ANSWERS

EXERCISE 1.1

1. (a) Lahulspiti: –8°C, Srinagar: –2°C, Shimla: 5°C, Ooty: 14°C, Bangalore: 22°C
    (b) 30°C   (c) 6°C   (d) Yes; No   **2.** 35

3. –7°C; –3°C   **4.** 6200 m   **5.** By a positive integer; Rs 358

6. By a negative integer; – 10.   **7.** (ii) is the magic square

9. (a) <   (b) <   (c) >   (d) s<
    (e) >

10. (i) 11 jumps   (ii) 5 jumps   (iii) (a) –3 + 2 –3 + 2 – 3 + 2 – 3 + 2 –3 + 2 –3 = – 8
    (b) 4 – 2 + 4 – 2 + 4 = 8
    8 in (b) represents going up 8 steps.

EXERCISE 1.2

1. One such pair could be:
    (a) –10, 3   (b) – 6, 4; (– 6 – 4 = –10)   (c) –3, 3

2. One such pair could be:
    (a) –2, –10; [–2 – (–10) = 8]   (b) – 6, 1
    (c) –1, 2; (–1 – 2 = –3)

3. Scores of both the teams are same, i.e., –30; Yes

4. (i) –5   (ii) 0   (iii) –17   (iv) –7
    (v) –3

EXERCISE 1.3

1. (a) –3   (b) –225   (c) 630   (d) 316   (e) 0
    (f) 1320   (g) 162   (h) –360   (i) –24   (j) 36

3. (i) – a (ii) (a) 22   (b) –37   (c) 0

4. –1 × 5 = –5, –1 × 4 = – 4 = – 5 + 1, – 1 × 3 = – 3 = – 4 + 1,
    –1 × 2 = – 2 = – 3 + 1, – 1 × 1 = – 1 = – 2 + 1, – 1 × 0 = 0 = – 1 + 1 so, – 1 × (–1) = 0 + 1 = 1.

5. (a) 480   (b) – 53000   (c) – 15000   (d) – 4182
    (e) – 62500   (f) 336   (g) 493   (h) 1140

6. – 10°C   **7.** (i) 8   (ii) 15   (iii) 0

8. (a) Loss of Rs 1000   (b) 4000 bags

9. (a) – 9   (b) – 7   (c) 7   (d) – 11

EXERCISE 1.4

1. (a) –3   (b) –10   (c) 4   (d) –1

    (e) –13   (f) 0   (g) 1   (h) –1   (i) 1

3. (a) 1   (b) 75   (c) – 206   (d) –1

    (e) – 87   (f) – 48   (g) –10   (h) –12

4. (–6, 2), (–12, 4), (12, – 4), (9, –3), (–9, 3)   (There could be many such pairs)
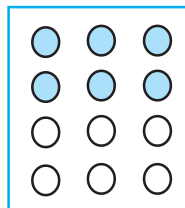
5. 9 p.m.; – 14°C   **6.** (i) 8   (ii) 13   **7.** 1 hour

EXERCISE 2.1

1. (i) $\dfrac{7}{5}$ (ii) $\dfrac{39}{8}\left(=4\dfrac{7}{8}\right)$ (iii) $\dfrac{31}{35}$ (iv) $\dfrac{91}{165}$

    (v) $\dfrac{13}{5}\left(=2\dfrac{3}{5}\right)$ (vi) $\dfrac{37}{6}\left(=6\dfrac{1}{6}\right)$ (vii) $\dfrac{39}{8}\left(=4\dfrac{7}{8}\right)$

2. (i) $\dfrac{2}{3},\dfrac{8}{21},\dfrac{2}{9}$ (ii) $\dfrac{7}{10},\dfrac{3}{7},\dfrac{1}{5}$ **3.** Yes   **4.** $\dfrac{139}{3}\left(=46\dfrac{1}{3}\right)$cm

5. (i) $8\dfrac{17}{20}$cm   (ii) $7\dfrac{5}{6}$cm; Perimeter of ΔABE is greater.

6. $\dfrac{3}{10}$cm   **7.** $\dfrac{2}{5}$; Ritu; $\dfrac{1}{5}$ **8.** Vaibhav; by $\dfrac{1}{6}$ of an hour.

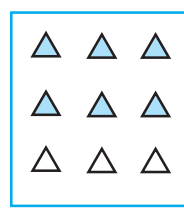## EXERCISE 2.2

1. (i) (d)   (ii) (b)   (iii) (a)   (iv) (c)

2. (i) (c)   (ii) (a)   (iii) (b)

3. (i) $4\dfrac{1}{5}$ (ii) $1\dfrac{1}{3}$ (iii) $1\dfrac{5}{7}$ (iv) $1\dfrac{1}{9}$ (v) $2\dfrac{2}{3}$

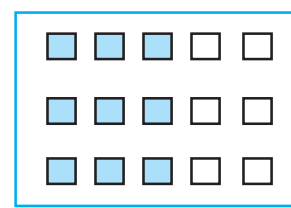   (vi) 15   (vii) $6\dfrac{2}{7}$ (viii) 16   (ix) $4\dfrac{1}{3}$ (x) 9

4. One way of doing this is:

             (i)   (ii)   (iii)

5. (a) (i) 12 (ii) 23   (b) (i) 12 (ii) 18   (c) (i) 12 (ii) 27   (d)(i) 16 (ii) 28

6. (a) $15\dfrac{3}{5}$ (b) $33\dfrac{3}{4}$ (c) $15\dfrac{3}{4}$ (d) $25\dfrac{1}{3}$

     (e) $19\dfrac{1}{2}$ (f) $27\dfrac{1}{5}$

7. (a) (i) $1\dfrac{3}{8}$ (ii) $2\dfrac{1}{9}$ (b) (i) $2\dfrac{19}{48}$ (ii) $6\dfrac{1}{24}$ **8.** (i) 2 litres (ii) $\dfrac{3}{5}$

EXERCISE 2.3

1. (i) (a) $\dfrac{1}{16}$ (b) $\dfrac{3}{20}$ (c) $\dfrac{1}{3}$ (ii) (a) $\dfrac{2}{63}$ (b) $\dfrac{6}{35}$ (c) $\dfrac{3}{70}$

2. (i) $1\dfrac{7}{9}$ (ii) $\dfrac{2}{9}$ (iii) $\dfrac{9}{16}$ (iv) $1\dfrac{2}{25}$

     (v) $\dfrac{5}{8}$ (vi) $1\dfrac{13}{20}$ (vii) $1\dfrac{13}{35}$

3. (i) $2\dfrac{1}{10}$ (ii) $4\dfrac{44}{45}$ (iii) 8 (iv) $2\dfrac{1}{42}$ (v) $1\dfrac{33}{35}$ (vi) $7\dfrac{4}{5}$ (vii) $2\dfrac{1}{7}$

