost of 1 chair is ₹ 368.82 and the cost of 21 chairs is ₹ 7445.22.

20. Outer radius = R = 20 m

Inner radius = r = 20 – 5 = 15 m



Area of the path

= Area of the shaded region

= Area of outer circle – Area of inner circle.

$= \pi R^2 - \pi r^2 = \pi(R^2 - r^2)$

$= \frac{22}{7}(20^2 - 15^2)$

$= \frac{22}{7} \times (400 - 225)$

$= \frac{22}{7} \times 175 = 22 \times 25$

= 550.

Thus, area of the path is 550 m^2.

21. Area of a triangle = $\frac{1}{2}$ × Base × Altitude

$\therefore \quad \text{Altitude} = \frac{2 \times \text{Area}}{\text{Base}} = \frac{2 \times 90}{30}$

= 6 cm.

22. Area of a square = (side)^2 = (PQ)^2

= PQ × PQ = 15 × 15

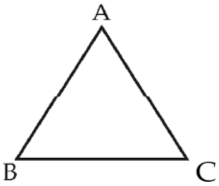
= 225 cm^2.

Perimeter of the square = 4 × PQ

= 4 × 15

= 60 cm.

23.



ΔABC is an equilateral triangle.

$\therefore \quad AB = BC = CA$

ΔXYZ is also an equilateral triangle

$\therefore \quad XY = YZ = ZX$

But $\quad AB = XY \quad$ (Given)

$\therefore \quad BC = YZ$

And $\quad CA = ZX$

So, we conclude that ΔABC and ΔXYZ are congruent under SSS condition.

24.(*i*) A parallelogram has no line of symmetry.

(*ii*) An equilateral triangle has three lines of symmetry.

(*iii*) A semicircle has one line of symmetry.

25. Let the third angle be *x*:

According to the angle sum property of a triangle, we have

$50° + 50° + x = 180°$

or $\quad 100° + x = 180°$

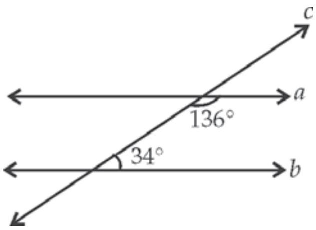
Subtracting 100° from both the sides, we get

$100° + x - 100° = 180° - 100°$

or $\quad x = 80°.$

Thus, the third angle is of measure 80°.

26. Line c is the transversal for the lines *a* and *b*.



Given angles of measures 34° and 136° are interior angles on the same side of the transversal c.

Sum of these angles

$= 34° + 136° = 170°$

Hence, the sum of interior angles on the same side of the transversal is not 180°, so the lines *a* and *b* are not parallel.

27. Let the angles be A, 2A and 6A.

According to the angle sum property of a triangle,

$A + 2A + 6A = 180°$

or $\quad 9A = 180°$

$\therefore \quad A = \frac{180°}{9} = 20°$

$\therefore \quad 2A = 2 \times 20° = 40°$

and $\quad 6A = 6 \times 20° = 120°.$

Thus, the measures of the angles of the given triangle are 20°, 40° and 120°.

28.(*i*) $3.7 \times 4 = \frac{37}{10} \times 4 = \frac{37 \times 4}{10}$

$= \frac{148}{10} = 14.8.$

(*ii*) $156.8 \times 100 = \frac{1568}{10} \times 100$

$= 1568 \times 10 = 15680.$

(*iii*) $2.835 \div 1000 = \frac{2835}{1000} \times \frac{1}{1000}$

$= \frac{2835}{1000000} = 0.002835.$

SECTION-D

29. Let us re-arrange the given ages in the ascending order, we get

35, 38, 43, 46, 46, 46, 47, 50, 52, 54

(*i*) The oldest friend's age = 54 years

The youngest friend's age = 35 years

(*ii*) Range = The oldest friend's age – The youngest friend's age

= 54 years – 35 years

= 19 years.

(*iii*) Sum of all the ages

= 35 + 38 + 43 + 46 + 46 + 46 + 47 + 50 + 52 + 54

= 457 years

∴ Mean age

$$= \frac{\text{Sum of all the ages}}{\text{Total number of the friends}}$$

$$= \frac{457}{10} = 45.7 \text{ years.}$$

(*iv*) Out of the given data, 46 years is occured highest number of times

∴ Mode = 46 years.

30. (*i*) $9^{11} \div 9^7 = \frac{9^{11}}{9^7}$

$= 9^{11-7}$ $\left[\because \frac{a^m}{a^n} = a^{m-n}\right]$

$= 9^4$.

(*ii*) $(a^2 \times x^2)^5 = (a^2x^2)^5$

$= \left\{(ax)^2\right\}^5$ $[\because p^m q^m = (pq)^m]$

$= (ax)^{2 \times 5}$

$= (ax)^{10}$.

(*iii*) $(6^3)^4 = 6^{3 \times 4}$ $[\because (l^s)^t = l^{s \times t}]$

$= 6^{12}$.

(*iv*) $(-2)^4 \times (-2)^{-4} = (-2)^{4-4}$

$[\because a^m \times a^n = a^{m+n}]$

$= (-2)^0$

$= 1$ $[\because a^0 = 1 \text{ for } a \neq 0]$

(*v*) $\left(7^{50}\right)^2 = 7^{(50 \times 2)}$ $[\because (l^s)^t = l^{s \times t}]$

$= 7^{100}$.

31.(*i*) 80,00,000 = 8.000000 × 1000000

$= 8.0 \times 10^6$.

