(e) 6.3 + 4 – 3.5

6.3	10.3
+4.0	–3.5
10.3	6.8

∴ 6.3 + 4 – 3.5 = 6.8

(f) 6 – 12.237 + 8.46

6.00	14.460
+8.46	–12.237
14.46	2.223

∴ 6 – 12.237 + 8.46 = 2.223

(g) 12.121 + 121.21 – 121.12

12.121	133.331
+121.210	–121.120
133.331	12.211

∴ 12.121 + 121.21 – 121.12 = 12.211

(h) 24 – 27.047 + 15.26

24.00	39.260
+15.26	–27.047
39.26	12.213

∴ 24 – 27.047 + 15.26 = 12.213

(i) 43.16 + 493.28 – 507.34

43.16	536.44
+493.28	–507.34
536.44	29.10

∴ 43.16 + 493.28 – 507.34 = 29.10

4.

10.000
–6.125
3.875

∴ 3.875 should be added to 6.125 to get 10.

5. greatest two-digit number = 99

102.55
–99.00
3.55

∴ 3.55 should be subtracted from 102.55 to get greatest two-digit number.

6.

0.0016	1000.0000
+993.4500	–993.4516
993.4516	6.5484

7. New temperature = 102.60
Normal temperature = –98.60
Temperature above normal = 4.00

8. Height of pea plant on Saturday = 6.50 cm
Increament in height = 0.55 cm
∴ height of pea plant an Monday = 7.05 cm

9. Money spend on notebook = ₹ 25.75
Money spend on pen = – ₹ 107.60
Total money spend = ₹ 133.35

10.

5.39	16.00
+8.06	–13.45
13.45	2.55

11. Sum

68.01
+58.60
126.61

Difference

68.01
–58.60
9.41

∴

126.61
–9.41
117.20

12. Temperature on thursday = 39.2°C
Temperature on wednesday = –27.6°C
difference = 11.6°C

13. Capacity of two containers = 145.75 *l*
= + 250.50 *l*
396.25 *l*

Capacity of drum = 725.00 *l*
Capacity of two containers = –396.25 *l*
Oil left in drum = 328.75 *l*

MCQ's

1. (b) **2.** (a) **3.** (c) **4.** (c) **5.** (d) **6.** (d) **7.** (c) **8.** (b) **9.** (c) **10.** (b)

7 Ratio, Proportion and Unitary Method

Exercise 7.1

1. (a) 2 : 15 or 4 : 7
$\frac{2}{15}$ or $\frac{4}{7}$
2×7 or 4×15
$14 < 60$
$\therefore$ 2 : 15 < 4 : 7

(b) 11 : 9 or 3 : 5
$\frac{11}{9}$ or $\frac{3}{5}$
11×5 or 3×9
$55 > 27$
$\therefore$ 11 : 9 > 3 : 5

(c) 1 : 5 or 3 : 17
$\frac{1}{5}$ or $\frac{3}{17}$
1×17 or 3×5
$17 > 15$
$\therefore$ 1 : 5 > 3 : 7

(b) 5 : 13 or 2 : 5
$\frac{5}{13}$ or $\frac{2}{5}$
5×5 or 2×13
$25 < 26$
$\therefore$ 5 : 13 < 2 : 5

2. (a) 10 : 7 or 15 : 22
$\frac{10}{7}$ or $\frac{15}{22}$
10×22 or 15×7
$220 > 105$
$\therefore$ 10 : 7 > 15 : 22

(b) 5 : 9 or 23 : 14
$\frac{5}{9}$ or $\frac{23}{14}$
5×14 or 23×9
$70 < 207$
$\therefore$ 5 : 9 < 23 : 14

(c) 9 : 16 or 4 : 11
$\frac{9}{16}$ or $\frac{4}{11}$
9×11 or 4×16
$99 > 64$
$\therefore$ 9 : 16 > 4 : 11

(d) 7 : 21 or 2 : 5
$\frac{7}{21}$ or $\frac{2}{5}$
7×5 or 2×21
$35 < 41$
$\therefore$ 7 : 21 < 2 : 5

3. (a) 1 : 2 or 3 : 7
$\frac{1}{2}$ or $\frac{3}{7}$

(b) 5 : 13 or 2 : 5
$\frac{5}{13}$ or $\frac{2}{5}$

1×7 or 3×2

$7 > 6$

$\therefore$ $1 : 2 > 3 : 7$

(c) $3 : 4$ or $5 : 6$

$\frac{3}{4}$ or $\frac{5}{6}$

3×6 or 5×4

$18 < 20$

$\therefore$ $3 : 4 < 5 : 6$

5×5 or 2×13

$25 < 26$

$\therefore$ $5 : 13 < 2 : 5$

(d) $9 : 11$ or $7 : 3$

$\frac{9}{11}$ or $\frac{7}{3}$

9×3 or 7×11

$27 < 77$

$\therefore$ $9 : 11 < 7 : 3$

4. (a) $65 : 91 = \frac{65}{91} = \frac{5}{7}$ or $5 : 7$

(b) $50 : 225 = \frac{50}{225} = \frac{2}{9}$ or $2 : 9$

(c) $450 : 270 = \frac{450}{270} = \frac{5}{3}$ or $5 : 3$

(d) $500 : 1000 = \frac{500}{1000} = \frac{1}{2}$ or $1 : 2$

5. (a) $\frac{4\,\text{cm}}{5\,\text{m}} = \frac{4\,\text{cm}}{500\,\text{cm}} = \frac{4}{500} = \frac{1}{125} = 1 : 125$

(b) $\frac{45\,\text{kg}}{180\,\text{kg}} = \frac{45}{180} = \frac{1}{4} = 1 : 4$

(c) $\frac{3.6\,\text{m}}{54\,\text{m}} = \frac{36}{540} = \frac{1}{15} = 1 : 15$

(d) $\frac{70\,\text{minutes}}{210\,\text{seconds}} = \frac{70 \times 60\,\text{seconds}}{210\,\text{seconds}} = \frac{4200}{210} = \frac{20}{1} = 20 : 1$

(e) $\frac{25\,\text{Paise}}{₹\ 50} = \frac{25\,\text{Paise}}{5000\,\text{Paise}} = \frac{1}{200} = 1 : 200$

(f) $\frac{2.3}{9.2} = \frac{23}{92} = \frac{1}{4} = 1 : 4$

6. sum of the terms of ratio $= 3 + 2 + 2 = 7$

A get $= \frac{3}{7} \times 3500 = 3 \times 500 = ₹\ 1500$

B get $= \frac{2}{7} \times 3500 = ₹\ 1000$

C get $= \frac{2}{7} \times 3500 = 2 \times 500 = ₹\ 1000$

7. sum of the terms of ratio $= 2 + 5 = 7$

Ist number $= \frac{2}{7} \times 49 = 2 \times 7 = 14$

IInd number $= \frac{5}{7} \times 49 = 5 \times 7 = 35$

8. $\frac{18.6\,\text{m}}{6.2\,\text{m}} = \frac{186}{62} = \frac{3}{1}$ or $3 : 1$

9. sum of the terms of ratio $= 8 + 5 = 13$

Ist part $= \frac{8}{13} \times 65 = 8 \times 5 = 40$

IInd part $= \frac{5}{\cancel{13}} \times \cancel{65}^{5} = 25$

10. ratio is $\frac{12}{13}:1$ or 12 : 13

$\therefore$ sum of the terms of ratio = 12 + 13 = 25

$$\text{Ist part} = \frac{12}{25} \times 1000 = 12 \times 40 = 480$$

$$\text{IInd part} = \frac{13}{25} \times 1000 = 13 \times 40 = 520$$

11. $\frac{1}{3000000} = \frac{3}{x}$

$x = 3 \times 3000000 \Rightarrow x = 9000000$ cm

$x = 90000$ m $\Rightarrow x = 90$ km

$\therefore$ towns are 90 km apart in actual

12. Let height of taller brother = $8x$

Let height of shorter brother = $7x$

shorter brother = 161 cm

$7x = 161 \Rightarrow x = 23$

$\therefore$ height of taller brother = $8x = 8 \times 23 = 184$ cm

13. Let male teachers = $3x$

Let female teachers = $2x$

male teachers = 30

$\therefore$ $3x = 30 \Rightarrow x = 10$

$\therefore$ female teachers = $2x = 2 \times 10 = 20$

14. (a) Ratio has no unit.

(b) The first term of a ratio is called as **antecedent.**

(c) The second term of a ratio is called the **consequent.**

15. (a) defective bulbs = 25

good bulbs = 70 – 25 = 45

$\therefore$ ratio = $\frac{25}{45} = \frac{5}{9} = 5 : 9$

(b) $\frac{\text{passing students}}{\text{appeared students}} = \frac{3}{\frac{4}{1}} = \frac{3}{4} = 3 : 4$

(c) $\frac{36}{42} = \frac{6}{7}$ or 6 : 7

(d) $\frac{AB}{CD} = \frac{9}{7} = 9 : 7$

Exercise 7.2

1. (a) Extremes of 4 : 5 :: 20 : 25 are 4 and 25

(b) Extremes of 5 : 7 :: 25 : 35 are 5 and 35

(c) Extremes of 16 : 24 :: 24 : 36 are 16 and 36

(d) Extremes of 50 : 150 :: 100 : 300 are 50 and 300

2. (a) Means of 25 : 5 :: 20 : 4 are 5 and 20

(b) Means of 1 : 4 :: 8 : 32 are 4 and 8

(c) Means of 25 : 30 :: 16 : 36 are 30 and 16

(d) Means of 15 : 32 :: 135 : 288 are 32 and 135

3. (a) 10 : 15 :: 20 : 25

Product of Means = $15 \times 20 = 300$

Product of Extremes = $10 \times 25 = 250$

Product of Means ≠ Product of Extremes

∴ false

(b) 24 : 96 :: 16 : 54

Product of Means = $96 \times 16 = 1536$

Product of Extremes = $24 \times 54 = 1296$

Product of means ≠ Product of Extremes

∴ False

(c) 1 : 2 :: 3 : 6

Product of means = $2 \times 3 = 6$

Product of Extremes = $1 \times 6 = 6$

Product of means = Product of Extremes

∴ False

(d) 75 : 150 :: 3 : 18

Product of means = $150 \times 3 = 450$

Product of Extremes = $75 \times 18 = 1350$

Product of means ≠ Product of Extremes

∴ False

(e) 63 : 105 :: 18 : 30

Product of means = $105 \times 18 = 1890$

Product of Extremes = $63 \times 30 = 1890$

Product of means = Product of Extremes

∴ true

(f) 5 : 25 :: 30 : 150

Product of means = $25 \times 30 = 750$

Product of Extremes = $5 \times 150 = 750$

Product of means = Product of Extremes

∴ true

(g) 66 : 22 :: 22 : 66

Product of means = $22 \times 22 = 484$

Product of Extremes = $66 \times 66 = 4356$

Product of means ≠ Product of Extremes

∴ Not true

(h) 18 : 24 :: 15 : 20

Product of means = $24 \times 15 = 360$

Product of Extremes = $18 \times 20 = 360$

Product of means = Product of Extremes

∴ true

4. (a) $169 : x :: x : 1$

Product of means = Product of Extremes

$x \times x = 169 \times 1$

$x^2 = 169 \quad \Rightarrow \quad x = \sqrt{169} \quad \Rightarrow \quad x = 13$

(b) $80 : 32 :: x : 16$

Product of means = Product of Extremes

$32 \times x = 16 \times 80 \quad \Rightarrow \quad x = \dfrac{\cancel{16} \times \cancel{80}^{40}}{\cancel{32}_{2}} \quad \Rightarrow \quad x = 40$

(c) $x : 3 :: 57 : 19$

Product of means = Product of Extremes

$3 \times 57 = x \times 19 \quad \Rightarrow \quad \dfrac{3 \times 57}{19} = x \quad \Rightarrow \quad 9 = x$

(d) $18 : x :: 27 : 3$

Product of means = Product of Extremes

$x \times 27 = 3 \times 18 \Rightarrow x = \dfrac{3 \times 18}{27} \Rightarrow x = 2$

(e) $125 : x :: x : 5$

Product of means = Product of Extremes

$x \times x = 5 \times 125 \Rightarrow x^2 = 625 \Rightarrow x = \sqrt{625} \Rightarrow x = 25$

(f) $10 : 15 :: 12 : x$

Product of means = Product of Extremes

$15 \times 12 = x \times 10 \Rightarrow \dfrac{15 \times 12}{10} = x \Rightarrow 18 = x$

5. (a) Let fourth proportion be x

$\therefore$ $21 : 27 :: 14 : x$

Product of means = Product of Extremes

$27 \times 14 = x \times 21 \Rightarrow \dfrac{\cancel{27}^{\,2} \times \cancel{14}}{\cancel{21}_{\,3}} = x \Rightarrow 18 = x$

$\therefore$ fourth proportion is 18.