4. (i) $\dfrac{3}{5}$ of $\dfrac{5}{8}$ (ii) $\dfrac{1}{2}$ of $\dfrac{6}{7}$ **5.** $2\dfrac{1}{4}$ m   **6.** $10\dfrac{1}{2}$ hours   **7.** 44 km

8. (a) (i) $\dfrac{5}{10}$ (ii) $\dfrac{1}{2}$ (b) (i) $\dfrac{8}{15}$ (ii) $\dfrac{8}{15}$

EXERCISE 2.4

1. (i) 16   (ii) $\dfrac{84}{5}$ (iii) $\dfrac{24}{7}$ (iv) $\dfrac{3}{2}$ (v) $\dfrac{9}{7}$ (vi) $\dfrac{7}{5}$

2. (i) $\dfrac{7}{3}$ (improper fraction)   (ii) $\dfrac{8}{5}$ (improper fraction)   (iii) $\dfrac{7}{9}$ (proper fraction)

     (iv) $\dfrac{5}{6}$ (proper fraction)   (v) $\dfrac{7}{12}$ (proper fraction)   (vi) 8(whole number)

     (vii) 11 (whole number)

3. (i) $\dfrac{7}{6}$ (ii) $\dfrac{4}{45}$ (iii) $\dfrac{6}{91}$ (iv) $\dfrac{13}{9}$ (v) $\dfrac{7}{8}$ (vi) $\dfrac{31}{49}$

4. (i) $\dfrac{4}{5}$ (ii) $\dfrac{2}{3}$ (iii) $\dfrac{3}{8}$ (iv) $\dfrac{35}{9}$ (v) $\dfrac{21}{16}$ (vi) $\dfrac{4}{15}$

     (vii) $\dfrac{48}{25}$ (viii) $\dfrac{11}{6}$

Exercise 2.5

1. (i) 0.5 　(ii) 0.7 　(iii) 7 　(iv) 1.49 　(v) 2.30 　(vi) 0.88

2. (i) ₹ 0.07 　(ii) ₹ 7.07 　(iii) ₹ 77.77 　(iv) ₹ 0.50 　(v) ₹ 2.35

3. (i) 0.05 m, 0.00005 km 　(ii) 3.5 cm, 0.035 m, 0.000035 km

4. (i) 0.2 kg 　(ii) 3.470 kg 　(iii) 4.008 kg

5. (i) $2 \times 10 + 0 \times 1 + 0 \times \dfrac{1}{10} + 3 \times \dfrac{1}{100}$ 　(ii) $2 \times 1 + 0 \times \dfrac{1}{10} + 3 \times \dfrac{1}{100}$

(iii) $2 \times 100 + 0 \times 10 + 0 \times 1 + 0 \times \dfrac{1}{10} + 3 \times \dfrac{1}{100}$

(iv) $2 \times 1 + 0 \times \dfrac{1}{10} + 3 \times \dfrac{1}{100} + 4 \times \dfrac{1}{1000}$

6. (i) Ones 　(ii) Tens 　(iii) Tenths 　(iv) Hundredths 　(v) Thousandths

7. Ayub travelled more by 0.9 km or 900 m 　**8.** Sarala bought more fruits 　**9.** 14.6 km

Exercise 2.6

1. (i) 1.2 　(ii) 36.8 　(iii) 13.55 　(iv) 80.4 　(v) 0.35 　(vi) 844.08
(vii) 1.72

2. 17.1 cm^2

3. (i) 13 　(ii) 368 　(iii) 1537 　(iv) 1680.7 　(v) 3110 　(vi) 15610
(vii) 362 　(viii) 4307 　(ix) 5 　(x) 0.8 　(xi) 90 　(xii) 30

4. 553 km 　**5.** (i) 0.75 　(ii) 5.17 　(iii) 63.36 　(iv) 4.03 　(v) 0.025
(vi) 1.68 　(vii) 0.0214 　(viii) 10.5525 　(ix) 1.0101 　(x) 110.011

Exercise 2.7

1. (i) 0.2 　(ii) 0.07 　(iii) 0.62 　(iv) 10.9 　(v) 162.8 　(vi) 2.07
(vii) 0.99 　(viii) 0.16

2. (i) 0.48 　(ii) 5.25 　(iii) 0.07 　(iv) 3.31 　(v) 27.223 　(vi) 0.056
(vii) 0.397

3. (i) 0.027 　(ii) 0.003 　(iii) 0.0078 　(iv) 4.326 　(v) 0.236 　(vi) 0.9853

4. (i) 0.0079 　(ii) 0.0263 　(iii) 0.03853 　(iv) 0.1289 　(v) 0.0005

5. (i) 2 　(ii) 180 　(iii) 6.5 　(iv) 44.2 　(v) 2 　(vi) 31
(vii) 510 　(viii) 27 　(ix) 2.1 　**6.** 18 km

Exercise 3.1

2.

Marks	Tally Marks	Frequency
1	|	1
2	||	2

3	|	1
4	|||	3
5	||||	5
6	||||	4
7	||	2
8	|	1
9	|	1

(i) 9   (ii) 1   (iii) 8   (iv) 5

3. 2   **4.** 50   **5.** (i) 12.5 (ii) 3 (iii) $\dfrac{0+8+6+4}{4} = \dfrac{18}{4}$ or $\dfrac{9}{2}$ (iv) A

6. (i) Highest marks = 95, Lowest marks = 39   (ii) 56 (iii) 73   **7.** 2058

8. (i) 20.5 (ii) 5.9 (iii) 5   **9.** (i) 151 cm (ii) 128 cm (iii) 23 cm (iv) 141.4 cm (v) 5

Exercise 3.2

1. Mode = 20, Median = 20, Yes.   **2.** Mean = 39, Mode = 15, Median = 15, No.

3. (i) Mode = 38, 43; Median = 40   (ii) Yes, there are 2 modes.