(*ii*) 2,00,072 = 2 × 100000 + 0 × 10000 + 0 × 1000 + 0 × 100 + 7 × 10 + 2 × 1

$= 2 \times 10^5 + 0 + 0 + 0 + 7 \times 10^1 + 2 \times 10^0$

$= 2 \times 10^5 + 7 \times 10^1 + 2 \times 10^0$.

(*iii*) $3 \times 3 \times 3 \times x \times x \times x \times a \times a \times y \times y \times y$

$= (3 \times 3 \times 3) \times (x \times x \times x) \times (a \times a) \times (y \times y \times y)$

$= 3^3 \times x^3 \times a^2 \times y^3$

$= (3^3 \times x^3 \times y^3) \times a^2$

$= (3 \times x \times y)^3 \times a^2$

$[\because a^3 \times b^3 \times c^3 = (abc)^3]$

$= (3xy)^3 \times a^2$.

(*iv*) $\frac{1}{10000 \times 81}$

$= \frac{1}{(10 \times 10 \times 10 \times 10) \times (3 \times 3 \times 3 \times 3)}$

$= \frac{1}{10^4 \times 3^4}$

$= \frac{1}{(10 \times 3)^4}$ $[\because a^m \times b^m = (a \times b)^m]$

$= \frac{1}{(30)^4} = 30^{-4}$ $\left[\because \frac{1}{a^m} = a^{-m}\right]$

(*v*) $(-1)^5 = (-1) \times (-1) \times (-1) \times (-1) \times (-1)$

$= \{(-1) \times (-1)\} \times \{(-1) \times (-1)\} \times (-1)$

$= 1 \times 1 \times (-1) = 1 \times (-1)$

$= -1.$ $[\because a \times (-1) = -a]$

32. (*i*) $p + 7 = 18$

or $p = 18 - 7$ (Transposing 7 to RHS)

∴ $p = 11$.

(*ii*) $5p - 12 = 28$

or $5p = 28 + 12 = 40$

(Transposing – 12 to RHS)

or $\frac{5p}{5} = \frac{40}{5}$

(Dividing both sides by 5)

∴ $p = 8$.

(*iii*) $24 + 8(y - 8) = 0$

or $24 + 8y - 64 = 0$

or $8y - 40 = 0$

or $8y = 40$

∴ $y = 5$.

33. We know that

$x = x \times 100\%$.

(*i*) $\frac{3}{4} = \frac{3}{4} \times 100\% = 3 \times 25\% = 75\%.$

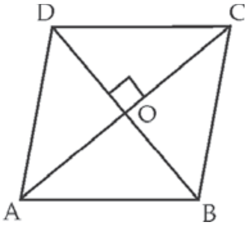
(*ii*) $2 : 8 = \frac{2}{8} = \frac{1}{4} = \frac{1}{4} \times 100\% = 25\%.$

(*iii*) $3.5 = 3.5 \times 100\% = \frac{35}{10} \times 100\%$

$= 35 \times 10\% = 350\%.$

34. (*i*) Let ABCD be a rhombus with diagonals BD = 16 cm and AC = 30 cm

Let AC and BD intersect each other at O.



We know that diagonals of a rhombus bisect each other at right angles.

$\therefore \quad BO = DO = \frac{BD}{2} = \frac{16}{2} = 8 \text{ cm},$

$AO = CO = \frac{AC}{2} = \frac{30}{2} = 15 \text{ cm}$

And $\angle COD = 90°$

In right triangle COD,

$CD^2 = CO^2 + DO^2$

(Pythagoras property)

$= (15)^2 + (8)^2 = 225 + 64$

$= 289.$

$\therefore \quad CD = \sqrt{289} = 17 \text{ cm}$

Now perimeter of the rhombus

$= 4 \times CD = 4 \times 17$

$= 68$ cm.

Thus, the perimeter of the rhombus is 68 cm.

(*ii*) Radius $r = 24.5$ m

$= \frac{245}{10} \text{ m} = \frac{49}{2} \text{ m}$

Circumference $= 2\pi r$

$= 2 \times \frac{22}{7} \times \frac{49}{2}$

$= 22 \times 7 = 154$ m.

Distance covered in 4 complete turns

$= 4 \times$ Circumference

$= 4 \times 154 = 616$ m.

So, the distance covered by the boy is 616 metres.

Practice Paper – 4

SECTION-A

1. (A) Negative of – 7 = – (– 7) = 7

= Positive number.

2. (C) Let the fraction be $\frac{x}{y}$.

Then its reciprocal $= \frac{y}{x}$

$\therefore \quad \frac{x}{y} \times \frac{y}{x} = \frac{xy}{xy} = 1.$

3. (B) 1.444... is not a rational number.

4. (A)

$$\begin{array}{r} 345.50 \\ -\,200.00 \\ \hline 145.50 \end{array}$$

5. (C) Mode = Observation having highest frequency

= 5

Range = 7 – 1 = 6.

6. (C) $5x + 3 = 18$ or $5x = 18 - 3 = 15$

$\therefore \quad x = \frac{15}{5} = 3.$

7. (C) ∵ 92° + 44° + 44° = 180° and two of angles are equal.

So, this set of angles forms an isosceles triangle.

8. (C) $8 \times 4^{x+1} = 2^9$

or $2^3 \times (2^2)^{x+1} = 2^9$

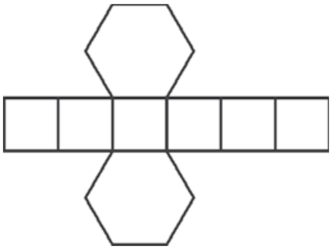
or $2^{3+2(x+1)} = 2^9$

or $2^{3+2x+2} = 2^9$

$\therefore$ $2x + 5 = 9$

or $x = \frac{9-5}{2} = \frac{4}{2} = 2.$

9. (C) This is the net for a hexagonal prism.