(b) Let fourth proportion be x

$\therefore$ $57 : 76 :: 108 : x$

Product of means = Product of Extremes

$\therefore$ $76 \times 108 = 57 \times x \Rightarrow \dfrac{\cancel{76}^{\,4} \times \cancel{108}^{\,36}}{\cancel{57}_{\,19}} = x \Rightarrow 144 = x$

$\therefore$ fourth proportion is 144.

(c) Let the fourth proportion be x

$\therefore$ $3 : 9 :: 27 : x$

Product of means = Produt of Extremes

$9 \times 27 = 3 \times x \Rightarrow \dfrac{9 \times 27}{3} = x \Rightarrow 81 = x$

$\therefore$ fourth proportion is 81.

(d) Next fourth proportion be x

$\therefore$ $1 : 10 :: 100 : x$

Product of means = Product of Extremes

$\therefore$ $10 \times 100 = 1 \times x \Rightarrow 1000 = x$

$\therefore$ fourth proportion is 1000.

6. (a) Let mean proportion be x

$\therefore$ $36 : x :: x : 16$

Product of mean = Product of Extremes

$x \times x = 36 \times 16$

$x^2 = 36 \times 16$

$x = \sqrt{36 \times 36}$

$x = 6 \times 4 \Rightarrow x = 24$

$\therefore$ mean proportion is 24.

(b) Let mean proportion be x

$\therefore$ $4 : x :: x : 9$

Product of means = Product of Extremes

$x \times x = 4 \times 9 \quad \Rightarrow x^2 = 36 \quad \Rightarrow x = \sqrt{36} \quad \Rightarrow \quad x = 6$

$\therefore$ mean proportion is 6.

(c) Let mean proportion be x

$\therefore$ $4 : x :: x : 16$

Product of means = Product of Extremes

$x \times x = 4 \times 16 \quad \Rightarrow \quad x^2 = 4 \times 16 \quad \Rightarrow x = \sqrt{4 \times 16} \quad \Rightarrow \quad x = 8$

$\therefore$ mean proportion is 8.

(d) Let mean proportion be x

$\therefore$ $125 : x :: x : 5$

Product of means = Product of Extremes

$x \times x = 125 \times 5 \quad \Rightarrow x^2 = 625$

$x = \sqrt{625} \quad \Rightarrow x = 25$

$\therefore$ mean proportion is 25.

(e) Let mean proportion be x

$\therefore$ $121 : x :: x : 100$

Product of means = Product of Extremes

$\therefore$ $x \times x = 121 \times 100 \quad \Rightarrow \quad x^2 = 12100$

$x = \sqrt{12100} \quad \Rightarrow \quad x = 110$

$\therefore$ mean proportion is 110.

(f) Let mean proportion be x

$\therefore$ $32 : x :: x : 50$

Product of means = Product of Extremes

$\therefore$ $x \times x = 50 \times 32 \quad \Rightarrow \quad x^2 = 1600$

$x = \sqrt{1600} \quad \Rightarrow \quad x = 40$

$\therefore$ mean proportion is 40.

(g) Let mean proportion be x

$\therefore$ $4 : x :: x : 36$

Product of means = Product of Extremes

$\therefore$ $x \times x = 36 \times 4 \quad \Rightarrow \quad x^2 = 36 \times 4$

$x^2 = \sqrt{36 \times 4} \quad \Rightarrow \quad x = 12$

$\therefore$ mean proportion is 12.

(h) Let mean proportion be x

$\therefore$ $25 : x :: x : 36$

Product of means = Product of Extremes

$x \times x = 36 \times 25$

$x^2 = 36 \times 25$

$x = \sqrt{36 \times 25} \quad \Rightarrow \quad x = 30$

$\therefore$ mean proportion is 30.

7. Let fourth proportion be x

$\therefore$ $15 : 20 :: 30 : x$

Product of means = Product of Extremes

$20 \times 30 = 15 \times x \quad \Rightarrow \dfrac{20 \times 30}{15} = x \quad \Rightarrow 40 = x$

$\therefore$ fourth proportion is 40.

8. Let number be x

$\therefore$ $x : 32 :: 18 : 24$

Product of means = Product of Extremes

$$32 \times 18 = x \times 24 \quad \Rightarrow \quad \frac{\overset{4}{\cancel{32}} \times \overset{6}{\cancel{18}}}{\underset{3}{\cancel{24}}} = x \quad \Rightarrow \quad 24 = x$$

$\therefore$ 24 has the same ratio to 32 as 18 has to 24.

9. If x, y, z are in proportion then,

$$y^2 = xz \quad \Rightarrow \quad 6^2 = x \times 12 \quad \Rightarrow \quad 3 = x$$

10. Let 2nd proportion be x

$\therefore$ $42 : x :: 70 : 35$

Product of means = Product of Extremes

$$x \times 70 = 35 \times 42 \quad \Rightarrow \quad x = \frac{35 \times 42}{70} \quad \Rightarrow \quad x = 21$$

$\therefore$ 2nd proportion is 21.

11. $l : b = 6 : 3 \qquad 80 : b = 6 : 3$

Product of means = Product of Extremes

$$b \times 6 = 3 \times 80 \quad \Rightarrow \quad b = 40$$

breadth = 40 cm

12. scale actual

$$1 : 90 :: x : 270$$

Product of means = Product of Extreme

$$90 \times x = 270 \times 1 \quad \Rightarrow \quad x = 3$$

$\therefore$ 270 m represent 3 units on map.

13. Let mean proportion be x

$\therefore$ $9 : x :: x : 4 \quad \Rightarrow \quad x \times x = 4 \times 9$

$x^2 = 36 \quad \Rightarrow \quad x = 6$

$\therefore$ mean proportion is 6.

14. high : l = high : l

$$8 : 352 = 12.5 : l$$

Product of means = Product of Extremes

$$352 \times 12.5 = 8 \times l \quad \Rightarrow \quad \frac{352 \times 12.5}{8} = l$$

$$44 \times 12.5 = l \quad \Rightarrow \quad 550 = l$$

$\therefore$ 12.5 cm high tin hold 550 litres of oil.

Exercise 7.3

1. 12 kg of sugar cost = ₹ 264

1 kg of sugar cost = ₹ $\frac{264}{12}$

31 kg of sugar cost = ₹ $\frac{264}{12} \times 31$ = ₹ 682

2. Price of 15 articles = ₹ 360

Price of 1 article = ₹ $\frac{360}{15}$

Price of 21 articles = ₹ $\frac{360}{15} \times 21$ = ₹ 504

3. (a) 180 km travelled in = 4 hours

1 km travelled in = $\frac{4}{180}$ hours

400 km travelled in = $\frac{4}{180} \times 400$ hours

$= \frac{\cancel{4}}{\cancel{180}_{3}} \times 400 \times 60$ minutes = 8 hrs. 53 min 20 sec

(b) In 4 hours car travels = 180 km

In 1 hour car travels = $\frac{180}{4}$ km

In 12 hours car travels = $\frac{180}{4} \times 12$ km = 540 km

4. For ₹ 6825 chairs purchased = 13

For ₹ 1 chairs purchased = $\frac{13}{6825}$

For ₹ 5250 chairs purchased = $\frac{13}{6825} \times 5250$

For ₹ 5250 chairs purcahsed = 10.

5. In 12 months person saves = ₹ 12522

In 1 month person saves = ₹ $\frac{12522}{12}$

In 3 months person saves = ₹ $\frac{12522}{12} \times 3$ = ₹ 3130.50

6. For ₹ 15pens bought = 12

For ₹ 1 pens bought = $\frac{12}{15}$

For ₹ 43.75 pens bought = $\frac{12}{15} \times 43.75$

For ₹ 43.5 pens bought = 35.

7. 84 km journey cost = ₹ 189

1 km journey cost = ₹ $\frac{189}{84}$

136 km journey cost = ₹ $\frac{189}{84} \times 136$

136 km journey cost = ₹ 306.

8. $\frac{3}{5}$ quintal of rice cost = ₹ 180

1 quintal of rice cost = ₹ $\frac{180}{3/5}$

$\frac{5}{6}$ quintal of rice cost = ₹ $\frac{180}{3/5} \times \frac{5}{6}$ = ₹ $\frac{180 \times 5}{3} \times \frac{5}{6}$ = ₹ 250.

9. For 8 machines mens needed = 20

For 1 machine mens needed = $\frac{20}{8}$

For 12 machines mens needed $= \frac{20}{8} \times 12$

For 12 machines mens needed = 30.

10. For 150 boys meals supplied = 6

For 1 boys meals supplied = 6×150

For 180 boys meals supplied $= \frac{6 \times 150}{180}$

For 180 boys meals supplied = 5.

MCQ's

1. (b) **2.** (a) **3.** (c) **4.** (a) **5.** (b) **6.** (a) **7.** (b) **8.** (c) **9.** (b) **10.** (d) **11.** (b) **12.** (c).

8 Algebraic Expressions

Exercise 8.1

1. (a) $-9 + (-p)$

$= -p - q$

(b) $3(4 - 2q)$

$= 12 - 6q$

(c) $3(j) - 2(k)$

$3j - 2k$

(d) $(111 - 14\,\text{m}) - 18$

$111 - 14\,\text{m} - 18$

$= 93 - 14\,\text{m}$

(e) $(4q - 9c) \times \frac{3}{7}$

$= \frac{12q}{7} - \frac{27c}{7}$

(f) $\frac{2}{3} \times 10x - 4z$

$= \frac{20x}{3} - 4z$

2. (a) $5x + 9$

(b) $(x - 24) - 2$

$x - 24 - 2$

$x - 26$

(c) $8(x + 5)$

$8x + 40$

(d) $\left(1 + \frac{x}{6}\right) \times 8$

$8 + \frac{8x}{6}$

(e) $10 - \frac{40}{x}$

(f) $x \times (-3) + 4$

$-3x + 4$

(g) $(4x - 8) \times 3$

$12x - 24$

(h) $(-x - 2) \times 3$

$-3x - 6$

(i) $7 + \left(8x \times \frac{1}{2}\right)$

$7 + 4x$

(j) $3x - 1$

3. (b) $7a^2b^2$

Here constant = 7 variables = a and b

(c) xy^2

Here constant = 1 variables = x and y

(d) 0

Here constant = 0

(e) $-p^8 q$

Here constant $= -1$ variables $= p$ and q

(f) $10^2 S$

Here constant $= 10^2 = 10 \times 10 = 100$ variables $= S$

(g) $-3x^3 \times 2y^2$

Here constant $= -3 \times 2 = -6$ variables $= x$ and y

(h) $6p^4 q$

Here constant $= 6$ variables $= p$ and q

(i) $100S$

Here constant $= 100$ variables $= S$

(j) $2x^3$

Here constant $= 2$ variables $= x$

(k) $4a + 3b^4$

Here constant $= 4$ and 3 variables $= a$ and b

(*l*) $a^3 x^2 y$

Here constant $= 1$ variables $= a, x$ and y

(m) $7x^3 y^2$

Here constant $= 7$ variables $= x$ and y

(n) -5

Here constant $= -5$

4. (a) $7x^3$

$7 \times x \times x \times x$

(b) $8a^3 b$

$8 \times a \times a \times a \times b$

(c) $-6ab^2$

$-6 \times a \times b \times b$

(d) p^5

$p \times p \times p \times p \times p$

(e) $-xy^7$

$-x \times y \times y \times y \times y \times y \times y \times y$

(f) ab

$a \times b$

(g) $-9pq^3$

$-9 \times p \times q \times q \times q$

(h) $5x^2 y^3$

$5 \times x \times x \times y \times y \times y$

(i) $-2q^3 r^3$

$-2 \times q \times q \times q \times r \times r \times r$

(j) $12x^4 y^2$

$12 \times x \times x \times x \times x \times y \times y$

5. (a) $-1 \times x \times x \times x \times x \times y \times y$

$-1x^3 y^2$

(b) $7 \times a \times a \times a \times a \times b \times b \times b \times b$

$7a^4 b^4$

(c) $p \times p \times p$ (11) times

p^{11}

(d) $-2 \times p \times p \times p \times q \times q$

$-2p^3 q^2$

(e) $10 \times a \times a \times b \times b \times b \times a \times a \times b$

$10a^4 b^4$

(f) $2 \times p \times q \times q \times p \times q$

$2p^2 q^3$

(g) $-1 \times 3 \times w \times w \times x \times y \times y \times z$

$-3w^2 xy^2 z$

(h) $\frac{3}{\cancel{2}} \times \cancel{4}^2 \times q \times q \times r \times r \times s$