4. Mode = 14, Median = 14

5. (i) T   (ii) F   (iii) T   (iv) F

Exercise 3.3

1. (a) Cat   (b) 8

4. (i) Maths   (ii) S. Science   (iii) Hindi

5. (ii) Cricket   (iii) Watching sports

6. (i) Jammu   (ii) Jammu, Bangalore

   (iii) Bangalore and Jaipur or Bangalore and Ahmedabad   (iv) Mumbai

Exercise 3.4

1. (i) Certain to happen   (ii) Can happen but not certain   (iii) Imposible

   (iv) Can happen but not certain (v) Can happen but not certain

2. (i) $\dfrac{1}{6}$ (ii) $\dfrac{1}{6}$ **3.** $\dfrac{1}{2}$

Exercise 4.1

1. (i) No.   (ii) No   (iii) Yes   (iv) No   (v) Yes   (vi) No

   (vii) Yes   (viii) No   (ix) No   (x) No   (xi) Yes

2. (a) No   (b) No   (c) Yes   (d) No   (e) No   (f) No

3. (i) $p = 3$ (ii) $m = 6$

4. (i) $x + 4 = 9$ (ii) $y - 2 = 8$ (iii) $10a = 70$ (iv) $\dfrac{b}{5} = 6$

(v) $\dfrac{3t}{4} = 15$ (vi) $7m + 7 = 77$ (vii) $\dfrac{x}{4} - 4 = 4$ (viii) $6y - 6 = 60$

(ix) $\dfrac{z}{3} + 3 = 30$

5. (i) The sum of p and 4 is 15   (ii) 7 subtracted from m is 3

(iii) Twice a number m is 7   (iv) One-fifth of a number m is 3

(v) Three-fifth of a number m is 6   (vi) Three times a number p when added to 4 gives 25

(vii) 2 subtracted from four times a number p is 18

(viii) Add 2 to half of a number p to get 8

6. (i) $5m + 7 = 37$ (ii) $3y + 4 = 49$ (iii) $2l + 7 = 87$ (iv) $4b = 180°$

Exercise 4.2

1. (a) Add 1 to both sides; $x = 1$ (b) Subtract 1 from both sides; $x = -1$

(c) Add 1 to both sides; $x = 6$ (d) Subtract 6 from both sides; $x = -4$

(e) Add 4 to both sides; $y = -3$ (f) Add 4 to both sides; $y = 8$

(g) Subtract 4 from both sides; $y = 0$ (h) Subtract 4 from both sides; $y = -8$

2. (a) Divide both sides by 3; $l = 14$ (b) Multiply both sides by 2; $b = 12$

(c) Multiply both sides by 7; $p = 28$ (d) Divide both sides by 4; $x = \dfrac{25}{4}$

(e) Divide both sides by 8; $y = \dfrac{36}{8}$ (f) Multiply both sides by 3; $z = \dfrac{15}{4}$

(g) Multiply both sides by 5; $a = \dfrac{7}{3}$ (h) Divide both sides by 20; $t = \dfrac{1}{2}$

3. (a) Step 1: Add 2 to both sides   (b) Step 1: Subtract 7 from both sides

Step 2: Divide both sides by 3; $n = 16$ Step 2: Divide both sides by 5; $m = 2$

(c) Step 1: Multiply both sides by 3   (d) Step 1: Multiply both sides 10

Step 2: Divide both sides by 20; $p = 6$ Step 2: Divide both sides by 3; $p = 20$

4. (a) $p = 10$ (b) $p = 9$ (c) $p = 20$ (d) $p = -15$ (e) $p = 8$ (f) $s = -3$

(g) $s = -4$ (h) $s = 0$ (i) $q = 3$ (j) $q = 3$ (k) $q = -3$ (l) $q = 3$

EXERCISE 4.3

1. (a) $y = 8$ (b) $t = \dfrac{-18}{5}$ (c) $a = -5$ (d) $q = -8$ (e) $x = -4$ (f) $x = \dfrac{5}{2}$

   (g) $m = \dfrac{1}{2}$ (h) $z = -2$ (i) $l = \dfrac{4}{9}$ (j) $b = 12$

2. (a) $x = 2$ (b) $n = 12$ (c) $n = -2$ (d) $x = -4$ (e) $x = 0$

3. (a) $p = \dfrac{12}{5}$ (b) $p = \dfrac{6}{5}$ (c) $t = 2$ (d) $p = 7$ (e) $m = 2$

4. (a) Possible equations are: $10x + 2 = 22$; $\dfrac{x}{5} = \dfrac{2}{5}$; $5x - 3 = 7$

   (b) Possible equations are: $3x = -6$; $3x + 7 = 1$; $3x + 10 = 4$

EXERCISE 4.4

1. (a) $8x + 4 = 60$; $x = 7$ (b) $\dfrac{x}{5} - 4 = 3$; $x = 35$ (c) $\dfrac{3}{4}y + 3 = 21$; $y = 24$

   (d) $2m - 11 = 15$; $m = 13$ (e) $50 - 3x = 8$; $x = 14$ (f) $\dfrac{x+19}{5} = 8$; $x = 21$

   (g) $\dfrac{5n}{2} - 7 = 23$; $n = 12$

2. (a) Lowest score = 40   (b) $70°$ each   (c) Sachin: 132 runs, Rahul: 66 runs
3. (i) 6   (ii) 15 years   (iii) 25   **4.** 30

EXERCISE 5.1

1. (i) $70°$ (ii) $27°$ (iii) $33°$
2. (i) $75°$ (ii) $93°$ (iii) $26°$
3. (i) supplementary   (ii) complementary   (iii) supplementary
   (iv) supplementary   (v) complementary   (vi) complementary
4. $45°$ **5.** $90°$ **6.** $\angle 2$ will increase with the same measure as the decrease in $\angle 1$.
7. (i) No   (ii) No   (iii) Yes   **8.** Less than $45°$
9. (i) Yes   (ii) No   (iii) Yes   (iv) Yes   (v) Yes   (vi) $\angle COB$
10. (i) $\angle 1, \angle 4$; $\angle 5, \angle 2 + \angle 3$ (ii) $\angle 1, \angle 5$; $\angle 4, \angle 5$
11. $\angle 1$ and $\angle 2$ are not adjacent angles because their vertex is not common.
12. (i) $x = 55°$, $y = 125°$, $z = 125°$ (ii) $x = 115°$, $y = 140°$, $z = 40°$
13. (i) $90°$ (ii) $180°$ (iii) supplementary   (iv) linear pair   (v) equal
    (vi) obtuse angles