10. (A) $\frac{-5}{7} = \frac{x}{28} \Rightarrow 7x = -5 \times 28$

$\Rightarrow \quad x = \frac{-5 \times 28}{7} = -5 \times 4 = -20.$

SECTION-B

11. $2\pi r = 8.8$ or $2 \times \frac{22}{7} \times r = 8.8$

$\therefore \quad r = \frac{8.8 \times 7}{2 \times 22} = \frac{88}{10} \times \frac{7}{44}$

$= \frac{2 \times 7}{10} = \frac{7}{5} = 1.4$ m.

And $2r = 2 \times 1.4 = 2.8$ m.

Thus, diameter = 2.8 m

and radius = 1.4 m.

12. An exterior angle of a triangle is equal to the sum of two opposite interior angles

$\therefore \quad x + 60° = 130°$

or $x = 130° - 60°$

(Transposing 60° to RHS)

$= 70°.$

13. P = ₹ 184, R = 5%, T = 2 years

$$I = \frac{PRT}{100} = \frac{184 \times 5 \times 2}{100}$$

$$= \frac{184 \times 10}{10 \times 10} = \frac{184}{10} = 18.4.$$

Thus, the interest be ₹ 18.4.

14. Let R% of 1 km be 75 m.

$\therefore \quad \frac{R}{100} \times 1 \text{ km} = 75 \text{ m}$

or $\frac{R}{100} \times 1000 \text{ m} = 75 \text{ m}$

[1 km = 1000 m]

$\therefore \quad R = \frac{75 \times 100}{1000} = \frac{75}{10} = 7.5.$

Thus, the required percentage is 7.5%.

15. $0.4 : 0.6 = \frac{0.4}{0.6} = \frac{0.4 \times 10}{0.6 \times 10} = \frac{4}{6} = \frac{2}{3}$

$= 2 : 3.$

16. $x + 5x + 7 = 25$

or $6x + 7 = 25$

or $6x = 25 - 7 = 18$

or $\frac{6x}{6} = \frac{18}{6}$

(Dividing both sides by 6)

$\therefore \quad x = 3.$

17. (*i*) Degree of $x^2 + xyz + y^3$

= Degree of xyz or degree of y^3

= 3.

(*ii*) Degree of $m^2n^2 + mn^2 + 2$

= Degree of m^2n^2.

$= 2 + 2 = 4.$

18. First 5 natural numbers are:

1, 2, 3, 4, 5

Sum of these numbers

$= 1 + 2 + 3 + 4 + 5 = 15$

$\therefore$ Mean $= \frac{15}{5} = 3.$

SECTION-C

19. We know that

$$1 \text{ m} = 100 \text{ cm} \quad \text{or} \quad 100 \text{ cm} = 1 \text{ m}$$

Dividing both sides by 100, we have

$$1 \text{ cm} = \frac{1}{100} \text{ m}$$

$$\therefore \quad 7 \text{ cm} = 7 \times \frac{1}{100} \text{ m} = 0.07 \text{ m}$$

Further,

$$100 \text{ cm} = 1 \text{ m} = \frac{1}{1000} \text{ km}$$

$$(\because 1000 \text{ m} = 1 \text{ km})$$

$$\therefore \quad 1 \text{ cm} = \frac{\left(\frac{1}{1000}\right)}{100} \text{ km} = \frac{1}{100000} \text{ km}$$

$$\therefore \quad 7 \text{ cm} = \frac{7}{100000} \text{ km} = 0.00007 \text{ km}$$

Hence, 7 cm = 0.07 m

and 7 cm = 0.00007 km.

20. Arranging the given data in ascending order, we get

12, 12, 13, 14, 14, 14, 14, 16, 19

Mode:

Mode of the data = The observation occuring mostly.

= 14.

Median:

Number of observations = 9

This is an odd number.

$$\therefore \quad \text{Median} = \left(\frac{9+1}{2}\right)^{\text{th}} \text{ observation}$$

$$= 5^{\text{th}} \text{ observation}$$

$$= 14.$$

21.(*i*) $3p - 2 = 28$

or $3p = 28 + 2 = 30$

(Transposing – 2 to RHS)

$$\therefore \quad \frac{3p}{3} = \frac{30}{3}$$

(Dividing both sides by 3)

$\therefore \quad p = 10.$

(*ii*) $0 = 20 + 5(m - 5)$

or $0 = 20 + 5m - 25$ or $0 = 5m - 5$

or $5 = 5m$ (Transposing – 5 to LHS)

or $\frac{5}{5} = m$ or $1 = m$

i.e., $m = 1$.

22. The new solid (see figure) is a cuboid.

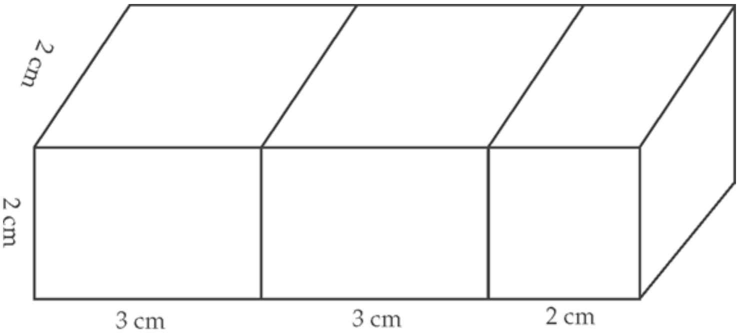
Length of the new solid,

$$l = 3 \text{ cm} + 3 \text{ cm} + 2 \text{ cm}$$

$$= 8 \text{ cm}.$$

Breadth of the new solid, b = 2 cm

Height of the new solid, h = 2 cm.