$6q^2 r^2 s$

(i) $5 \times 2 \times a \times a \times b \times b$

$10a^2 b^2$

6. (a) Volume $= (\text{side})^3$

$V = a^3$

(b) Perimeter $= 2(\text{length} + \text{breadth})$

$P = 2(x + y)$

(c) Area = length × breadth

$A = x \times y$

$A = xy$

Exercise 8.2

1. (a) $x^2y + x^2y^2 - xy^2 = (1)^2(2) + (1)^2(2)^2 - (1)(2)^2$

$= 1 \times 2 + 1 \times 4 - 1 \times 4$ $(\therefore x = 1,\ y = 2)$

$= 2 + 4 - 4 = 2$

(b) $4a - 3b + c = 4(2) - 3(3) + 5$

$= 8 - 9 + 5$ $(\therefore a = 2, b = 3, c = 5)$

$= 13 - 9 = 4$

(c) $a^2 - 2b^2 + 3c^2 = 0^2 - 2(1)^2 + 3(1)^2$

$= 0 - 2 + 3 = 1$ $(\therefore a = 0, b = 1, c = 1)$

(d) $x^2 - y^2 - z^2 = 1^2 - (-2)^2 - (3)^2$

$= 1 - 4 - 9$ $(\therefore x = 1,\ y = -2,\ z = 3)$

$= 1 - 13 = -12$

(e) $4xyz - 2xy + 3xyz = 4(-1)(2)(1) - 2(-1)(2) + 3(-1)(2)(1)$

$= -8 + 4 - 6$

$= -8 - 6 + 4$ $(\therefore x = -1,\ y = 2,\ z = 1)$

$= -14 + 4 = -10$

(f) $5 + 4x^3 - 4x + 2a = 5 + 4(3)^3 - 4(3) + 2(5)$

$= 5 + 4(27) - 12 + 10$ $(\therefore x = 3, a = 5)$

$= 5 + 108 - 12 + 10$

$= 123 - 12 = 111$

2. $\frac{m^2}{3n} = \frac{6^2}{3(3)} = \frac{36}{9} = 4$ $(\therefore m = 6, \text{and } n = 3)$

3. $\frac{xy}{w} - (x + w) = \frac{25 \times 36}{20} - (25 + 20)$ $(\therefore x = 25,\ y = 36, w = 20)$

$= 5 \times 9 - 45 = 45 - 45 = 0$

4. $3x + (2y \times z) = 3(7) + (2 \times 6 \times 4)$ $(\therefore x = 7,\ y = 6,\ z = 4)$

$= 21 + (12 \times 4) = 21 + 48 = 69$

MCQ's

1. (c) **2.** (a) **3.** (c) 4. (b) **5.** (a) **6.** (c) **7.** (d) **8.** (a) **9.** (b) **10.** (c)

9 Linear Equation in One Variable

Exercise 9.1

1. (a) $2x = x + 3$ (b) $5x - 5 = 10$ (c) $\frac{x}{3} = 6$

(d) $17 = x + 8$ (e) $8x = 40$ (f) $x + 7 = 12$

(g) $2x - 5 = 15$ (h) $x = 10 + 15$ or $x - 10 = 15$

(i) $25 - 2x = 10$ (j) $3x + \frac{x}{3} = 15$

2. (a) 7 more than x is 10 (b) x less then 3 is 7 (c) 7 less than x is 5
(d) x divided by 5 is 7 (e) 4 more than twice a number gives 10
(f) 11 more than x is 17

3. (a) $x+5=8$
$x=8-5$
$x=3$

x	LHS	RHS
1	6	8
2	7	8
3	8	8

(b) $x-3=7$
$\Rightarrow$ $x=7+3$
$x=10$

x	LHS	RHS
8	5	7
9	6	7
10	3	3

(c) $3x=9$
$x=\frac{9}{3}$
$x=3$

x	LHS	RHS
1	3	9
2	6	9
3	9	9

(d) $x+7=7$
$x=7-7$
$x=0$

x	LHS	RHS
1	8	7
2	9	7
0	7	7

(e) $\frac{x}{2}=3$
$\Rightarrow$ $x=6$

x	LHS	RHS
2	1	3
4	2	3
6	3	3

(f) $2x+4=3x$
$\Rightarrow$ $4=3x-2x$
$4=x$

x	LHS	RHS
1	6	3
2	8	6
3	10	9
4	12	12

(g) $10-x=6$
$\Rightarrow$ $x=10-6$
$x=4$

x	LHS	RHS
1	9	6
2	8	6
3	7	6
4	6	6

(h) $x-4=2x-6$
$-4+6=2x-x$
$x=2$

x	LHS	RHS
0	-4	-6
1	-3	-4
2	-2	-2

(i) $2x+3=3x$
$\Rightarrow$ $3x-2x=3$
$\Rightarrow$ $x=3$

x	LHS	RHS
1	5	3
2	7	6
3	9	9

4.

LHS	RHS
$3+2(3)$	9
$=3+6$	$=9$

LHS = RHS

$\therefore$ $x=3$ is the root of $3+2x=9$

5.

LHS		RHS
$5x-8$		$2x-2$
$5(2)-8$		$2(2)-2$
$10-8$		$4-2$
2	=	2

LHS = RHS

$\therefore$ $x=2$ is the root of $5x-8=2x-2$.

Exercise 9.2

1. (a) $x+2=7$

$x=7-2$

$x=5$

Verification

LHS	RHS
Put $x=2$	$=7$
$5+2=7$	
$\therefore$ LHS = RHS	
$\therefore$ Verified	

(b) $x+5=-7$

$x=-7-5$

$x=-12$

Verification

LHS : Put $x=-12$	RHS
$x+5$	$=-7$
$=-12+5=-7$	
$\therefore$ LHS = RHS	
$\therefore$ Verified	

(c) $3-x=1$

$x=3-1$

$x=2$

Verification

LHS : Put $x=2$	RHS
$3-x$	$=1$
$=3-2=1$	
$\therefore$ LHS = RHS	
$\therefore$ Verified	

(d) $x-2=-5$

$x=-5-2$

$x=-7$

Verification

LHS : Put $x=-7$	RHS
$x-2$	$=-7$
$=-5-2=-7$	
$\therefore$ LHS = RHS	
$\therefore$ Verified	

(e) $3x-3=12$

$\Rightarrow$ $3x=12+3$

$\Rightarrow$ $3x=15$

$x=\frac{15}{3}$

$x=5$

Verification

LHS : Put $x=5$	RHS
$3x-3$	$=12$
$=3\times5-3$	
$=15-3=12$	
$\therefore$ LHS = RHS	
$\therefore$ Verified	

(f) $4x-4=16$

$\Rightarrow \quad 4x=16+4$

$\Rightarrow \quad 4x=20$

$x=\frac{20}{4}$

$x=5$

Verification

LHS : Put $x=5$ RHS

$=4x-4$ $=16$

$=4\times5-4$

$=20-4=16$

$\therefore$ LHS = RHS

$\therefore$ Verified

(g) $\frac{3x}{5}=18$

$3x=18\times5$

$x=\frac{18\times5}{3}$

$x=30$

Verification

LHS : Put $x=30$ RHS

$\frac{3x}{5}=\frac{3\times30}{5}$ $=18$

$=18$

$\therefore$ LHS = RHS

$\therefore$ Verified

(h) $6x-5=2x+11$

$6x-2x=11+5$

$4x=16$

$x=\frac{16}{4}$

$x=4$

Verification

LHS : Put $x=4$ RHS : Put $x=4$

$6x-5$ $=2x+11$

$=6\times4-5$ $=2\times4+11$

$=24-5=19$ $=8+11=19$

$\therefore$ LHS = RHS

$\therefore$ Verified

(i) $\frac{x}{2}=\frac{x}{3}+5$

$\Rightarrow \quad \frac{x}{2}-\frac{x}{3}=5$

$\Rightarrow \quad \frac{3x-2x}{6}=5$

$\Rightarrow \quad \frac{x}{6}=5$

$\Rightarrow \quad x=30$

Verification,

LHS : Put $x=30$ RHS: Put $x=30$

$=\frac{x}{2}$ $=\frac{x}{3}+5$

$=\frac{30}{2}$ $=\frac{30}{3}+5$

$=15$ $=10+5=15$

$\therefore$ LHS = RHS

$\therefore$ Verified

2. (a) $3(x+2)-2(x-3)=5$

$\Rightarrow \quad 3x+6-2x+6=5$

$\Rightarrow \quad x=5-12$

$\Rightarrow \quad x+12=5$

$\Rightarrow \quad x=-7$

(b) $\frac{m}{4}-\frac{1}{2}=\frac{m}{3}+1$

$\Rightarrow \quad \frac{m}{4}-\frac{m}{3}=1+\frac{1}{2}$

$\Rightarrow \quad \frac{-m}{12}=\frac{3}{2}$

$\Rightarrow \quad -m=18$

$\Rightarrow \quad \frac{3m-4m}{12}=\frac{3}{2}$

$\Rightarrow \quad -m=\frac{3\times12}{2}$

$\Rightarrow \quad m=-18$

(c) $\frac{3y}{10} - 4 = 11$

$\Rightarrow \frac{3y}{10} = 11 + 4 \quad \Rightarrow \quad y = \frac{15 \times 10}{3} \quad \Rightarrow \quad y = 50$

(d) $\frac{2x}{3} + 8 = \frac{x}{2} - 1$

$\Rightarrow \frac{2x}{3} - \frac{x}{2} = -1 - 8 \quad \Rightarrow \quad \frac{2 \times 2x - 3x}{6} = -9 \quad \Rightarrow \quad \frac{4x - 3x}{6} = -9$

$\Rightarrow \quad \frac{x}{6} = -9 \quad \Rightarrow \quad x = -9 \times 6 \quad \Rightarrow \quad x = -54$

(e) $3(x + 6) + 2(x + 3) = 54$

$\Rightarrow 3x + 18 + 2x + 6 = 54 \quad \Rightarrow 5x + 24 = 54 \quad \Rightarrow 5x = 54 - 24$

$\Rightarrow 5x = 30 \quad \Rightarrow \quad x = \frac{30}{5} \quad \Rightarrow \quad x = 6$

(f) $\frac{m}{4} + 8 = 12$

$\Rightarrow \frac{m}{4} = 12 - 8 \quad \Rightarrow \quad \frac{m}{4} = 4 \quad \Rightarrow m = 16$

(g) $6x + 5 = 3x + 20$

$\Rightarrow 6x - 3x = 20 - 5 \quad \Rightarrow \quad 3x = 15$

$\Rightarrow \quad x = \frac{15}{3} \quad \Rightarrow \quad x = 5$

(h) $12m - 3 = 5(2m + 1)$

$\Rightarrow 12m - 3 = 10m + 5 \quad \Rightarrow 12m - 10m = 5 + 3 \quad \Rightarrow 2m = 8$

$\Rightarrow \quad m = \frac{8}{2} \quad \Rightarrow \quad m = 4$

(i) $2(x - 2) - 3(x - 3) = 5(x - 5)$

$\Rightarrow 2x - 4 - 3x + 9 = 5x - 25 \quad \Rightarrow -x + 5 = 5x - 25 \quad \Rightarrow -x - 5x = -25 - 5$

$\Rightarrow -6x = -30 \quad \Rightarrow \quad x = \frac{30}{6} \quad \Rightarrow \quad x = 5$