14. (i) ∠AOD, ∠BOC   (ii) ∠EOA, ∠AOB   (iii) ∠EOB, ∠EOD

     (iv) ∠EOA, ∠EOC   (v) ∠AOB, ∠AOE; ∠AOE, ∠EOD; ∠EOD, ∠COD

EXERCISE 5.2

1. (i) Corresponding angle property   (ii) Alternate interior angle property

     (iii) Interior angles on the same side of the transversal are supplementary

2. (i) ∠1, ∠5; ∠2, ∠6; ∠3, ∠7; ∠4, ∠8   (ii) ∠2, ∠8; ∠3, ∠5

     (iii) ∠2, ∠5; ∠3, ∠8   (iv) ∠1, ∠3; ∠2, ∠4; ∠5, ∠7; ∠6, ∠8

3. $a = 55°$; $b = 125°$; $c = 55°$; $d = 125°$; $e = 55°$; $f = 55°$

4. (i) $x = 70°$ (ii) $x = 100°$

5. (i) ∠DGC = 70°   (ii) ∠DEF = 70°

6. (i) l is not parallel to m (ii) l is not parallel to m

     (iii) l is parallel to m (iv) l is not parallel to m

EXERCISE 6.1

1. Altitude, Median, No.

EXERCISE 6.2

1. (i) 120°   (ii) 110°   (iii) 70°   (iv) 120°   (v) 100°   (vi) 90°

2. (i) 65°   (ii) 30°   (iii) 35°   (iv) 60°   (v) 50°   (vi) 40°

EXERCISE 6.3

1. (i) 70°   (ii) 60°   (iii) 40°   (iv) 65°   (v) 60°   (vi) 30°

2. (i) $x = 70°, y = 60°$ (ii) $x = 50°, y = 80°$ (iii) $x = 110°, y = 70°$

     (iv) $x = 60°, y = 90°$ (v) $x = 45°, y = 90°$ (vi) $x = 60°, y = 60°$

EXERCISE 6.4

1. (i) Not possible   (ii) Possible   (iii) Not possible

2. (i) Yes   (ii) Yes   (iii) Yes   **3.** Yes   **4.** Yes   **5.** No

6. Between 3 and 27

EXERCISE 6.5

1. 26 cm   **2.** 24 cm   **3.** 9 m   **4.** (i) and (iii)   **5.** 18m   **6.** (ii)

7. 98 cm   **8.** 68 cm

EXERCISE 7.1

1. (a) they have the same length   (b) 70°   (c) m∠A = m∠ B

3. ∠A ↔ ∠F, ∠B ↔ ∠E, ∠C ↔ ∠D, $\overline{AB} ↔ \overline{FE}$, $\overline{BC} ↔ \overline{ED}$, $\overline{AC} ↔ \overline{FD}$

4. (i) ∠C   (ii) $\overline{CA}$ (iii) ∠A   (iv) $\overline{BA}$

EXERCISE 7.2

1. (a) SSS Congruence criterion   (b) SAS Congruence criterion
    (c) ASA Congruence criterion   (d) RHS Congruence criterion
2. (a) (i) PE (ii) EN (iii) PN   (b) (i) EN (ii) AT
    (c) (i) ∠RAT = ∠EPN (ii)∠ATR = ∠PNE
3. (i) Given   (ii) Given   (iii) Common   (iv) SAS Congruence criterion   4. No
5. ΔWON   6. ΔBTA, ΔTPQ   9. BC = QR, ASA Congruence criterion

EXERCISE 8.1

1. (a) 10:1   (b) 500:7   (c) 100:3   (d) 20:1   2. 12 computers
3. (i) Rajasthan : 190 people ; UP : 830 people   (ii) Rajasthan

EXERCISE 8.2

1. (a) 12.5%   (b) 125%   (c) 7.5%   (d) $28\frac{4}{7}\%$

2. (a) 65%   (b) 210%   (c) 2%   (d) 1235%

3. (i) $\frac{1}{4}, 25\%$ (ii) $\frac{3}{5}$; 60%   (iii) $\frac{3}{8}$; 37.5%

4. (a) 37.5   (b) $\frac{3}{5}$ minute or 36 seconds   (c) ₹ 500
    (d) 0.75 kg or 750 g

5. (a) 12000   (b) ₹ 9,000   (c) 1250 km   (d) 20 minutes   (e) 500 litres

6. (a) 0.25; $\frac{1}{4}$ (b) 1.5; $\frac{3}{2}$ (c) 0.2; $\frac{1}{5}$ (d) 0.05; $\frac{1}{20}$ 7. 30%

8. 40%; 6000   9. ₹ 40,000   10. 5 matches

EXERCISE 8.3

1. (a) Profit = ₹ 75; Profit % = 30   (b) Profit = ₹ 1500; Profit % = 12.5
    (c) Profit = ₹ 500; Profit % = 20   (d) Loss = ₹ 100; Loss % = 40
2. (a) 75%; 25%   (b) 20%, 30%, 50%   (c) 20%; 80%   (d) 12.5%; 25%; 62.5%

3. 2%   4. $5\frac{5}{7}\%$ 5. ₹ 12,000   6. ₹ 16,875

7. (i) 12% (ii) 25 g   8. ₹ 233.75   9. (a) ₹ 1,632 (b) ₹ 8,625
10. 0.25%   11. ₹ 500

EXERCISE 9.1

1. (i) $\dfrac{-2}{3}, \dfrac{-1}{2}, \dfrac{-2}{5}, \dfrac{-1}{3}, \dfrac{-2}{7}$　　　　　　(ii) $\dfrac{-3}{2}, \dfrac{-5}{3}, \dfrac{-8}{5}, \dfrac{-10}{7}, \dfrac{-9}{5}$

　　(iii) $\dfrac{-35}{45} = \dfrac{-7}{9}, \dfrac{-34}{45}, \dfrac{-33}{45} = \dfrac{-11}{15}, \dfrac{-32}{45}, \dfrac{-31}{45}$　　(iv) $\dfrac{-1}{3}, \dfrac{-1}{4}, 0, \dfrac{1}{3}, \dfrac{1}{2}$

2. (i) $\dfrac{-15}{25}, \dfrac{-18}{30}, \dfrac{-21}{35}, \dfrac{-24}{40}$　　　　　　(ii) $\dfrac{-4}{16}, \dfrac{-5}{20}, \dfrac{-6}{24}, \dfrac{-7}{28}$

　　(iii) $\dfrac{5}{-30}, \dfrac{6}{-36}, \dfrac{7}{-42}, \dfrac{8}{-48}$　　　　　　(iv) $\dfrac{8}{-12}, \dfrac{10}{-15}, \dfrac{12}{-18}, \dfrac{14}{-21}$

3. (i) $\dfrac{-4}{14}, \dfrac{-6}{21}, \dfrac{-8}{28}, \dfrac{-10}{35}$　　(ii) $\dfrac{10}{-6}, \dfrac{15}{-9}, \dfrac{20}{-12}, \dfrac{25}{-15}$　　(iii) $\dfrac{8}{18}, \dfrac{12}{27}, \dfrac{16}{36}, \dfrac{28}{63}$

4. (i)

　　(ii)

　　(iii)