23.(*i*) $(12^2)^3 \div 12^3 = (12)^{2 \times 3} \div 12^3$

$= 12^6 \div 12^3$

$= (12)^{6-3} = 12^3.$

(*ii*) $(-2)^5 \div (-2)^3 = (-2)^{5-3}$

$= (-2)^2 = [(-1) \times 2]^2$

$= (-1)^2 \times 2^2 = 1 \times 2^2$

$= 2^2.$

24. Let the other number be *x*. Then

$$x + \frac{1}{14} = \frac{8}{7}$$

Subtracting $\frac{1}{14}$ from both sides, we get

$$x + \frac{1}{14} - \frac{1}{14} = \frac{8}{7} - \frac{1}{14}$$

or $x = \dfrac{2 \times 8 - 1}{14} = \dfrac{16 - 1}{14}$

$\therefore$ $x = \dfrac{15}{14}$ or $1\dfrac{1}{14}$.

Thus, the other number is $1\frac{1}{14}$.

25. P = ₹ 750, I = ₹ 225, R = 6%.

$$I = \frac{PRT}{100}$$

$\therefore$ $225 = \dfrac{750 \times 6 \times T}{100}$

$\therefore$ $T = \dfrac{225 \times 100}{750 \times 6} = \dfrac{225}{750} \times \dfrac{100}{6}$

$= \dfrac{3}{10} \times \dfrac{50}{3} = 5$ years

Thus, the required time is 5 years.

26. $(8 - 3y + 2y^2) - (y^2 + 6 - 4y)$

$= 8 - 3y + 2y^2 - y^2 - 6 + 4y$

$= (2y^2 - y^2) + (-3y + 4y) + (8 - 6)$

$= y^2 + y + 2.$

27. Let Salma's present age be *y* years.

$\therefore$ After 15 years, Salma's age

$= (y + 15)$ years.

Also, after 15 years, Salma's age

= 4 × Present age

$= 4y$ years.

$\therefore$ $4y = y + 15$

or $4y - y = 15$ or $3y = 15$

$\therefore$ $y = \dfrac{15}{3} = 5.$

Hence, Salma's present age is 5 years.

28. Let the two classes would get 5T and 7T toffees respectively.

$\therefore$ $5T + 7T = 84$

or $12T = 84$

Divide both sides by 12, we get

$$T = \frac{84}{12} = 7$$

$\therefore$ $5T = 5 \times 7 = 35$

And $7T = 7 \times 7 = 49$

Hence, the classes get 35 and 49 toffees respectively.

SECTION-D

29. Let the other number be *p*. Then

$$p \times \left(\frac{-26}{8}\right) = \frac{15}{8}$$

Multiplying both sides by $\frac{8}{-26}$, we get

$$p \times \left(\frac{-26}{8}\right) \times \left(\frac{8}{-26}\right) = \frac{15}{8} \times \frac{8}{-26}$$

or $p = \dfrac{15}{-26} = \dfrac{-15}{26}$

Thus, the other number is $\frac{-15}{26}$.

30. Add $x^2 - 3xy + y^2$ and $x^2 + 5xy - y^2$ as

$$\begin{array}{rrrr} & x^2 & -\ 3xy & +\ y^2 \\ + & x^2 & +\ 5xy & -\ y^2 \\ \hline & 2x^2 & +\ 2xy & \end{array}$$

Subtract $x^2 - 4xy + 4y^2$ from $2x^2 + 2xy$ as

$$\begin{array}{rrrr} & 2x^2 & +\ 2xy & \\ + & x^2 & +\ 4xy & +\ 4y^2 \\ \hline & x^2 & +\ 6xy & -\ 4y^2 \end{array}$$

31. (*i*) ABD is a triangle.

$\therefore$ Sum of its interior angles = 180°

i.e., $a + 100° + 40° = 180°$

or $a + 140° = 180°$

$\therefore$ $a = 180° - 140°$

(Transposing 140° to RHS)

$= 40°$

Similarly, for ΔBCD,

$b + 80° + 30° = 180°$

or $b + 110° = 180°$

$\therefore$ $b = 180° - 110° = 70°$

(Transposing 110° to RHS)

Thus, $a = 40°$ and $b = 70°$.

(*ii*) In ΔABC and ΔFED,

$\angle B = \angle E$ (Each right angle)

AC = DF (Hypotenuse)

BC = DE (Sides)

So, by RHS congruence criterion,

$\Delta ABC \cong \Delta FED$.

32. (*i*) Let the whole quantity be x. Then

5% of $x = 800$ or $\frac{5}{100} \times x = 800$

$\therefore$ $x = \frac{800 \times 100}{5}$

$= 160 \times 100 = 16000$

Thus, the whole quantity is 16000.

(*ii*) Total number of students = 50

Number of girls = 40% of 50

$= \frac{40}{100} \times 50$

$= 4 \times 5 = 20.$

Number of boys

= Total number of students – Number of girls

$= 50 - 20 = 30.$

Thus, the number of boys is 30.

(*iii*) Total number of students = 40

Number of students who like playing football = 25% of 40 = $\frac{25}{100} \times 40$

$= \frac{1000}{100} = 10$

$\therefore$ Number of students who do not like playing football = 40 – 10 = 30.

Thus, 30 students do not like playing football.

33. (*i*) Subtract $\frac{11}{15}$ from $\frac{-13}{20}$.

Let us first find LCM of 15 and 20.