3. (a) $3(2 - 5x) - 2(1 - 6x) = 1$

$6 - 15x - 2 + 12x = 1$

$-15x + 12x + 6 - 2 = 1$

$-3x + 4 = 1$

$-3x = 1 - 4$

$-3x = -3$

$x = 1$

Verification

LHS	**RHS**
$3(2 - 5x) - 2(1 - 6x)$	1
$3[2 - 5(1)] - 2[1 - 6(+1)]$	
$3[2 - 5] - 2[1 - 6]$	
$3(-3) - 2(-5)$	
$-9 + 10$	
$1 = 1$	

LHS = RHS

$\therefore$ Verified

(b) $\frac{n}{4} - 5 = \frac{n}{6} + \frac{1}{2}$

$\frac{n}{4} - \frac{n}{6} = 5 + \frac{1}{2}$

$\frac{3n - 2n}{12} = \frac{10 + 1}{2}$

$\frac{n}{12} = \frac{11}{2}$

Verification

LHS	**RHS**
$\frac{n}{4} - 5$	$\frac{n}{6} + \frac{1}{2}$
$\frac{66}{4} - 5$	$\frac{66}{6} + \frac{1}{2}$

$$n = \frac{12 \times 11}{2}$$

$$n = 66$$

$$\frac{66 - 20}{4}$$

$$\frac{46}{4}$$

$$\frac{23}{2}$$

$$11 + \frac{1}{2}$$

$$\frac{11 \times 2 + 1}{2}$$

$$\frac{23}{2}$$

LHS = RHS

$\therefore$ Verified

(c) $\frac{2m}{3} + 8 = \frac{m}{2} - 1$

$$\frac{2m}{3} - \frac{m}{2} = -1 - 8$$

$$\frac{4m - 3m}{6} = -9$$

$$\frac{m}{6} = -9$$

$$m = -9 \times 6$$

$$m = -54$$

Verification

LHS	**RHS**
$\frac{2m}{3} + 8$	$\frac{m}{2} - 1$
$\frac{2(-54)}{3} + 8$	$\frac{-54}{2} - 1$
$2(-18) + 8$	$-27 - 1$
$-36 + 8$	-28
$-28 = -28$	

LHS = RHS

$\therefore$ Verified

(d) $\frac{2x}{5} - \frac{3}{2} = \frac{x}{2} + 1$

$$\frac{2x}{5} - \frac{x}{2} = 1 + \frac{3}{2}$$

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

$$\frac{4x - 5x}{10} = \frac{2 + 3}{2}$$

$$\frac{-x}{10} = \frac{5}{2}$$

$$x = -\frac{5}{2} \times 10$$

$$x = -25$$

Verification

LHS	**RHS**
$\frac{2x}{5} - \frac{3}{2}$	$\frac{x}{2} + 1$
$\frac{2(-25)}{5} - \frac{3}{2}$	$\frac{-25}{2} + 1$
$\frac{-50}{5} - \frac{3}{2}$	$\frac{-25 + 2}{2}$
$-10 - \frac{3}{2}$	$\frac{-23}{2}$
$\frac{-20 - 3}{2}$	
$\frac{-23}{2} = \frac{-23}{2}$	

LHS = RHS

$\therefore$ Verified

(e) $\frac{x - 3}{5} - 2 = \frac{2x}{5}$

$$\frac{(x - 3) - 10}{5} = \frac{2x}{5}$$

$$x - 3 - 10 = 2x$$

$$2x - x = -3 - 10$$

Verification

LHS	**RHS**
$\frac{x - 3}{5} - 2$	$\frac{2x}{5}$
$\frac{-13 - 3 - 2}{5}$	$\frac{2 \times -13}{5}$

$x = -13$

$\frac{-16-10}{5}$ $\quad$ $\frac{-26}{5}$

$\frac{-26}{5}$

LHS = RHS

$\therefore$ Verified

(f) $\frac{3x}{10} - 4 = 14$

$\frac{3x}{10} = 14 + 4$

$\frac{3x}{10} = 18$

$x = \frac{18 \times 10}{3}$

$x = 60$

Verification

LHS	**RHS**
$\frac{3x}{10} - 4$	$\frac{3(60)}{10} - 4$
$3(6) - 4$	14
$18 - 4$	
$14 = 14$	
LHS = RHS	
$\therefore$ Verified	

Exercise 9.3

1. Let the number be x

$\therefore \quad 3x + 5 = 50 \quad \Rightarrow \quad 3x = 50 - 5$

$3x = 45 \quad \Rightarrow \quad x = 15$

$\therefore$ Number is 15.

2. Let Ist number = x $\quad \therefore$ IInd number $x + 18$

$\therefore \quad x + (x + 18) = 92 \quad \Rightarrow \quad 2x + 18 = 92$

$2x = 92 - 18 \quad \Rightarrow \quad 2x = 74$

$\Rightarrow \quad x = 37$

$\therefore$ Numbers are 37 and 37 + 48

37 and 55

3. Let breadth = x $\quad \therefore$ length = $3x$

Perimeter = $2(l + b) \quad \Rightarrow \quad 168 = 2[3x + x]$

$168 = 2(4x) \quad \Rightarrow \quad 168 = 8x$

$168 \div 8 = x \quad \Rightarrow \quad 21 = x$

$\therefore$ Breadth = 21 cm and length $3 \times 21 = 63$ cm

4. Let breadth = x $\quad \therefore$ length = $x + 5$

Perimeter = $2(l + b) \quad \Rightarrow \quad 74 = 2[(x + 5) + x]$

$74 = 2[2x + 5] \quad \Rightarrow \quad 74 = 4x + 10$

$74 - 10 = 4x \quad \Rightarrow \quad 64 = 4x$

$64 \div 4 = x \quad \Rightarrow \quad 16 = x$

$\therefore$ Breadth = 16 m

Length = 16 + 5 = 21 m

5. Let breadth = x cm $\quad \therefore$ length = $x + 7$

Length of wire = Perimeter of Rectangle

$86 = 2(l + b) \quad \Rightarrow \quad 86 = 2[(x + 7) + x]$

$86 = 2(2x + 7) \quad \Rightarrow \quad 86 = 4x + 14$

$86 - 14 = 4x \quad \Rightarrow \quad 72 = 4x$

$72 \div 4 = x \quad \Rightarrow \quad 18 = x$

$\therefore$ Breadth of rectangle = 18 cm

Length of rectangle = 18 + 7 = 25 cm

6. Let number be x

$\therefore \quad 17x + 4 = 225 \quad \Rightarrow \quad 17x = 225 - 4$

$17x = 221 \quad \Rightarrow \quad x = 13$

$\therefore$ Number is 13.

7. Let number be x

$\therefore \quad 5 \times x = 100 \quad \Rightarrow \quad x = \frac{\cancel{100}^{20}}{\cancel{5}} \quad \Rightarrow \quad x = 20$

$\therefore$ Number is 20.

8. Let Ist number = x

$\therefore$ IInd number = $x + 1$

$\therefore$ IIIrd number = $x + 2$

$\therefore \quad x + (x + 1) + (x + 2) = 114 \quad \Rightarrow \quad 3x + 3 = 114$

$3x = 114 - 3 \quad \Rightarrow \quad 3x = 111$

$x = 37$

$\therefore$ Numbers are 37, 37 + 1, 37 + 2 *i.e.,* 37, 38, 39.

9. Let age of Ajay = x years

$\therefore$ Let age of Reena = $(x + 6)$ years

$\therefore \quad x + (x + 6) = 28 \quad \Rightarrow \quad 2x + 6 = 28$

$2x = 28 - 6 \quad \Rightarrow \quad x = 22 \div 2$

$\Rightarrow \quad x = 11$ years

$\therefore$ Age of Ajay = 11 years

and Age of Reena = 11 + 6 = 17 years

10. Let Age of Vikas = x years

$\therefore$ Age of Deepak = $2x$ years

$\therefore \quad 2x - x = 11$

$x = 11$

$\therefore$ Age of Vikas = 11 years

$\therefore$ Age of Deepak = 2 (11) = 22 years

11. Let Age of Rekha = x years

$\therefore$ Age of Mrs. Goel = $(x + 27)$ years

After 8 years

Age of Rekha = $(x + 8)$

Age of Mrs. Goel = $(x + 27) + 8 = x + 35$

$\therefore$ Age of Mrs. Goel = 2 (Age of Rekha)

$x + 35 = 2(x + 8)$

$x + 35 = 2x + 16$

$35 - 16 = 2x - x$

$19 = x$

$\therefore$ Age of Reena = 19 years

Age of Rekha = (19 + 27) = 46 years.

12. Let present age of son = x years

$\therefore$ Present age of man = $4x$ years

After 16 years,

Age of son $= x + 16$

Age of man $= 4x + 16$

$\therefore$ Age of man = 2 (Age of son)

$$4x + 16 = 2(x + 16)$$

$$4x + 16 = 2x + 32$$

$$2x = 16 \quad \Rightarrow \quad x = 8$$

$\therefore$ Present age of son = 8 years

Present age of man $= 4 \times 8 = 32$ years.

13. Let present age of son = x years

$\therefore$ Present age of man = $3x$ years

3 years ago,

Age of son $= x - 3$

Age of man $= 3x - 3$

Age of man = 4 (Age of son) (given)

$$3x - 3 = 4(x - 3)$$

$$3x - 3 = 4x - 12$$

$$-3 + 12 = 4x - 3x$$

$$9 = x$$

$\therefore$ Age of son = 9 years

Age of man $= 3(9) = 27$ years.

14. Let number of 50 paise coins = x

$\therefore$ Number of 25-paise coins = $4x$

$\therefore$ Value of 50 paise coins + value of 25 paise coins = ₹ 30

$$50 \times x + 25(4x) = 3000 \text{ paise}$$

$$50x + 100x = 3000$$

$$150x = 3000 \quad \Rightarrow \quad x = 20$$

$\therefore$ 50-paise coins = 20

25-paise coins = 80

15. Let number of girls = x

$\therefore$ Number of boys $= x + 334$

$\therefore$ No. of girls + no. of boys = 572

$$x + (x + 334) = 572$$

$$2x + 334 = 572$$

$$2x = 572 - 334$$

$$2x = 238$$

$$x = 119$$

$\therefore$ Number of girls = 119

Number of boys $= 119 + 334 = 453$

16. Since, $\angle AOD + \angle DOC + \angle BOC = 180°$

$\Rightarrow \quad 5x° + 3x° + x° = 180°$

$\Rightarrow \quad 9x° = 180°$

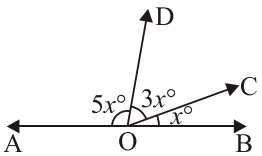
$\Rightarrow \quad x° = \dfrac{180°}{9}$

$x° = 20°$

$\therefore \quad \angle AOD = 5 \times 20° = 100°$

$\angle DOC = 3 \times 20° = 60°$

$\angle BOC = 20° = 20°$



17. Sides of square $= (3x - 8)$ cm and $(x + 14)$ cm

($\therefore$ All sides are equal in square)

$\therefore \quad 3x - 8 = x + 14$

$3x - x = 14 + 8$

$2x = 22$

$x = \frac{22}{2} = 11 \quad \Rightarrow \quad x = 11$

Side of square $= (3x - 8)$ cm $= (3 \times 11 - 8)$ cm $= 33 - 8$ cm $= 25$ cm

Perimeter of square $= 4\,(3x - 8)$ cm

$= 4\,(3 \times 11 - 8)$ cm [$\therefore$ Perimeter of square = 4 (sides)]

$= 4 \times 25$ cm $= 100$ cm

18. Given, length of figure $= (4a + 3)$cm

Breadth of figure $= (2a + 1)$ cm

Given, perimeter of figure $= 10a + 12$

Then $10a + 12 = 2[(4a + 3) + (2a + 1)] = 2[4a + 3 + 2a + 1]$

$10a + 12 = 2 \times (6a + 4)$

$10a + 12 = 12a + 8$

$12 - 8 = 12a - 10a$

$2a = 4$

$a = \frac{4}{2}$

$a = 2$

MCQ's

1. (b) **2.** (a) **3.** (b) **4.** (c) **5.** (a)

10 Basic Geometrical Concepts (2D Shapes)

Exercise 10.1

1. A ray has one end point whereas line has no end point.

2. Line is of infinite length.

3. Only one line can pass through P and Q.

4. (i) Points are A, B, C, D, E, F, G, H

lines are $AB, BC, CD, DA, EF, FG, GH, HE, AE, BF, CG, DH$

(ii) Points are O, P, Q, R and S

lines are $PQ, QR, RS, SP, OP, OQ, OR$ and OS.