　　(iv)
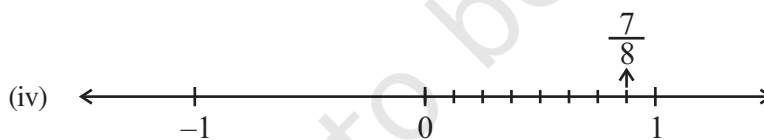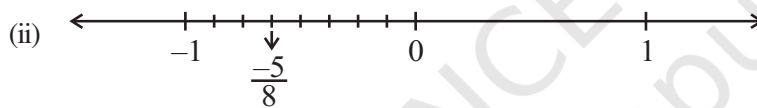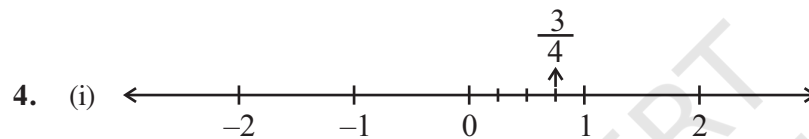
5. P represents $\dfrac{7}{3}$　　　Q represents $\dfrac{8}{3}$　　　R represents $\dfrac{-4}{3}$　　　S represents $\dfrac{-5}{3}$

6. (ii), (iii), (iv), (v)

7. (i) $\dfrac{-4}{3}$　　(ii) $\dfrac{5}{9}$　　(iii) $\dfrac{-11}{18}$　　(iv) $\dfrac{-4}{5}$

8. (i) $<$　　(ii) $<$　　(iii) $=$　　(iv) $>$　　(v) $<$　　(vi) $=$　　(vii) $>$

9. (i) $\dfrac{5}{2}$　　(ii) $\dfrac{-5}{6}$　　(iii) $\dfrac{2}{-3}$　　(iv) $\dfrac{1}{4}$　　(v) $-3\dfrac{2}{7}$

10. (i) $\dfrac{-3}{5}, \dfrac{-2}{5}, \dfrac{-1}{5}$　　　　(ii) $\dfrac{-4}{3}, \dfrac{-1}{3}, \dfrac{-2}{9}$　　(iii) $\dfrac{-3}{2}, \dfrac{-3}{4}, \dfrac{-3}{7}$

Exercise 9.2

1. (i) $\dfrac{-3}{2}$ (ii) $\dfrac{34}{15}$ (iii) $\dfrac{17}{30}$ (iv) $\dfrac{82}{99}$

   (v) $\dfrac{-26}{57}$ (vi) $\dfrac{-2}{3}$ (vii) $\dfrac{34}{15}$

2. (i) $\dfrac{-13}{72}$ (ii) $\dfrac{23}{63}$ (iii) $\dfrac{1}{195}$ (iv) $\dfrac{-89}{88}$ (v) $\dfrac{-73}{9}$

3. (i) $\dfrac{-63}{8}$ (ii) $\dfrac{-27}{10}$ (iii) $\dfrac{-54}{55}$ (iv) $\dfrac{-6}{35}$ (v) $\dfrac{6}{55}$

   (vi) 1

4. (i) -6 (ii) $\dfrac{-3}{10}$ (iii) $\dfrac{4}{15}$ (iv) $\dfrac{-1}{6}$ (v) $\dfrac{-14}{13}$

   (vi) $\dfrac{91}{24}$ (vii) $\dfrac{-15}{4}$

Exercise 11.1

1. (i) $150000\ \text{m}^2$ (ii) ₹ 1,500,000,000
2. $6400\ \text{m}^2$ **3.** 20 m   **4.** 15 cm; $525\ \text{cm}^2$ **5.** 40 m
6. 31cm; Square   **7.** 35cm; $1050\ \text{cm}^2$ **8.** ₹ 284

Exercise 11.2

1. (a) $28\ \text{cm}^2$ (b) $15\ \text{cm}^2$ (c) $8.75\ \text{cm}^2$ (d) $24\ \text{cm}^2$ (e) $8.8\ \text{cm}^2$
2. (a) $6\ \text{cm}^2$ (b) $8\ \text{cm}^2$ (c) $6\ \text{cm}^2$ (d) $3\ \text{cm}^2$
3. (a) 12.3 cm   (b) 10.3 cm   (c) 5.8 cm   (d) 1.05 cm
4. (a) 11.6 cm   (b) 80 cm   (c) 15.5 cm
5. (a $91.2\ \text{cm}^2$ (b) 11.4 cm
6. length of BM = 30cm; length of DL = 42 cm

7. Area of ΔABC = $30\ \text{cm}^2$; length of AD = $\dfrac{60}{13}$ cm

8. Area of ΔABC = $27\ \text{cm}^2$; length of CE = 7.2 cm

Exercise 11.3

1. (a) 88 cm   (b) 176 mm   (c) 132 cm

2. (a) $616\ \text{mm}^2$ (b) $1886.5\ \text{m}^2$ (c) $\dfrac{550}{7}\ \text{cm}^2$
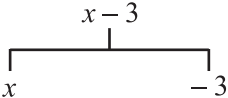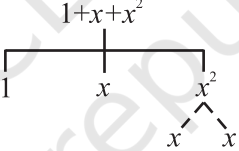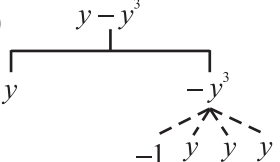
3. 24.5 m; 1886.5 m²   4. 132 m; ₹ 528   5. 21.98 cm²

6. 4.71 m; ₹ 70.65   7. 25.7 cm   8. ₹ 30.14 (approx.)   9. 7 cm; 154 cm²; 11cm; circle.

10. 536 cm²   11. 23.44 cm²   12. 5 cm; 78.5 cm²   13. 879.20 m²

14. Yes   15. 119.32 m; 56.52m   16. 200 Times   17. 94.2 cm
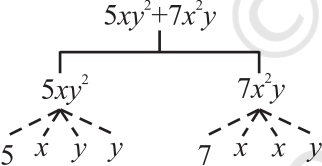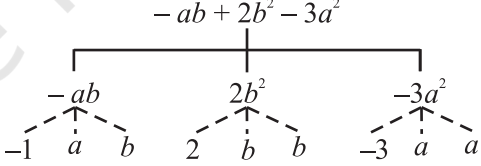
EXERCISE 11.4

1. 1750 m²; 0.675 ha   2. 1176 m²   3. 30 cm²

4. (i) 63 m²   (ii) ₹ 12,600   5. (i) 116 m² (ii) ₹ 31,360

6. 0.99 ha; 20.01 ha   7. (i) 441 m² (ii) ₹ 48,510   8. Yes, 9.12 cm cord is left

9. (i) 50m²   (ii) 12.56 m² (iii) 37.44m² (iv) 12.56m

10. (i) 110 cm²   (ii) 150 cm²;   11. 66 cm²

EXERCISE 12.1

1. (i) $y - z$ (ii) $\dfrac{1}{2}(x + y)$ (iii) z^2 (iv) $\dfrac{1}{4}pq$ (v) $x^2 + y^2$ (vi) $5 + 3mn$