$\therefore$ LCM (15, 20)

$= 2 \times 2 \times 3 \times 5 = 60$

2	15, 20
2	15, 10
3	15, 5
5	5, 5
	1, 1

$\therefore$ $\frac{11}{15} = \frac{11 \times 4}{15 \times 4} = \frac{44}{60}$ $\left(\because \frac{60}{15} = 4\right)$

and $\frac{-13}{20} = \frac{-13 \times 3}{20 \times 3}$ $\left(\because \frac{60}{20} = 3\right)$

$= \frac{-39}{60}$

Now, $\frac{-13}{20} - \frac{11}{15} = \frac{-39}{60} - \frac{44}{60}$

$= -\left(\frac{39}{60} + \frac{44}{60}\right)$

$= -\left(\frac{39 + 44}{60}\right)$

$= \frac{-83}{60}.$

(*ii*) $2\frac{3}{14} = \frac{2\times14+3}{14} = \frac{28+3}{14} = \frac{31}{14}$

$\frac{-3}{-7} = \frac{3}{7}$

Add $\frac{31}{14}$ and $\frac{3}{7}$.

Let us find LCM of 7 and 14.

∴ LCM (7, 14)

$= 2 \times 7 = 14$

$$\begin{array}{c|c} 2 & 7, 14 \\ \hline 7 & 7, 7 \\ \hline & 1, 1 \end{array}$$

$\therefore \quad \frac{3}{7} = \frac{3\times2}{7\times2} = \frac{6}{14}$

$\left(\because \frac{14}{7} = 2\right)$

Now, $2\frac{3}{14} + \frac{-3}{-7} = \frac{31}{14} + \frac{6}{14}$

$= \frac{31+6}{14} = \frac{37}{14}$

$= 2\frac{9}{14}$.

34. (*i*) **RECTANGLE:**

Area = 40 cm^2, base = 5 cm

We know that:

Area of a rectangle = Base × Height

∴ 40 = 5 × Height

$\therefore \quad \text{Height} = \frac{40}{5} = 8$ cm.

TRIANGLE:

Base = b = 5 cm

Height = h = height of the rectangle

= 8 cm.

$\therefore$ Area of the triangle $= \frac{1}{2}bh$

$= \frac{1}{2} \times 5 \times 8$

$= 5 \times 4$

$= 20$ cm^2.

Thus, area of the triangle is 20 cm^2.

(*ii*) Length of rectangle (l) = 24 m

Breadth of rectangle (b) = 5 m

∴ Area of rectangle = $l \times b$

$= 24 \times 5$ m^2

Side of square = 2 m

∴ Area of square = $(\text{side})^2$

$= 2 \times 2 = 4$ m^2

Now, number of squares

$= \frac{\text{Area of the rectangle}}{\text{Area of a square}}$

$= \frac{24\times5}{4} = 6 \times 5 = 30.$

Thus, 30 squares can be cut from the flower bed.

Practice Paper –5

SECTION-A

1. (C) 7 is a positive integer

$7 \times (-1) = -7$ = Negative integer

2. (B) $3\frac{3}{8} = \frac{3\times8+3}{8} = \frac{27}{8}$

∴ Multiplicative inverse $= \frac{1}{\left(\frac{27}{8}\right)} = \frac{8}{27}$.

3. (A) $\because -1 > -3 > -9$

$\therefore \quad \frac{-1}{17} > \frac{-3}{17} > \frac{-9}{17}$

∴ Required number $\frac{-9}{17} - \left(\frac{-1}{17}\right)$

$= \frac{-9}{17} + \frac{1}{17}$

$= \frac{-8}{17}$.

4. (B) $0.07 \times 7.08 = \frac{0.07\times100}{100} \times \frac{7.08\times100}{100}$

$$= \frac{7}{100} \times \frac{708}{100} = \frac{4956}{10000}$$

$$= 0.4956.$$

5. (C) Mean

$$= \frac{1+2+3+4+5+6+7+8+9+10}{10}$$

$$= \frac{55}{10} = 5.5.$$

6. (C) Let the unknown number be x. Then,

$$5 + \frac{3}{2} \text{ of } x = 20 \text{ or } 5 + \frac{3}{2}x = 20$$

$$\text{or } 10 + 3x = 40 \quad \text{or } x = \frac{30}{3}$$

$$\therefore\ x = 10.$$

7. (A) An exterior angle = Sum of two opposite interior angles

$$\therefore \quad \angle 1 = \angle 2 + \angle 3.$$

8. (A)

5	67375
5	13475
5	2695
7	539
7	77
11	11
	1

$$\therefore \quad 67375 = 5^3 \times 7^2 \times 11$$

$$= 5^3 \times (-7)^2 \times 11.$$

9. (D) A sphere has no vertex.

10. (A) The integer 7 can be re-written as $\frac{7}{1}$ which is a rational number.

SECTION-B

11. (*i*) Product of 6 negative integers = Positive integer.

Positive integer × Positive integer = Positive integer

Thus., the product of 6 negative integers and 1 positive integer will have positive sign.

(*ii*) Product of 19 negative integers = Negative integer

Product of 3 positive integers = Positive integer

Product of 1 negative integer and 1 positive integer = Negative integer

Thus, the product of 19 negative integers and 3 positive integers will have negative sign.