5. (a) $\overleftrightarrow{PQ}$ (b) $\overleftrightarrow{a}$

6. (a) $AE \,||\, BF \,||\, CH \,||\, DI$.

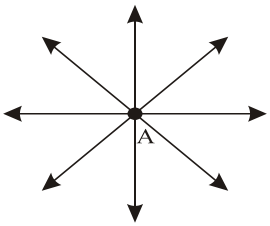
(b) AE and AD; AG and GJ; AE and EF; BF and BC, GI and DI are 5 pairs of inter-secting lines.

(c) JG and DI have point of intersection J.

(d) AG and BF have point of intersection K.

7. (a) $\overleftrightarrow{CD}$ (line) (b) $\overline{AB}$ (line segment) (c) $\overrightarrow{AB}$ (ray)

8.



Yes, we can draw more lines through A.

9. (a) true (b) true (c) true (d) false (e) false (f) false (g) true (h) false (i) false (j) false (k) true.

Exercise 10.2

1. (a) Open figure (b) closed figure (c) closed figure (d) open figure.

2. Point outside the figure = E, Q, L, B, A, P

Point inside the figure = Z, D, S, C, N

Points on the figure = R, F, M, K, T

Exercise 10.3

1. (a) $\angle POR$ (b) $\angle KLM$.

2. Angles are $\angle EOD$, $\angle EOC$, $\angle EOB$, $\angle EOA$

$\angle DOC$, $\angle DOB$, $\angle DOA$

$\angle COB$, $\angle COA$

$\angle BOA$

3. Points in the interior of $\angle ABC = D, G, E$

Points in outside of $\angle ABC = H, J, F$

4. $\angle 1 > \angle 2$

5. $\angle 1 = \angle AOB$; $\angle 2 = \angle BOC$ $\angle 3 = \angle COD$; $\angle 4 = \angle DOE$

$\angle 5 = \angle EOF$; $\angle 6 = \angle AOF$

Exercise 10.4

1. Triangles are ΔPOQ, ΔQOR, ΔROS, ΔSOP, ΔPQR, ΔQRS, ΔRSP, ΔSPQ,

2. (a) Side opposite to $\angle P = RQ$.

(b) Side opposite to $\angle R = PQ$.

(c) angle opposite to side $QR = \angle P$.

3. (a) Points interior of ΔPQR are D, N, C.

(b) Points on the ΔPQR are M, S, Z.

(c) Points in the exterior of ΔPQR are A, B, L and Y.

4. Altitudes are PT, RU, QS.

Exercise 10.5

1. (a) 4-sides ; they are PQ, QR, RS and SP.

(b) 4-angles; they are $\angle P, \angle Q, \angle R$ and $\angle S$.

(c) 4-vertices; they are P, Q, R and S.

(d) Adjacent sides are :

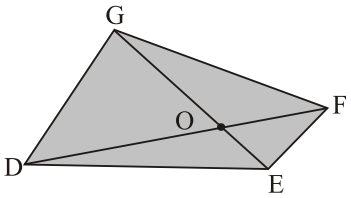
(PQ, QR); (QR, RS); (RS, SP); (SP, PQ).

(e) Opposite sides are (PQ, RS); (QR, SP).

(f) Adjacent angles are $(\angle P, \angle Q)$; $(\angle Q, \angle R)$; $(\angle R, \angle S)$ and $(\angle S, \angle P)$.
(g) Opposite angles are $(\angle P, \angle R)$ and $(\angle Q, \angle S)$.
(h) 2 diagonals are PR and QS.
(i) No.

2. A Quadrilateral in which the measure of each angle is less than 180° is called a convex Quadrialteral.

3.

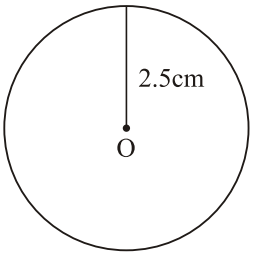


4.

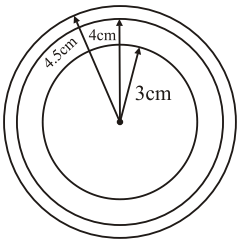
(a) A Quadrilateral has **4** sides and **2** diagonals.
(b) Two sides of a quadrilateral are said to be **adjacent** if they have a common end point.
(c) A quadrilateral has two pairs of opposite angles.
(d) A quadrilateral divides the plane of paper into **three** parts.

Exercise 10.6

1.

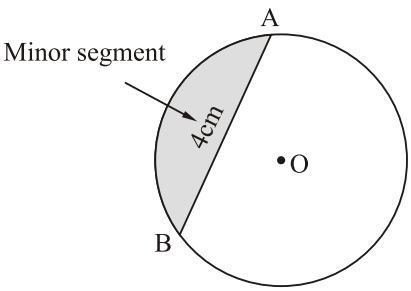


2.

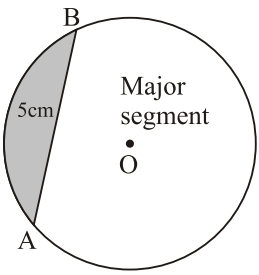


3. $r = \frac{d}{2} = \frac{14}{2} \therefore$ radius = 7 m

4.



5.



6. (a) Point A lies in the **interior** of both the circles.
(b) Point B lies in the **exterior** of the smaller circle and is in the **interior** the bigger circle.
(c) Point C lies in the **exterior** of both the circles.

7. (a) Diameter of the circle is ***BC*.**
(b) O is the **centre** of the circle.
(c) Tangent of the circle is ***MN*.**
(d) ED is a **secant** of the circle.
(e) ***OA*** is a radius of the circle.
(f) If length of OA is 3 cm, length of BC is **6 cm.**

(g) If BC is 10 cm long, length of OC is **5 cm.**

(h) MN is a **tangent** of the circle.

MCQ's

1. (d) **2.** (b) **3.** (b) **4.** (a) **5.** (a) **6.** (c) **7.** (c) **8.** (b) **9.** (b) **10.** (a) **11.** (c) **12.** (b) **13.** (a) **14.** (b) **15.** (c).

11 Understanding Elementary Shapes

Exercise 11.1

1. (a) $AB = 3\,\text{cm}$ (b) $PQ = 5\,\text{cm}$ (c) $MN = 6\,\text{cm}$

2. $AB = 4$ cm, $BC = 2$ cm, $CD = 3.5$ cm and $AD = 3$ cm

3. (a) $AB + BC + CD + DA$
$= 3.5 + 2 + 3.5 + 2$
$= 7\text{ cm} + 4\text{ cm}$
$= 11\text{ cm}$

(b) $PQ + QR + RS + SP$
$= 2 + 2 + 2 + 2$
$= 8\,\text{cm}$

(c) $MN + NP + PM = 4\text{ cm} + 3\text{ cm} + 5\text{ cm} = 12\,\text{cm}$

4. Do it yourself

5. (a) 50° (b) 130° (c) 20° (d) 30° (e) 130° (f) 70°

6. (a) $\angle A = \angle B = \angle C = \angle D = 90°$ (b) $\angle P = \angle R = 45°$; $\angle S = \angle Q = 135°$

(c) $\angle X = \angle Y = 65°$; $\angle Z = 50°$

Exercise 11.2

1. Intersecting lines — in (a), (b), (e) and (f)
Intersecting lines — in (c) and (d)

2. Pairs of parallel lines = $(l, m), (r, s)$
Pairs of perpendicular lines = $(l, r)\,(l, s)\,(m, r)(m, s)$

3. Pair of intersecting lines = $(l,\ p)\,(l, q)\,(m,\ p)(m, q)$
Pair of parallel lines = $(l, m)\,(p, q)$

4. (a) Pairs of parallel lines segments = $(\overline{AB}, \overline{ED}), (\overline{BC}, \overline{FE}), (\overline{CD}, \overline{AF})$

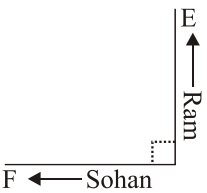
(b) Pairs of parallel lines segments = $(\overline{AB}, \overline{PQ}), (\overline{AC}, \overline{QR}), (\overline{BC}, \overline{RP})$

5. Pairs of perpendicular line segment = $(\overline{AB}, \overline{DM}), (\overline{AB}, \overline{BN}), (\overline{CD}, \overline{DM}), (\overline{CD}, \overline{BN})$
Pairs of parallel line segment = $(\overline{DM}, \overline{NB}), (\overline{AB}, \overline{DC}), (\overline{BC}, \overline{AD})$

Exercise 11.3

1. (a) acute angle (b) obtuse angle (c) Right angle
(d) reflex angle (e) straight angle

2. Angle between them = 90°



3. (a) 45° — acute angle (b) 0° — zero angle
(c) 180° — straight angle (d) 270° — reflex angle
(e) 135° — obtuse angle (f) 75° — acute angle
(g) 130° — obtuse angle

4. (a) acute angle (b) straight angle (c) right angle

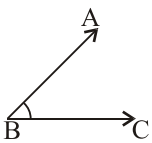


(d) 0° or complete angle (e) obtuse angle (f) acute angle

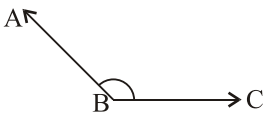


(g) obtuse angle

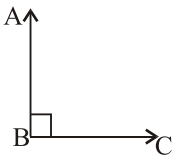
5.



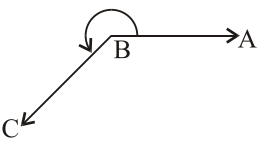
Acute angle



Obtuse angle



Right angle



Reflex angle

6. (a) One right angle = 90° (b) One straight angle = 180°
(c) One complete angle = 360°

7. We know that there are 4 right angle in one turn of a wheel. So there will be 4 + 4 + 2 = 10 right angle in two and half turns.

8. Acute angle — string of flying kite
Right angle — A straight poll on the surface of earth.
Obtuse angle — When we bent our elbow slightly it becomes obtuse angle.

9. (a) South (b) North

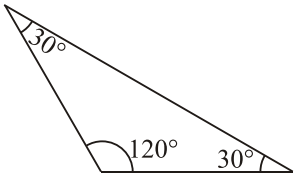
10. Angle between a pair of adjacent spokes = $\frac{360°}{48}$ = 7.5°

Exercise 11.4

1.

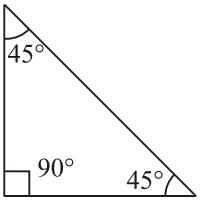
	Measure of the triangle	Type of triangle
(a)	3 equal sides	(vi) equilateral triangle
(b)	2 equal sides	(v) isosceles triangle
(c)	3 acute angles	(iv) acute-angled triangle
(d)	One right angle	(ii) right-angled triangle
(e)	One obtuse with two equal sides	(i) obtuse-isosceles triangle
(f)	all acute angles with all different sides	(iii) acute scalene triangle

2. (a)



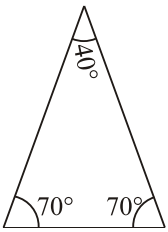
obtuse angled triangle

(b)



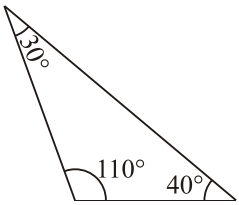
right angled triangle

(c)



acute angled triangle

(d)



obtuse angled triangle

3. (a) (i) right angled triangle, (ii) isosceles triangle

(b) (i) acute angled triangle (ii) equilateral triangle

(c) (i) obtuse angled triangle (ii) scalene triangle

(d) (i) acute angled triangle (ii) isosceles triangle.

4. Let first angle = $x°$

and second angle = $x°$ [isosceles triangle is two angle equal]

Then we know that

$$\Rightarrow \quad x° + x° + 130° = 180°$$

$$\Rightarrow \quad 2x° + 130° = 180°$$

$$2x° = 180° - 130°$$

$$2x° = 50°$$

$$x° = \frac{50}{2}$$

$$\Rightarrow \quad x = 25°$$

Therefore first angle is 25° and second angle is 25°.