   (vii) $10 - yz$ (viii) $ab - (a + b)$

2. (i) (a), (b), (c), (d), (e)

(ii)

	Expression	Terms	Factors
(a)	$-4x + 5$	$-4x$ 5	$-4, x$ 5
(b)	$-4x + 5y$	$-4x$ $5y$	$-4, x$ $5, y$
(c)	$5y + 3y^2$	$5y$ $3y^2$	$5, y$ $3, y, y$
(d)	$xy + 2x^2y^2$	xy $2x^2y^2$	x, y $2, x, x, y, y$
(e)	$pq + q$	pq q	p, q q

(f)	$1.2ab - 2.4b + 3.6a$	$1.2ab$ $-2.4b$ $3.6a$	$1.2, a, b$ $-2.4, b$ $3.6, a$
(g)	$\dfrac{3}{4}x + \dfrac{1}{4}$	$\dfrac{3}{4}x$ $\dfrac{1}{4}$	$\dfrac{3}{4}, x$ $\dfrac{1}{4}$
(h)	$0.1p^2 + 0.2q^2$	$0.1p^2$ $0.2q^2$	$0.1, p, p$ $0.2, q, q$

3.

	Expression	Terms	Coefficients
(i)	$5 - 3t^2$	$-3t^2$	-3
(ii)	$1 + t + t^2 + t^3$	t t^2 t^3	1 1 1
(iii)	$x + 2xy + 3y$	x $2xy$ $3y$	1 2 3
(iv)	$100m + 1000n$	$100m$ $1000n$	100 1000
(v)	$-p^2q^2 + 7pq$	$-p^2q^2$ $7pq$	-1 7
(vi)	$1.2a + 0.8b$	$1.2a$ $0.8b$	1.2 0.8
(vii)	$3.14r^2$	$3.14r^2$	3.14
(viii)	$2(l + b)$	$2l$ $2b$	2 2
(ix)	$0.1y + 0.01y^2$	$0.1y$ $0.01y^2$	0.1 0.01

4. (a)

	Expression	Terms with x	Coefficient of x
(i)	$y^2x + y$	y^2x	y^2
(ii)	$13y^2 - 8yx$	$-8yx$	$-8y$
(iii)	$x + y + 2$	x	1
(iv)	$5 + z + zx$	zx	z

(v)	$1 + x + xy$	x xy	1 y
(vi)	$12xy^2 + 25$	$12xy^2$	$12y^2$
(vii)	$7 + xy^2$	xy^2	y^2

(b)

	Expression	**Terms with y^2**	**Coefficient of y^2**
(i)	$8 - xy^2$	$- xy^2$	$- x$
(ii)	$5y^2 + 7x$	$5y^2$	5
(iii)	$2x^2y - 15xy^2 + 7y^2$	$-15xy^2$ $7y^2$	$-15x$ 7

5. (i) binomial (ii) monomial (iii) trinomial (iv) monomial

(v) trinomial (vi) binomial (vii) binomial (viii) monomial

(ix) trinomial (x) binomial (xi) binomial (xii) trinomial

6. (i) like (ii) like (iii) unlike (iv) like

(v) unlike (vi) unlike

7. (a) $- xy^2$, $2xy^2$; $- 4yx^2$, $20x^2y$; $8x^2$, $-11x^2$, $- 6x^2$; $7y$, y; $- 100x$, $3x$; $- 11yx$, $2xy$.

(b) $10pq$, $-7qp$, $78qp$; $7p$, $2405p$; $8q$, $- 100q$; $-p^2q^2$, $12q^2p^2$; -23, 41; $-5p^2$, $701p^2$; $13p^2q$, qp^2

EXERCISE 12.2

1. (i) $8b - 32$ (ii) $7z^3 + 12z^2 - 20z$ (iii) $p - q$ (iv) $a + ab$

(v) $8x^2y + 8xy^2 - 4x^2 - 7y^2$ (vi) $4y^2 - 3y$

2. (i) $2mn$ (ii) $- 5tz$ (iii) $12mn - 4$ (iv) $a + b + 3$

(v) $7x + 5$ (vi) $3m - 4n - 3mn - 3$ (vii) $9x^2y - 8xy^2$

(viii) $5pq + 20$ (ix) 0 (x) $- x^2 - y^2 - 1$

3. (i) $6y^2$ (ii) $- 18xy$ (iii) $2b$ (iv) $5a + 5b - 2ab$

(v) $5m^2 - 8mn + 8$ (vi) $x^2 - 5x - 5$

(vii) $10ab - 7a^2 - 7b^2$ (viii) $8p^2 + 8q^2 - 5pq$

4. (a) $x^2 + 2xy - y^2$ (b) $5a + b - 6$

5. $4x^2 - 3y^2 - xy$

6. (a) $- y + 11$ (b) $2x + 4$

EXERCISE 12.3

1. (i) 0 (ii) 1 (iii) -1 (iv) 1 (v) 1

2. (i) -1 (ii) -13 (iii) 3 **3.** (i) -9 (ii) 3 (iii) 0 (iv) 1

4. (i) 8   (ii) 4   (iii) 0   **5.** (i) –2   (ii) 2   (iii) 0   (iv) 2

6. (i) $5x - 13$; –3   (ii) $8x - 1$; 15   (iii) $11x - 10$; 12   (iv) $11x + 7$; 29

7. (i) $2x+4$; 10 (ii) $-4x + 6$; –6 (iii) $-5a + 6$; 11   (iv) $-8b + 6$; 22   (v) $3a - 2b - 9$; –8

8. (i) 1000   (ii) 20   **9.** –5   **10.** $2a^2 + ab + 3$; 38

EXERCISE 12.4

1.

Symbol	Number of Digits	Number of Segments
6	5	26
	10	51
	100	501
4	5	16
	10	31
	100	301
8	5	27
	10	52
	100	502

2. (i) $2n - 1 \rightarrow$ 100th : 199

(ii) $3n + 2 \rightarrow$ 5th : 17;

10th : 32;

100th : 302

(iii) $4n + 1 \rightarrow$ 5th : 21;

10th : 41;

100th : 401

(iv) $7n + 20 \rightarrow$ 5th : 55;

10th : 90;

100th : 720

(v) $n^2 + 1 \rightarrow$ 5th : 26;

10th : 101

EXERCISE 13.1

1. (i) 64   (ii) 729   (iii) 121   (iv) 625

2. (i) 6^4 (ii) t^2 (iii) b^4 (iv) $5^2 \times 7^3$ (v) $2^2 \times a^2$ (vi) $a^3 \times c^4 \times d$