12. $l = 8$ cm,

$$b = 3\frac{1}{2} \text{ cm} = \frac{6+1}{2} \text{ cm} = \frac{7}{2} \text{ cm}$$

$$\text{Area of the rectangle} = l \times b = 8 \times \frac{7}{2}$$

$$= \frac{56}{2} = 28 \text{ cm}^2.$$

13. (*i*) $\because \quad 1 \text{ km} = 1000 \text{ m}$

$$\therefore \quad 8 \text{ km} = 8 \times 1000 \text{ m} = 8000 \text{ m}$$

$$\therefore\ 8 \text{ km } 35 \text{ m} = 8000 \text{ m} + 35 \text{ m}$$

$$= 8035 \text{ m}.$$

(*ii*) $\because \quad 1000 \text{ mm} = 1 \text{ m}$

$$\therefore \quad 1 \text{ mm} = \frac{1}{1000} \text{ m}$$

$$\therefore \quad 4509 \text{ mm} = \frac{1}{1000} \times 4509$$

$$= 4.509 \text{ m}.$$

14. (*i*)

$$\frac{-80}{100} = \frac{80}{-100}$$

$$= \frac{4 \times 20}{-5 \times 20} = \frac{4}{-5}.$$

(*ii*)

$$-8\frac{2}{11} = -\left(8\frac{2}{11}\right) = -\left(\frac{8 \times 11 + 2}{11}\right)$$

$$= -\frac{88+2}{11} = -\frac{90}{11} = \frac{-90}{11}.$$

15.(*i*) $\frac{1}{2} - \frac{1}{4} = \frac{1\times 2 - 1\times 1}{4} = \frac{2-1}{4} = \frac{1}{4}$

Reciprocal of $\left(\frac{1}{2} - \frac{1}{4}\right)$

$= \text{Reciprocal of } \frac{1}{4} = 4.$

(*ii*) $\frac{7}{8} \times \frac{-3}{20} = \frac{7\times(-3)}{8\times 20} = \frac{-21}{160}$

Reciprocal of $\left(\frac{7}{8} \times \frac{-3}{20}\right)$

$= \text{Reciprocal of } \frac{-21}{160}$

$= \frac{160}{-21} = \frac{-160}{21}.$

16.(*i*) $(-2)^4 \times (-2)^{13} = (-2)^{4+13}$

$(\because a^m \times a^n = a^{m+n})$

$= (-2)^{17}.$

(*ii*) $\left[\left(\frac{-2}{3}\right)^2 \times \left(-\frac{2}{5}\right)^4\right]^3$

$= \left(\frac{-2}{3}\right)^{2\times 3} \times \left(\frac{-2}{5}\right)^{4\times 3}$

$= \left(\frac{-2}{3}\right)^6 \times \left(\frac{-2}{5}\right)^{12}$

$= \frac{(-2)^6}{3^6} \times \frac{(-2)^{12}}{5^{12}}$

$= \frac{(-2)^{18}}{3^6 \times 5^{12}}$

$= 2^{18} \times 3^{-6} \times 5^{-12}.$

17. Substituting $a = -4$ in $7a^2 + 7a - 5$, we get

$7a^2 + 7a - 5 = 7(-4)^2 + 7(-4) - 5$

$= 7 \times 16 - 28 - 5$

$= 112 - 33 = 79.$

18. $4t + 5 = t + 15$

Transposing 5 to RHS and *t* to LHS, we get

$4t - t = 15 - 5$

or $3t = 10$

Dividing both sides by 3, we get

$\frac{3t}{3} = \frac{10}{3}$ or $t = \frac{10}{3} = 3\frac{1}{3}.$

SECTION-C

19. Let the numbers be $7x$ and $13x$.

Their sum $= 7x + 13x = 20x$

According to the given conditions, we have

$20x = 980$

or $x = \frac{980}{20} = 49$

(Dividing both sides by 20)

$\therefore$ $7x = 7 \times 49 = 343$

and $13x = 13 \times 49 = 637$

Hence, the required numbers are 343 and 637.

20. Capacity of 1 box

$= \frac{\text{Capacity of 45 boxes}}{45}$

$= \frac{2835}{45} = \frac{315}{5}$

= 63 laddoos

$\therefore$ Required number of boxes to fill 6615 laddoos

$= \frac{6615}{\text{Capacity of 1 box}}$

$= \frac{6615}{63} = \frac{735}{7}$

= 105

Thus, 105 boxes will be required.

21.(*i*) Number of days in the month of April = 30

∴ 40% of the days in the month of April = 40% of 30

$$= \frac{40}{100} \times 30 = 4 \times 3$$
$$= 12 \text{ days.}$$

(*ii*) $30\% \text{ of } 800 = \frac{30}{100} \times 800 = 30 \times 8$
$$= 240.$$

Decreasing 240 from 800, we get

$800 - 240 = 560.$

22. $\text{CP} = ₹\ 2005$

$\text{Profit} = 10\% \text{ of CP}$

$$= \frac{10}{100} \times 2005 = ₹\ 200.5$$

Now, SP = CP + Profit

$$= ₹\ 2005 + ₹\ 200.5 = ₹\ 2205.50.$$

OR

Let $\text{SP} = ₹\ x$

$\text{CP} = ₹\ 2005, \text{ Profit\%} = 10\%.$

$\text{Profit} = \text{SP} - \text{CP} = x - 2005$

We have, profit per cent

$$= \frac{\text{Profit}}{\text{CP}} \times 100$$

$$\therefore \quad 10\% = \frac{x \times 2005}{2005} \times 100$$

$$\therefore \quad \frac{10 \times 2005}{100} = x - 2005$$

or $200.5 = x - 2005$

or $x = 2005 + 200.5$

$= 2205.50$

Therefore, the selling price is ₹ 2205.50.

23. $\text{P} = ₹\ 250,$

$\text{A} = 2 \times \text{P} = 2 \times 250 = ₹\ 500,$

$\therefore \quad \text{I} = \text{A} - \text{P} = 500 - 250 = ₹\ 250$

$\text{R} = 8\%$

We know that

$$\text{I} = \frac{\text{PRT}}{100}$$

$$\therefore \quad \text{T} = \frac{\text{I} \times 100}{\text{P} \times \text{R}} = \frac{250 \times 100}{250 \times 8}$$

$$= \frac{100}{8} = 12.5 \text{ years.}$$

Thus, the required number of years is 12.5.