5. Let $\angle PRQ = x°$

We know that

$$\angle RPQ + \angle RQP + \angle PRQ = 180°$$

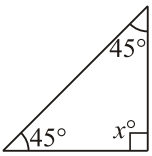
$$45° + 45° + x° = 180°$$

$$90° + x° = 180°$$

$$x° = 180 - 90°$$

$$x° = 90°$$

$$\therefore \quad \angle PRQ = 90°$$



6. So, an equilateral triangle is a triangle that has all side equal and three angles equal and each angle is 60°.

7. No, sum of three angles of triangle is 180°

Exercise 11.5

1. (a) True (b) False, every rectangle is a parallelogram

(c) True (d) True

(e) False, A square is a special form of rectangle

2.

Column A	Column B
(a) Opposite sides and parallel and equal	(iii) Parallelogram
(b) All angles are equal	(ii) Rectangle
(c) Diagonals bisect each other at right angles	(i) Rhombus

3. (i) Equilateral triangle $\rightarrow \Delta ABC$ (ii) Right triangle $\rightarrow \Delta ACD$

(iii) Rectangle $\rightarrow AGCE$ (iv) Trapezium $\rightarrow AGFC$

(v) Parallelogram $\rightarrow AGFD$

4. Do it your self

5. (a) **Square**

(i) Opposite sides are parallel

(ii) The diagonals bisect each other at 90°

(iii) All sides are equal

Rhombus

(i) Opposite sides are parallel

(ii) The diagonals bisect each at 90°

(iii) All sides are equal

(b) **Rectangle**

(i) All angles measure 90°

(ii) Diagonals bisect each other

(iii) Diagonals are equal in length

Square

(i) All angles are right angles

(ii) The diagonals bisect each other at 90°

(iii) The diagonals are equal in length.

(c) **Parallelogram**

(i) Opposite side are parallel

(ii) Diagonals bisect each other

Rectangle

(i) Opposite sides are parallelogram and parallel

(ii) Diagonals bisect each other

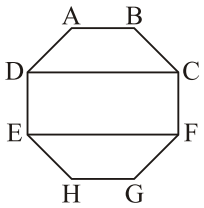
Rhombus

(i) Opposite sides are parallel

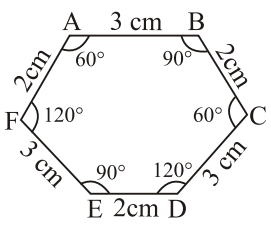
(ii) The diagonals bisect each other at 90°

6. Given

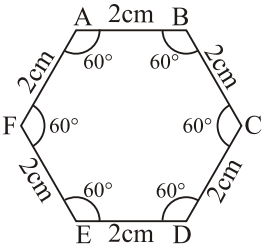
a octagon *ABCDEFGH* and *A* rectangle *DCEF*



7. Irregular hexagon has unequal sides whereas in a regular hexagon all sides and all angles are equal.

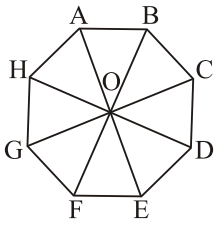


Irregular hexagon



Regular hexagon

8. Heptagon has 4 diagonals



Exercise 11.6

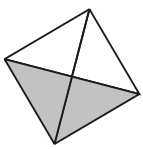
1.

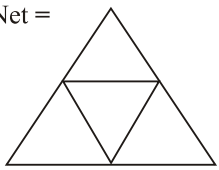
	Shapes	Objects
(a)	Sphere	(ii) A cricket ball
(b)	Cylinder	(i) A coke can
(c)	Cuboid	(iv) A chalk duster
(d)	Cube	(iii) A dice

2.

	Shape	Edges	Vertices	Faces
(a)	Cuboid	12	8	6
(b)	Cube	12	8	6
(c)	Cylinder	0	0	3
(d)	Cone	0	1	2
(e)	Sphere	0	0	1
(f)	Triangular prism	9	6	3
(g)	Triangular pyramid	6	4	4
(h)	Square pyramid	8	5	4

3. (a) 2 triangles (b) 4 triangles

4. Triangular prism 

Net = 

MCQ's

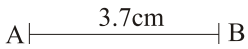
1. (c) **2.** (d) **3.** (b) **4.** (a) **5.** (a) **6.** (c) **7.** (a) **8.** (c) **9.** (c) **10.** (a)

12 Constructions

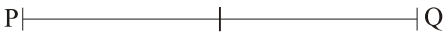
Exercise 12.1

1. (a) C ——— 5.5cm ——— D (b) P ——— 7.7cm ——— Q

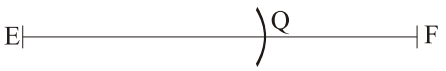
(c) E ——— 4.5cm ——— F

2. (a) 

$\therefore$ $AB + CD$

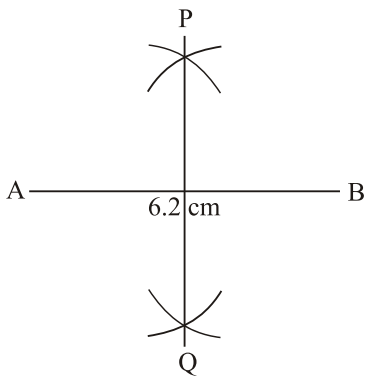


$PQ = AB + CD$

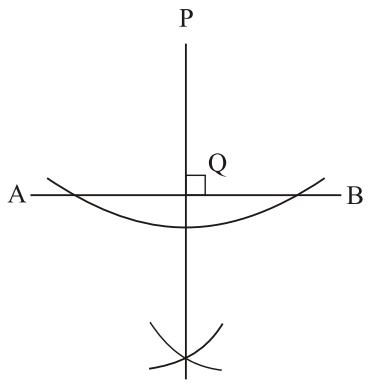
(b) 

$EF = CD + AB$

3. PQ is perpendicular bisector of $AB = 6.2$ cm.



4. PQ is perpendicular to $AB = 5$ cm where P is outside the line.



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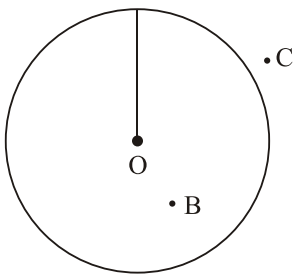

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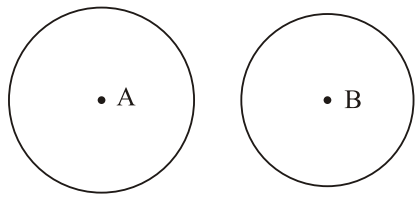

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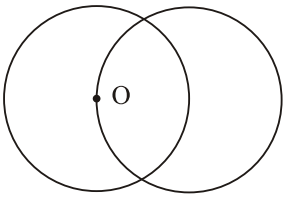
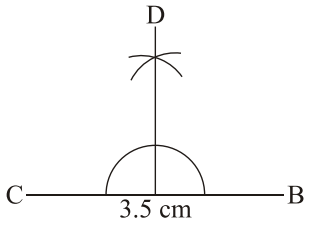


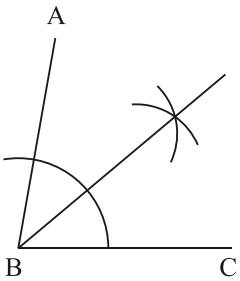
8. AD is perpendicular to BC at A.



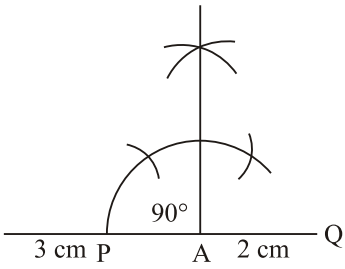
AD is perpendicular to BC at A.

Exercise 12.2

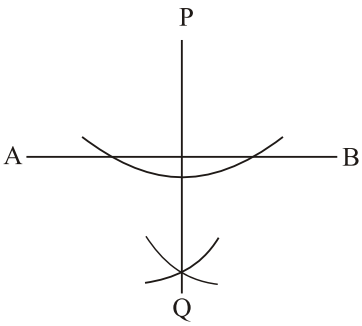
1.



2.

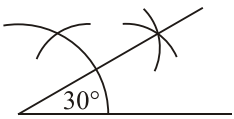


3.

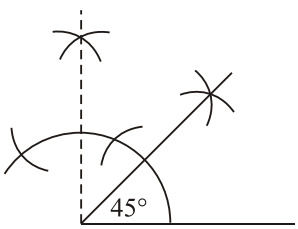


$PQ \perp AB$

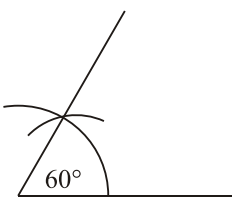
4. (a)



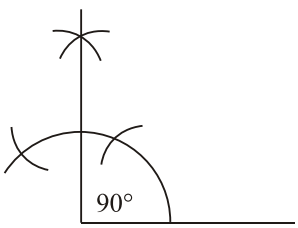
(b)



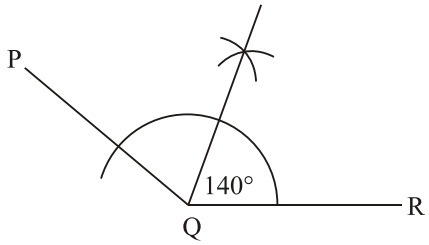
(c)



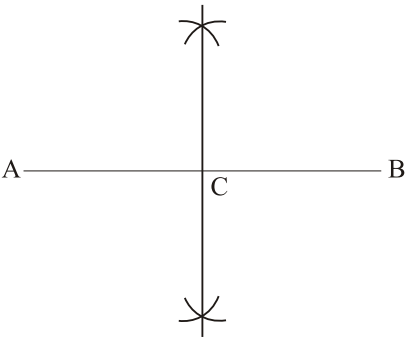
(d)



5.

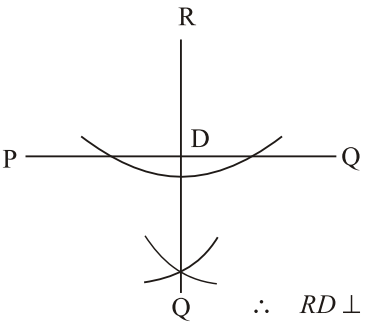


6.



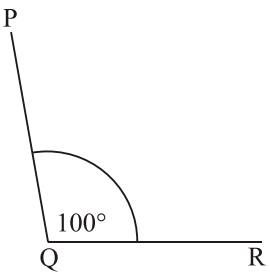
$AC = BC = 4.5$ cm, $AB = 9$ cm

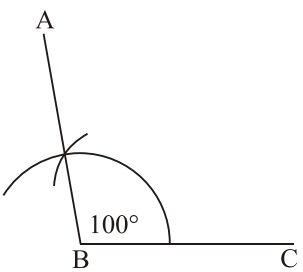
7.



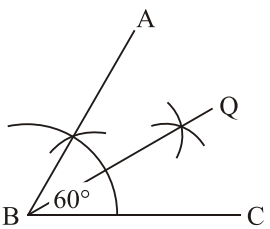
$\therefore \quad RD \perp PQ$

8.



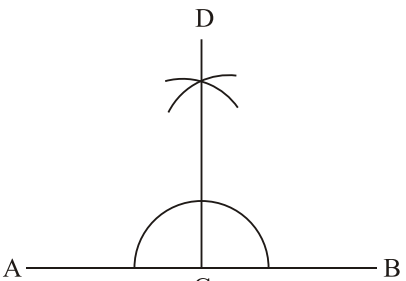


9.



BQ is bisector $\angle ABC = 60°$

10.