3. (i) 2^9 (ii) 7^3 (iii) 3^6 (iv) 5^5

4. (i) 3^4 (ii) 3^5 (iii) 2^8 (iv) 2^{100} (v) 2^{10}

5. (i) $2^3 \times 3^4$ (ii) 5×3^4 (iii) $2^2 \times 3^3 \times 5$ (iv) $2^4 \times 3^2 \times 5^2$

6. (i) 2000   (ii) 196   (iii) 40   (iv) 768   (v) 0

(vi) 675   (vii) 144   (viii) 90000

7. (i) – 64   (ii) 24   (iii) 225   (iv) 8000

8. (i) $2.7 \times 10^{12} > 1.5 \times 10^8$ (ii) $4 \times 10^{14} < 3 \times 10^{17}$

EXERCISE 13.2

1. (i) 3^{14} (ii) 6^5 (iii) a^5 (iv) 7^{x+2} (v) 5^3 (vi) $(10)^5$

(vii) $(ab)^4$ (viii) 3^{12} (ix) 2^8 (x) 8^{t-2}

2. (i) 3^3 (ii) 5^3 (iii) 5^5 (iv) 7×11^5 (v) 3^0 or 1   (vi) 3

(vii) 1   (viii) 2   (ix) $(2a)^2$ (x) a^{10} (xi) $a^3 b$ (xii) 2^8

3. (i) False; $10 \times 10^{11} = 10^{12}$ and $(100)^{11} = 10^{22}$ (ii) False; $2^3 = 8, 5^2 = 25$

(iii) False; $6^5 = 2^5 \times 3^5$ (iv) True; $3^0 = 1, (1000)^0 = 1$

4. (i) $2^8 \times 3^4$ (ii) $2 \times 3^3 \times 5$ (iii) $3^6 \times 2^6$ (iv) $2^8 \times 3$ **5.** (i) 98 (ii) $\dfrac{5t^4}{8}$ (iii) 1

EXERCISE 13.3

1. 279404 $= 2 \times 10^5 + 7 \times 10^4 + 9 \times 10^3 + 4 \times 10^2 + 0 \times 10^1 + 4 \times 10^0$

3006194 $= 3 \times 10^6 + 0 \times 10^5 + 0 \times 10^4 + 6 \times 10^3 + 1 \times 10^2 + 9 \times 10^1 + 4 \times 10^0$

2806196 $= 2 \times 10^6 + 8 \times 10^5 + 0 \times 10^4 + 6 \times 10^3 + 1 \times 10^2 + 9 \times 10^1 + 6 \times 10^0$

120719 $= 1 \times 10^5 + 2 \times 10^4 + 0 \times 10^3 + 7 \times 10^2 + 1 \times 10^1 + 9 \times 10^0$

20068 $= 2 \times 10^4 + 0 \times 10^3 + 0 \times 10^2 + 6 \times 10^1 + 8 \times 10^0$

2. (a) 86045   (b) 405302   (c) 30705   (d) 900230

3. (i) 5×10^7 (ii) 7×10^6 (iii) 3.1865×10^9 (iv) 3.90878×10^5

(v) 3.90878×10^4 (vi) 3.90878×10^3

4. (a) 3.84×10^8m (b) 3×10^8 m/s (c) 1.2756×10^7m (d) 1.4×10^9 m

(e) 1×10^{11} (f) 1.2×10^{10} years (g) 3×10^{20} m   (h) 6.023×10^{22}

(i) 1.353×10^9 km^3 (j) 1.027×10^9

EXERCISE 14.1

1.
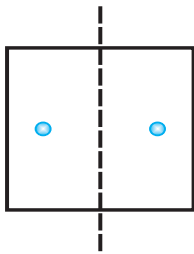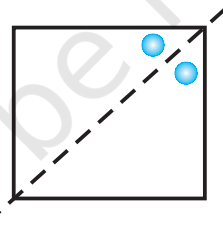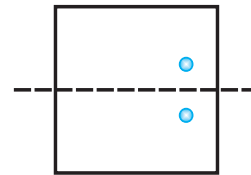
(a)   (b)   (c)
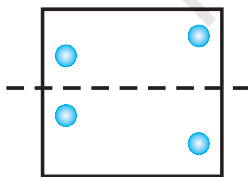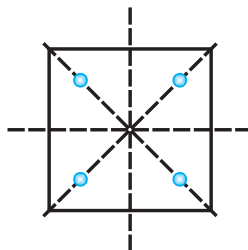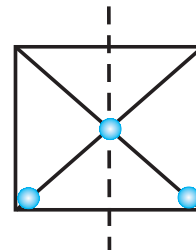
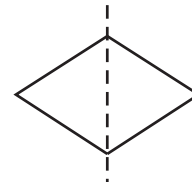(d)   (e)   (f)
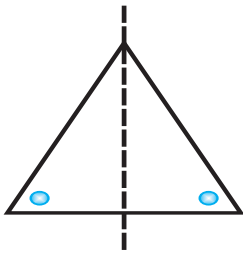
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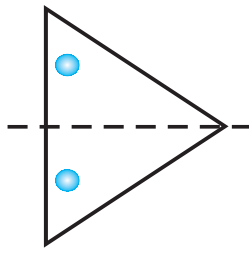
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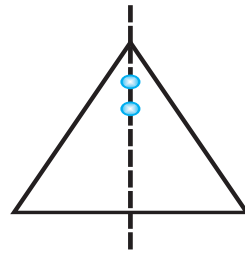
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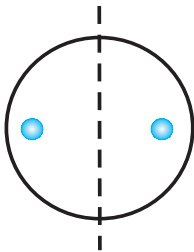
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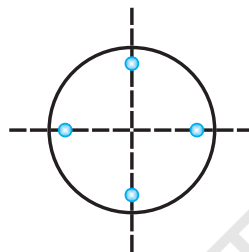
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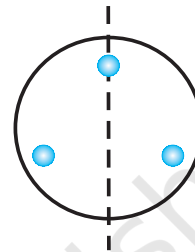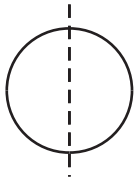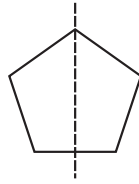
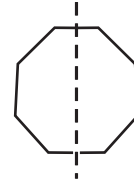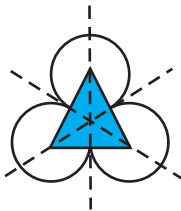(l)

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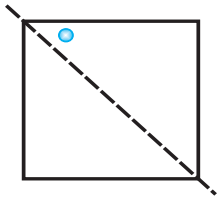
(a)

(b)
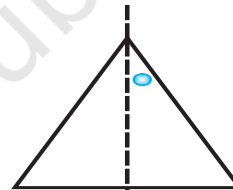
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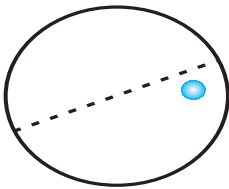
(d)
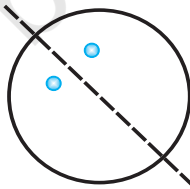
(e)