24.(*i*) Let the given angle be 45° + x

Here, x is greater than zero and less than 45°.

Then its complement

$= 90° - (45° + x)$

$= 90° - 45° - x$

$= 45° - x$

which is less than 45°.

Thus, the required complement angle is less than 45°.

(*ii*) The angles shown in the figure form a linear pair of angles.

$\therefore \quad 2x + 3x = 180°$

or $5x = 180°$

or $$\frac{5x}{5} = \frac{180°}{5}$$

(Dividing both sides by 5)

$\therefore \quad x = 36°.$

25. **Angle sum property of a triangle**: The total measures of angles of a triangle is 180°

(*i*) Let the third angle be x. Then

$x + 40° + 80° = 180°$

or $x + 120° = 180°$

$\therefore \quad x = 180° - 120° = 60°$

Thus, the measure of third angle is 60°.

(*ii*) Let the third angle be y. Then

$y + 25° + 114° = 180°$

or $y + 139° = 180°$

$\therefore \quad y = 180° - 139° = 41°$

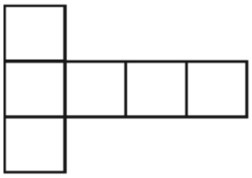
Thus, the measure of the third angle is 41°.

26. (*i*) The order of rotational symmetry of a square is 4.

(*ii*)

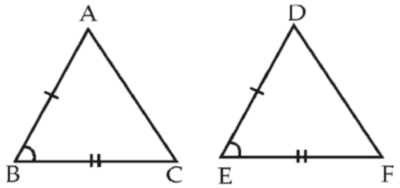
There is 1 line of symmetry for letter B.

(*iii*)



Net for a cube

27.



In Δ ABC and Δ DEF,

$AB = DE$ (Given)

$\angle B = \angle E$ (Given)

$BC = EF$ (Given)

So, by SAS congruence condition, we have

$\Delta ABC \cong \Delta DEF$.

28. Breadth $b = 90$ cm,

Perimeter = 400 cm, Length l = ?

Perimeter of a rectangle = $2(l + b)$

$\therefore \quad 400 = 2(l + 90)$

or $\quad 400 = 2l + 180$

$\therefore \quad 400 - 180 = 2l$

or $\quad \dfrac{220}{2} = l$

or $\quad l = 110$

Thus, the length of the rectangle is 110 cm.

SECTION -D

29. In order to construct a bar graph, you have to go to the following steps:

Step I. Take a graph paper and draw a pair of perpendicular lines OX and OY. Call OX as the horizontal axis and OY as the vertical axis.

Step II. Along OX, mark the names of the given students and choose the equal width of the bars and uniform gap between them.

Along OY, mark the marks obtained by the students.

Step III. Choose a suitable scale on *y*-axis to determine heights of the bars. You can choose.

1 big division = 50 marks.

Step IV. Calculation for heights of various bars:

Height of the bar for Romi

$$= \frac{450}{50} = 9 \text{ big divisions}$$

Height of the bar for Neetu

$$= \frac{300}{50} = 6 \text{ big divisions}$$

Height of the bar for Ria

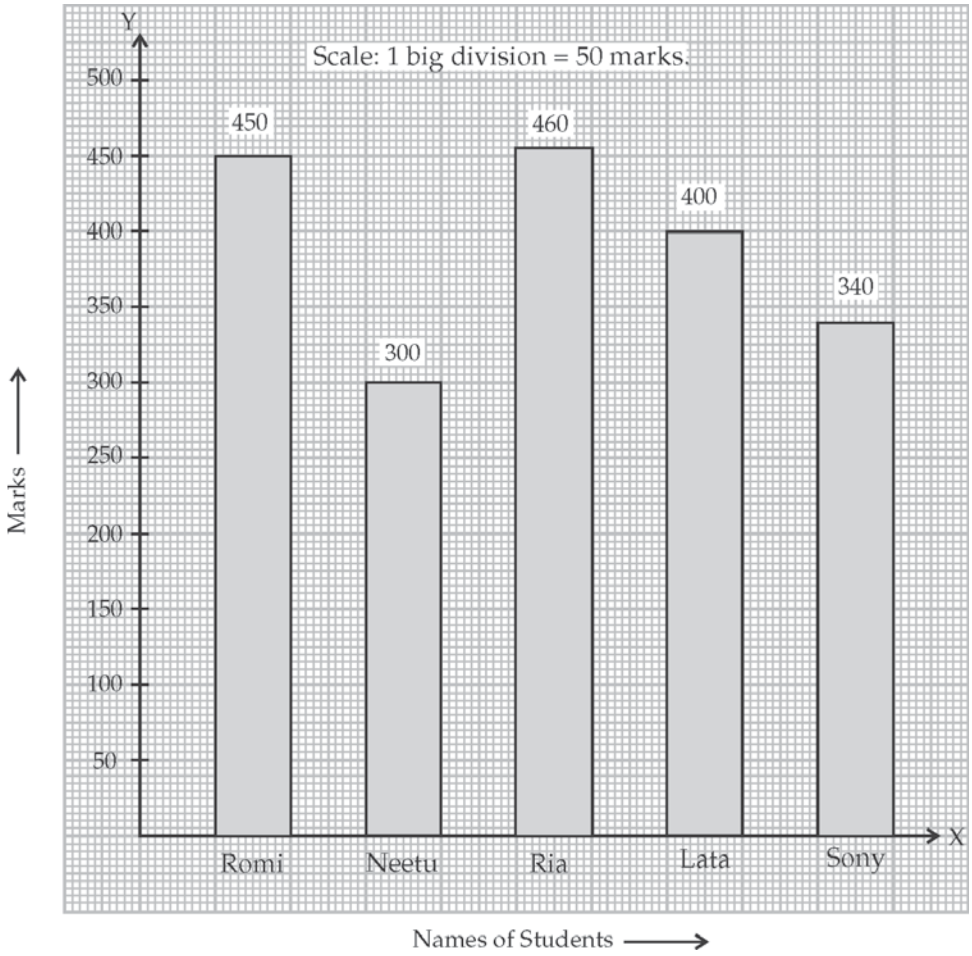
$$= \frac{460}{50} = 9.2 \text{ big divisions}$$