$CD \perp AB$

MCQ's

1. (b) **2.** (c) **3.** (a) **4.** (c) **5.** (d) **6.** (c)

13 Perimeter and Area

Exercise 13.1

1. (a) Perimeter = 3 cm + 4 cm + 5 cm = 12 cm

(b) Perimeter = 5 cm + 6 cm + 1 cm + 7 cm = 19 cm

(c) Perimeter = 6 cm + 4 cm + 4 cm + 4 cm = 18 cm

(d) Perimeter = 4 cm + 6 cm + 3 cm + 3 cm + 6 cm = 22 cm

2. (a) Length = 20 cm

Breadth = 12 cm

Perimeter = $2(l + b)$

$= 2(20 + 12)$

$= 2(32) = 64$ cm

(b) Length = 15 cm

Breadth = 12 cm

Perimeter = $2(l + b)$

$= 2(15 + 12)$

$= 2 \times 27 = 54$ cm

3. (a) Side = 10 cm

Perimeter = 4 × side

$= 4 \times 10 = 40$ cm

(b) Side = 12 cm

Perimeter = 4 × side

$= 4 \times 12 = 48$ cm

(c) Side = 25 cm

Perimeter = 4 × side

$= 4 \times 25 = 100$ cm

(d) Side = 30 cm

Perimeter = 4 × side

$= 4 \times 30 = 120$ cm

4. (a) $AB = 7$ cm, $BC = 8$ cm and $CA = 9$ cm

Perimeter = $AB + BC + CA$

= 7 cm + 8 cm + 9 cm = 24 cm

(b) $AB = 10$ cm, $BC = 11$ cm and $CA = 13$ cm

Perimeter = $AB + BC + CA$

= 10 cm + 11 cm + 13 cm = 34 cm

5. Length = 60 m, breadth = 45 m

Perimeter = $2(l + b) = 2(60 + 45)$

$= 2 \times 105 = 210$ m

So, length of the boundary wall = 210 m

6. Side = 80 m

Perimeter = 4 × side = 4 × 80 m = 320 m

So, boy has to cover (320 + 320 = 640 m) distance is twice round.

7. Let, $b = x$, $l = 2x$

$$\text{Perimeter} = 2(l + b)$$
$$60 = 2(2x + x)$$
$$60 = 2 \times 3x$$
$$6x = 60$$
$$x = \frac{\cancel{60}^{10}}{\cancel{6}}$$
$$x = 10 \text{ m}$$

So, breadth = 10 m, length = 20 m

8. $P = 36$ cm

$$P = 4 \times \text{Side}$$
$$36 = 4 \times \text{Side}$$

$$\text{Side} = \frac{\cancel{36}^{9}}{\cancel{4}}$$

$$\text{Side} = 9\,\text{cm}$$

9. Perimeter of triangle = 50 cm

One side = 15 cm

Second side = 16 cm

Third side = ?

$\therefore$ Third side = Perimeter – one side – second side

= 50 – 15 – 16

= 35 – 16 = 19 cm

10. Perimeter of regular hexagon = 36 cm

$\therefore$ $\text{Side} = \frac{\text{Perimeter}}{6} = \frac{36}{6} = 6$

Side = 6

11. Length = 400 m, breadth = 250 m

Perimeter $= 2(l + b) = 2(400 + 250)$

$= 2(650\,\text{m}) = 2 \times 650\,\text{m} = 1300\,\text{m}$

So, the length of wire needed = $4 \times 1300\,\text{m} = 5200\,\text{m}$

12. Perimeter of Isosceles triangle = 40 cm

One equal side = 10 cm

Second equal side = 10 cm

$\therefore$ Third side = perimeter – one side – second side

= 40 – 10 – 10 = 20 cm

13. Length of wire = perimeter of square

So, Perimeter of square = 4 × Side

$60 = 4 \times \text{Side}$

$$\text{Side} = \frac{\cancel{60}^{15}}{\cancel{4}}$$

Side = 15 cm

14. Nine rectangles can be drawn with dimensions :

1×17	6×12
2×16	7×11
3×15	8×10
4×14	9×9
5×13	

15. $l = 30\,\text{m}$, $b = 20\,\text{m}$

Perimeter $= 2(l + b) = 2(30 + 20)$

$= 2 \times 50\,\text{m} = 100\,\text{m}$

So, she needs $400 \div 100 = 4$ round of the field to run 400 m race.

16. length = $7x$, breadth = $5x$

Given, length = 70 m

$7x = 70$

$$x = \frac{\cancel{70}^{10}}{\cancel{7}}$$

$x = 10$

So, breadth $= 5 \times 10 = 50$ m

Perimeter $= 2(l + b) = 2(70 + 50)$

$= 2 \times 120$ m $= 240$ m

$\therefore$ Cost of fencing the field $= 8 \times 240 = ₹\ 1920$

17. (a) Perimeter $= 120$ cm

$$\text{Measurement of side} = \frac{\text{Perimeter}}{\text{No. of sides}} = \frac{\cancel{120}^{40}}{\cancel{3}_{1}} = 40 \text{ cm}$$

(b) Perimeter $= 120$ cm

$$\text{Measurement of side} = \frac{\text{Perimeter}}{\text{No. of sides}} = \frac{\cancel{120}^{30}}{\cancel{4}_{1}} = 30 \text{ cm}$$

(c) Perimeter $= 120$ cm

$$\text{Measurement of side} = \frac{\text{Perimeter}}{\text{No. of sides}} = \frac{\cancel{120}^{24}}{\cancel{5}_{1}} = 24 \text{ cm}$$

(d) Perimeter $= 120$ cm

$$\text{Measurement of side} = \frac{\text{Perimeter}}{\text{No. of sides}} = \frac{\cancel{120}^{20}}{\cancel{6}_{1}} = 20 \text{ cm}$$

(e) Perimeter $= 120$ cm

$$\text{Measurement of side} = \frac{\text{Perimeter}}{\text{No. of sides}} = \frac{\cancel{120}^{15}}{\cancel{8}_{1}} = 15 \text{ cm}$$

18. (a) Perimeter $= 15 + 15 + 15 + 15 = 60$ cm

(b) Perimeter $= 20 + 10 + 20 + 10 = 60$ cm

(c) Perimeter $= 15 + 20 + 25 = 60$ cm

(d) Perimeter $= 10 + 10 + 10 + 10 + 10 + 10 = 60$ cm

Exercise 13.2

1. (a) Area of given figure $= 4$ sq. units

(b) Area of given figure $= 6$ sq. units

(c) Area of given figure $= 6$ sq. units

(d) Area of given figure $= 5$ sq. units

2. (a) Area of given figure ≈ 6 sq. unit

(b) Area of given figure $\approx 12 + 2 = 14$ sq. unit

(c) Area of given figure ≈ 8 sq. unit

(d) Area of given figure ≈ 6 sq. unit

3. (a) Area of given figure $\approx 72\frac{1}{2}$ sq. unit

(b) Area of given figure $\approx 37\frac{1}{2}$ sq. unit

4. Do yourself

Exercise 13.3

1. (a) length $= 6$ cm, breadth $= 5$ cm

Area $=$ length $\times$ breadth

$= 6$ cm $\times 5$ cm

$= 30\text{ cm}^2$

(b) length $= 10$ cm, breadth $= 8$ cm

Area $=$ length $\times$ breadth

$= 10$ cm $\times 8$ cm

$= 80\text{ cm}^2$

(c) length = 25 cm, breadth = 16 cm

Area = length × breadth

= 25 cm × 16 cm

= 400 cm^2

2. (a) Side = 3 cm

Area = side × side

= 3 cm × 3 cm

= 9 cm^2

(b) Side = 9 cm

Area = side × side

= 9 cm × 9 cm

= 81 cm^2

(c) Side = 16 cm

Area = side × side

= 16 cm × 16 cm

= 256 cm^2

(d) Side = $10\frac{1}{2}$ cm

Area = side × side

$= 10\frac{1}{2} \times 10\frac{1}{2} = \frac{21}{2} \times \frac{21}{2}$

$= \frac{441}{4} = 110.25$ cm^2

3. length = 60 m, breadth = 42 m

Area = length × breadth

= 60 m × 42 m = 2520 m^2

4. length = 20 cm

breadth = 16 cm

Area = length × breadth

= 20 cm × 16 m = 320 cm^2

Side = 11 cm

Area = side × side

= 11 cm × 11 cm

= 121 cm^2

So, the area of rectangle is greater and area of square is smaller and smaller by = 320 – 121 = 199 cm^2

5. (a) Let side = x

Area = x^2

Now, side = $2x$

So, Area = $2x \times 2x = 4x^2$

So, Area becomes four times of previous one.

(b) Now, side = $\frac{x}{2}$

Area = $\frac{x}{2} \times \frac{x}{2} = \frac{x^2}{4}$

So, area becomes one-fourth of previous one.

(c) Now, side = $3x$

Area = $3x \times 3x = 9x^2$

So, area becomes nine times of previous one.

6. (a) Lets $l = x$, $b = y$

Area = $l \times b = x \times y = xy$

Now, $l = 2x$, $b = y$

Area = $l \times b = 2x \times y = 2xy$

So, area will be double when length gets double.

(b) Now $l = x$ and $b = 2y$

$$\text{Area} = l \times b$$
$$= x \times 2y = 2xy$$

So, area will be double when breadth gets double.

(c) Let $l = 2x$ and $b = 2x$

$$\text{Area} = l \times b$$
$$= 2x \times 2y = 4xy$$

So, area will be four times, when length and breadth gets double.

7. $1\text{ cm} = 10\text{ mm}$

$1\text{ cm}^2 = 10\text{ mm} \times 10\text{ mm} = 100\text{ mm}^2$

So, $1\text{ cm}^2 = 100\text{ mm}^2$

8. $\text{No. of tiles} = \dfrac{\text{Area of bathroom}}{\text{Area of tile}}$

$$= \frac{3\text{ m} \times 3\text{ m}}{20\text{ cm} \times 20\text{ cm}}$$

$$= \frac{3 \times 100\text{ cm} \times 3 \times 100\text{ cm}}{20\text{ cm} \times 20\text{ cm}} = 225$$

9. length $= 20\text{ m}$,

$\text{breadth} = \dfrac{2}{5} \times 20\text{ m} = 8\text{ m}$

$\text{Area} = l \times b = 20 \times 8 = 160\text{ m}^2$

$\therefore$ Cost of labelling $= 12 \times 160 = ₹\ 1920$

10. $l = 4\text{ m} = 400\text{ cm}$,

$b = 1\text{m } 25\text{ cm} = 100\text{ cm} + 25\text{ cm} = 125\text{ cm}$ [$1\text{ m} = 100\text{ cm}$]

$$\text{Area} = l \times b = 400 \times 125$$
$$= 50000\text{ cm}^2 \text{ or } \frac{50000}{10000}\text{ m}^2$$
$$= 5\text{ m}^2$$

11. $\text{No. of bricks} = \dfrac{\text{Area of wall}}{\text{Area of a brick}}$

$$= \frac{30\text{ m} \times 20\text{ m}}{25\text{ cm} \times 12\text{ cm}}$$

$$= \frac{30 \times 100\text{ cm} \times 20 \times 100\text{ cm}}{25\text{ cm} \times 12\text{ cm}}$$

$$= 200 \times 100 = 20000$$

12. Area $= 15$ sq. m, length $= 5\text{ m}$

$\text{Breadth} = \dfrac{\text{Area}}{\text{length}} = \dfrac{15}{5} = 3\text{ m}$

MCQ's

1. (a) **2.** (d) **3.** (b) **4.** (d) **5.** (c) **6.** (a) **7.** (c) **8.** (b)

14 Data Handling

Exercise 14.1

1.

Number	Tally mark	Frequency
1	‖	2
2	‖‖	3
3	‖‖	3
4	𝍸 ‖	7
5	𝍸		6
6	𝍸 ‖	7
7	𝍸	5
8	‖‖	4
9	‖‖	3

(a) $5 + 4 + 3 = 12$ students

(b) $2 + 3 + 3 = 8$ students

2. (a) 100 (b) 37 (c) 2 (d) 5

(e) (i) One group 30 to 39 $\Rightarrow$ 37, 39

(ii) Second group 40 to 49 $\Rightarrow$ 44, 48,48

(iii) Third group 50 to 59

$\Rightarrow$ $50 < 52 < 53 < 55 < 56 < 58 < 59$

(iv) 60 to 69

$60 < 61 < 62 < 64 < 67 < 68 < 70$

(v) 70 to 79

$70 < 75 < 77 < 78$

(vi) 80 to 89

$84 < 88 < 90$

(vii) 90 to 100

$90 < 98 < 100$

3.

No. of children	Tally marks	Frequency
1	𝍸		6
2	𝍸 ‖‖	8
3	‖‖	4
4	‖	2

(a) 8 (b) 4 (c) 1 (d) 2

4.