3.
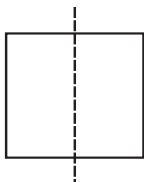
(a) Square
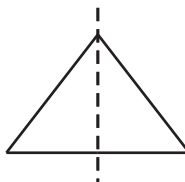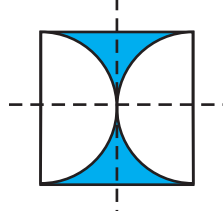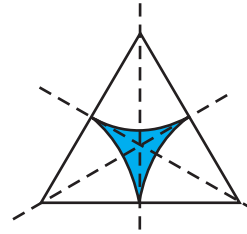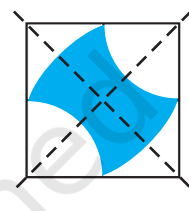
(b) Triangle

(c) Rhombus

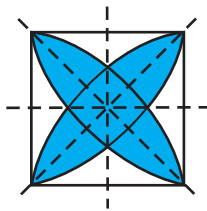(d) Circle   (e) Pentagon   (f) Octagon

4.

(a)   (b)   (c)   (d)

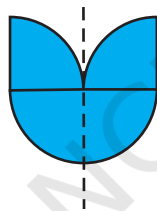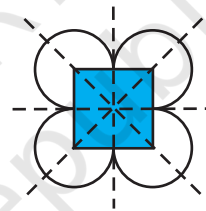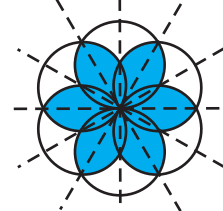(e)   (f)   (g)   (h)

7. (a) 3   (b) 1   (c) 0   (d) 4   (e) 2   (f) 2
   (g) 0   (h) 0   (i) 6   (j) Infinitely many

8. (a) A, H, I, M, O, T, U, V, W, X, Y   (b) B, C, D, E, H, I, O, X
   (c) O, X, I, H

10. (a) Median   (b) Diameter

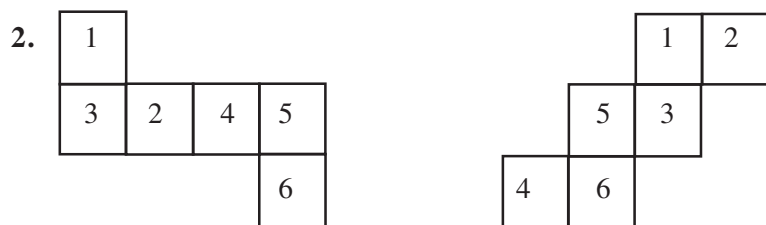## EXERCISE 14.2

1. (a), (b), (d), (e), (f)

2. (a) 2   (b) 2   (c) 3   (d) 4   (e) 4   (f) 5
   (g) 6   (h) 3

EXERCISE 14.3

3. Yes   **5.** Square   **6.** 120°, 180°, 240°, 300°, 360°
7. (i) Yes   (ii) No

EXERCISE 15.1

1. Nets in (ii), (iii), (iv), (vi) form cubes.

2.

	1		
3	2	4	5
			6

		1	2
		5	3
4	6		

3. No, because one pair of opposite faces will have 1 and 4 on them whose total is not 7, and another pair of opposite faces will have 3 and 6 on them whose total is also not 7.

4. Three faces
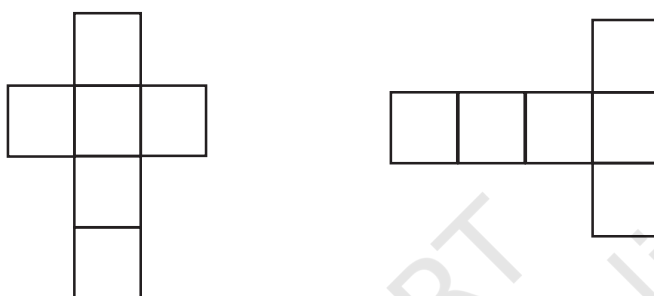
5. (a) (ii)   (b) (iii)   (c) (iv)   (d) (i)

BRAIN-TEASERS

1. Solve the number riddles:

   (i)   Tell me who I am! Who I am!

                    Take away from me the number eight,

         Divide further by a dozen to come up with

                    A full team for a game of cricket!

   (ii)   Add four to six times a number,

                    To get exactly sixty four!

         Perfect credit is yours to ask for

                    If you instantly tell the score!

2. Solve the teasers:

   (i)   There was in the forest an old Peepal tree

                    The grand tree had branches ten and three

         On each branch there lived birds fourteen

                    Sparrows brown, crows black and parrots green!

         Twice as many as the parrots were the crows

                    And twice as many as the crows were the sparrows!

         We wonder how many birds of each kind

                    Aren't you going to help us find?

(ii) I have some five-rupee coins and some two-rupee coins. The number of two-rupee coins is twice the number of five-rupee coins. The total money I have is 108 rupees. So how many five-rupee coins do I have? And how many two-rupee coins?

3. I have 2 vats each containing 2 mats. 2 cats sat on each of the mats. Each cat wore 2 funny old hats. On each hat lay 2 thin rats. On each rat perched 2 black bats. How many things are in my vats?

4. Twenty-seven small cubes are glued together to make a big cube. The exterior of the big cube is painted yellow in colour. How many among each of the 27 small cubes would have been painted yellow on

 (i)   only one of its faces?

(ii)   two of its faces?

(iii)   three of its faces?

5. Rahul wanted to find the height of a tree in his garden. He checked the ratio of his height to his shadow's length. It was 4:1. He then measured the shadow of the tree. It was 15 feet. So what was the height of the tree?

6. A woodcutter took 12 minutes to make 3 pieces of a block of wood. How much time would be needed to make 5 such pieces?

7. A cloth shrinks 0.5% when washed. What fraction is this?

8. Smita's mother is 34 years old. Two years from now mother's age will be 4 times Smita's present age. What is Smita's present age?

9. Maya, Madhura and Mohsina are friends studying in the same class. In a class test in geography, Maya got 16 out of 25. Madhura got 20. Their average score was 19. How much did Mohsina score?

Answers

1. (i)   140   (ii)   10

2. (i)   Sparrows: 104, crows: 52, Parrots: 26

(ii)   Number of ₹ 5 coins = 12, Number of ₹ 2 coins = 24

3. 124   **4.** (i) 6   (ii) 10   (iii) 8   **5.** 60 feet

6. 24 minutes   **7.** $\dfrac{1}{200}$ **8.** 7 years   **9.** 21