Height of the bar for Lata

$$= \frac{400}{50} = 8 \text{ big divisions}$$

Height of the bar for Sony

$$= \frac{340}{50} = 6.8 \text{ big divisions}$$



Step V. Draw the bars with heights obtained in the step IV and write the corresponding marks of the student on the top of each bar.

30.(*i*) One-fifth of $y = \frac{y}{5}$

Subtracting 7 from $\frac{y}{5}$, we get

$$\frac{y}{5} - 7$$

According to the given condition,

$$\frac{y}{5} - 7 = 7$$

This is the required equation.

Transposing – 7 to RHS, we get

$$\frac{y}{5} = 7 + 7$$

or $\frac{y}{5} = 14$

Multiplying both sides by 5, we get

$$\frac{y}{5} \times 5 = 14 \times 5 \text{ or } y = 70.$$

(*ii*) One-fourth of $x = \frac{x}{4}$

Adding 4 to $\frac{x}{4}$, we get $\frac{x}{4} + 4$.

According to the given condition.

$$\frac{x}{4} + 4 = 30$$

This is the required equation.

Transposing 4 to RHS, we get

$$\frac{x}{4} = 30 - 4 \text{ or } \frac{x}{4} = 26.$$

Multiplying both sides by 4, we get

$$x = 104.$$

31.(*i*) $\frac{-8}{-13} + \frac{31}{-39} + \frac{-11}{26} + 3$

$$= \frac{8}{13} + \frac{3}{1} - \left(\frac{31}{39} + \frac{11}{26}\right)$$

$$= \frac{8 + 3 \times 13}{13} - \frac{2 \times 31 + 11 \times 3}{78}$$

$$= \frac{8 + 39}{13} - \frac{62 + 33}{78} = \frac{47}{13} - \frac{95}{78}$$

$$= \frac{47 \times 6 - 95 \times 1}{78} = \frac{282 - 95}{78}$$

$$= \frac{187}{78} = 2\frac{31}{78}.$$

(*ii*) $\frac{-12}{5} + \frac{31}{10} + \frac{11}{-15} + \frac{-7}{-20}$

$$= \left(\frac{31}{10} + \frac{7}{20}\right) - \left(\frac{12}{5} + \frac{11}{15}\right)$$

$$= \frac{31 \times 2 + 7 \times 1}{20} - \frac{12 \times 3 + 11 \times 1}{15}$$

$$= \frac{62 + 7}{20} - \frac{36 + 11}{15} = \frac{69}{20} - \frac{47}{15}$$

$$= \frac{69 \times 3 - 47 \times 4}{60} = \frac{207 - 188}{60} = \frac{19}{60}.$$

32.(*i*) Side of the given square = 22 cm.

Area of the square = Side × Side

$= 22 \times 22 = 484 \text{ cm}^2$

Radius of the given circle, $r = 3$ cm

Area of the circle $= \pi r^2$

$$= \frac{22}{7} \times 3 \times 3$$

$$= \frac{198}{7} \text{ cm}^2$$

Area of the shaded portion

= Area of the square

– Area of the circle

$$= 484 - \frac{198}{7} = \frac{484 \times 7 - 198}{7}$$

$$= \frac{3388 - 198}{7} = \frac{3190}{7}.$$

$= 455.71 \text{ cm}^2$.

(*ii*) Area of the big rectangle

= Length × Breadth

$= 25 \times 20 = 500 \text{ m}^2$.

Area of the small rectangle

= Length × Breadth

$= 10 \times 5 = 50 \text{ m}^2$.

Area of the shaded portion

= Area of the big rectangle

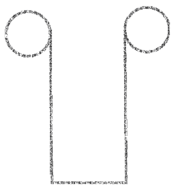
– Area of the small rectangle.

$= 500 - 50 = 450 \text{ m}^2$.

33.(*i*)

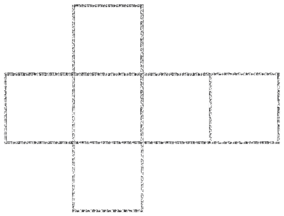
Net for a cone.

(*ii*)



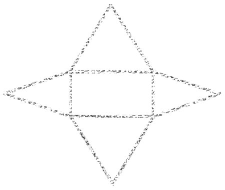
Net for a cylinder

(*iii*)



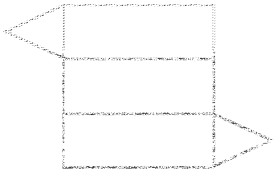
Net for a cube

(*iv*)



Net for a rectangular pyramid

(*v*)



Net for a triangular prism

34. Radius of circle, $r = 21$ cm

Perimeter of the square

$$= \text{circumference of the circle}$$

$$= 2\pi r$$

$$= 2 \times \frac{22}{7} \times 21 = 44 \times 3 = 132 \text{ cm}$$

Let side of the square $= a$.

Then,

$$4a = 132$$

$$\therefore \quad a = \frac{132}{4} = 33 \text{ cm}$$

Area of the square $= a^2$

$$= 33 \times 33$$

$$= 1089 \text{ cm}^2.$$

❑ ❑