Flight Number	Tally mark	Frequency
1055	𝍸 |	8
1056	𝍸	5
1476	|	1
1578	|	1
2001	|	1
2033	|	1
2044	𝍸	5
2046	|||	3
2048	|||	3
2218	|	1
2255	|	1

(a) 15 (b) 15 (c) 2255 (d) 1200

5. (a) 60 tablets (b) samsung (c) 230 tablets

6. (a) The factory made **300** fans on Tuesday.
(b) The factory made maximum number of fans on **Saturday**.
(c) The factory made minimum number of fans on **Wednesday**.
(d) **350** fans were made on Saturday.
(e) 200 fans are made on **Monday** and **Friday**.

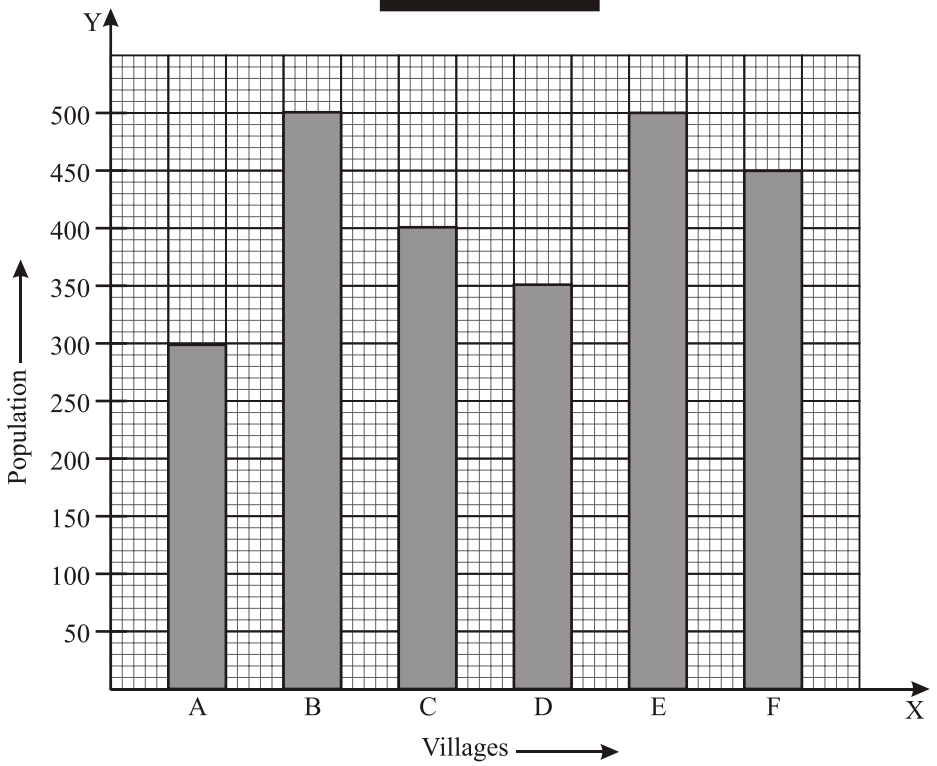
7.

Day	Books Issued
Monday	
Tuesday	
Wednesday	
Thursday	
Friday	
Saturday	

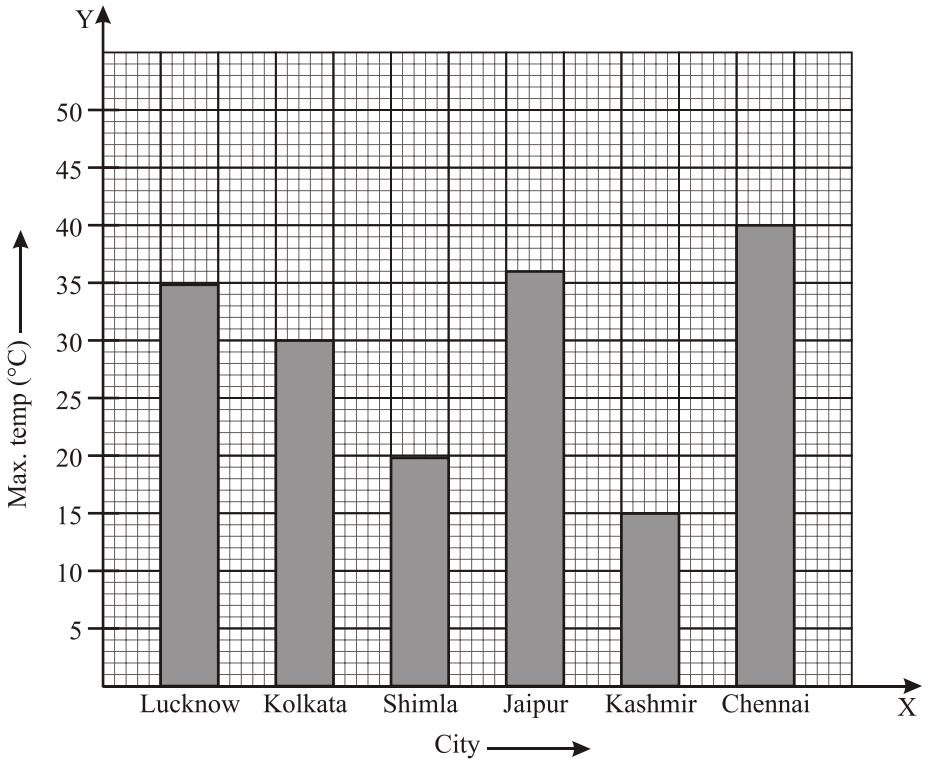
1  = 3 books

Exercise 14.2

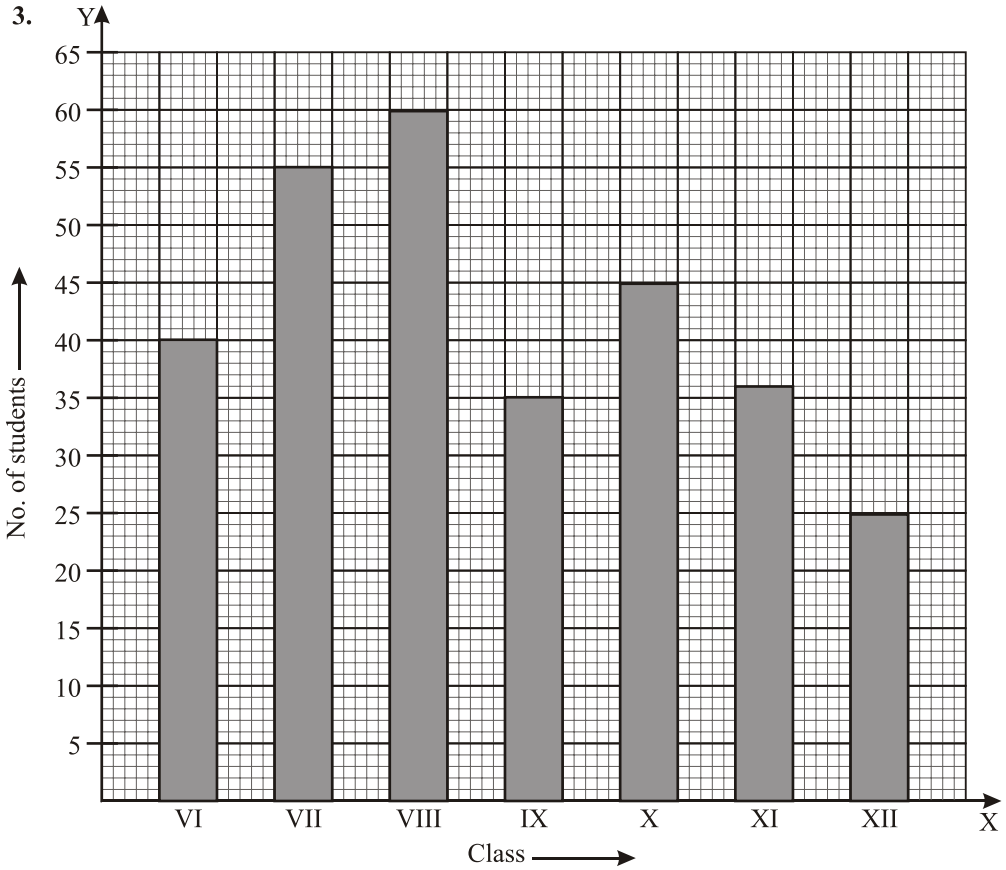
1.



2.



3.



4. (a) The bar graph shows the number of tickets sold by a cinema hall during a week.
(b) 30 tickets were sold on Monday.
(c) 25 tickets were sold on thursday.
(d) 10 more tickets were sold on Tuesday than Saturday.
(e) $220 = (30 + 50 + 60 + 25 + 15 + 40)$ total number of tickets were sold.

5. (a) 200 girls (b) 300 girls

6. (a) $12 + 20 + 16 + 6 + 12 + 2 = 68$ matches
(b) 12 matches (c) 12 matches

7. (a) Bar graph shows the total number of people who likes 8 different sports activities.
(b) $4500 + 3000 + 3250 + 1000 = 11750$
(c) $4500 - 3250 = 1250$ people
(d) percent of people who like cricket $= \frac{3000}{21000} \times 100$

$$= 14\frac{2}{7}\%$$

MCQ's

1. (b) **2.** (c) **3.** (b) **4.** (b) **5.** (a) **6.** (b) **7.** (c) **8.** (a) **9.** (c)

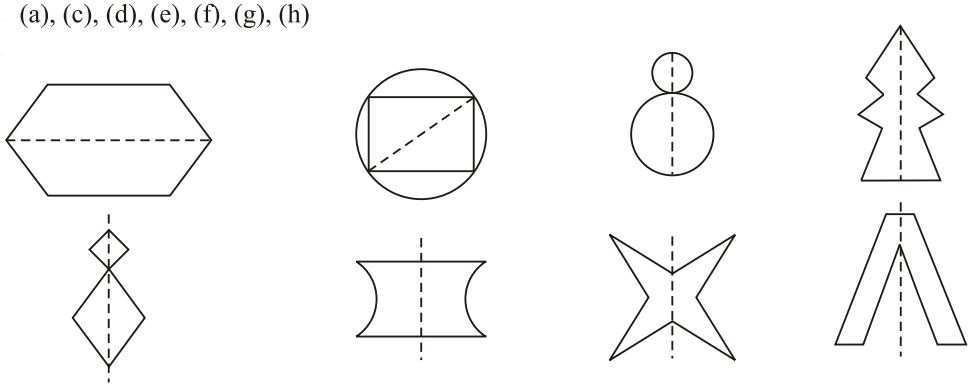
15 Symmetry

1. a, b, c, f, g, h and j are symmetrical.

2. M, Y, A, W and V are symmetrical.

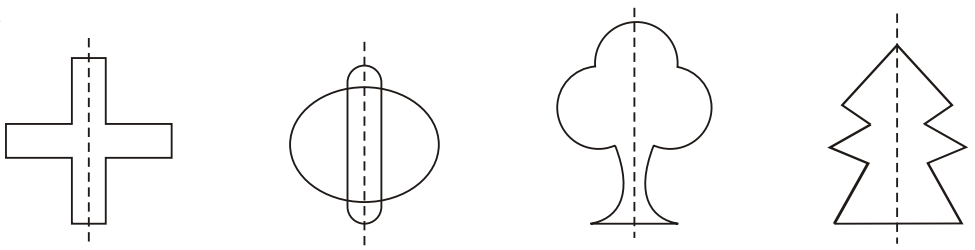
3. (a), (c), (d), (e), (f), (g), (h)

4.



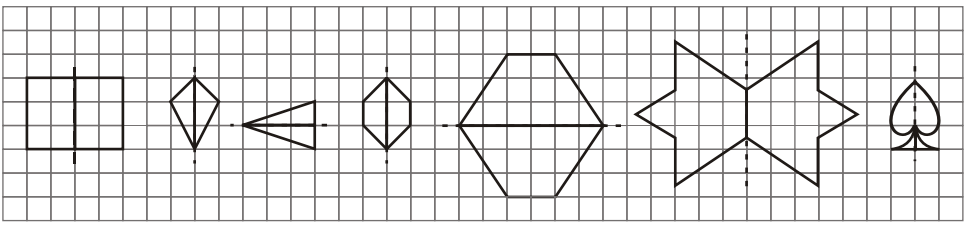
5. (a) Five (5) (b) One (1) (c) Four (4) (d) Four (4)

6.



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

8.



MCQ's

1. (b) **2.** (d) **3.** (d) **4.** (b) **5.** (b) **6.** (d)