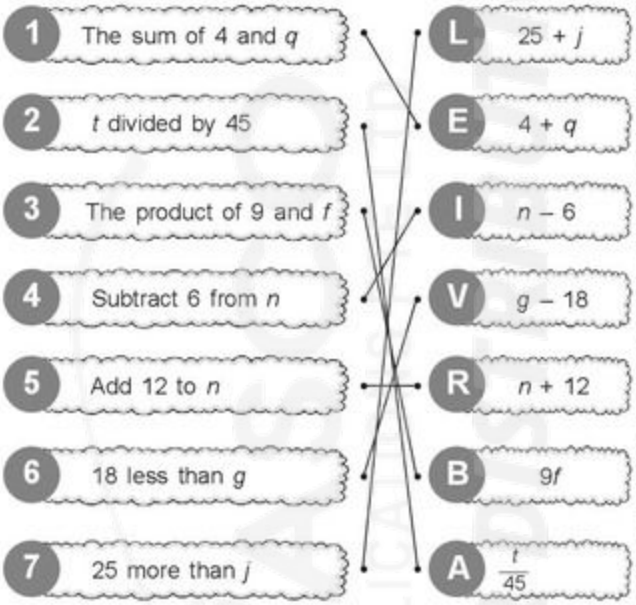
Answer Key
(Step-By-Step Mathematics 6)

Unit 1 Algebra

Drills

Exercise 1

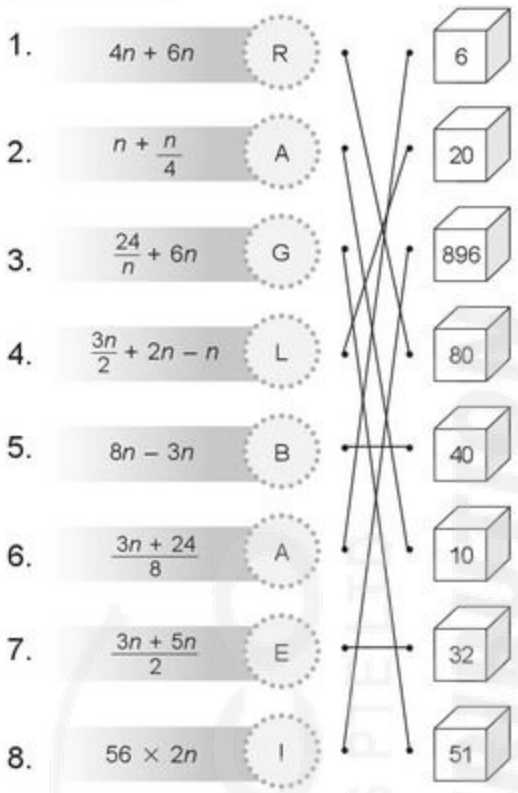


V	A	R	I	A	B	L	E
6		5	4	2	3	7	1

Exercise 2

1. $5r + 3r = 8r$ → $8r$
2. $45n - 21n + 8n$
   $= 24n + 8n$
   $= 32n$ → $32n$
3. $7 \times j = 7j$ → $7j$
4. $(24 - z) \div 6$
   $= \frac{24 - z}{6}$ → $\frac{24 - z}{6}$
5. $29u - 7u + 11u$
   $= 22u + 11u$
   $= 33u$ → $33u$
6. $8t + 4t - 3t$
   $= 12t - 3t$
   $= 9t$ → $9t$
7. $36k - 12k = 24k$ → $24k$

Exercise 3



A	L	G	E	B	R	A	!
10	20	51	32	40	80	6	896

1. $4n + 6n$
   $= 10n$
   $= 10(8)$
   $= \mathbf{80}$

2. $n + \frac{n}{4}$
   $= 8 + \frac{8}{4}$
   $= 8 + 2$
   $= \mathbf{10}$

3. $\frac{24}{n} + 6n$
   $= \frac{24}{8} + 6(8)$
   $= 3 + 48$
   $= \mathbf{51}$

4. $\frac{3n}{2} + 2n - n$
   $= \frac{3n}{2} + n$
   $= \frac{3(8)}{2} + 8$
   $= \frac{24}{2} + 8$
   $= 12 + 8$
   $= \mathbf{20}$

5. $8n - 3n$
   $= 5n$
   $= 5(8)$
   $= \mathbf{40}$

6. $\frac{3n + 24}{8}$
   $= \frac{3(8) + 24}{8}$
   $= \frac{24 + 24}{8}$
   $= \frac{48}{8}$
   $= \mathbf{6}$

7. $\frac{3n + 5n}{2}$
   $= \frac{8n}{2}$
   $= 4n$
   $= 4(8)$
   $= \mathbf{32}$

8. $56 \times 2n$
   $= 56 \times 2(8)$
   $= 56 \times 16$
   $= \mathbf{896}$

Exercise 4

1. Length of Rope B
   $= (a + 8)$ cm

2. Number of necklaces Emily made
   $= w - 34$

3. Number of marbles in each bag
   $= \frac{y}{7}$

4. Total number of bars of chocolates
   $= 25f$

5. Wife's monthly income
   $= \$\left(\frac{u}{2}\right)$

6. Cost of scanner
   $= \$(t - 200)$

7. Number of stickers Sean collected
   $= (k + 15)$ stickers

8. Average number of cupcakes
   $= \left(\frac{q}{4}\right)$ cupcakes

9. Area of triangle
   $= \frac{1}{\cancel{2}_1} \times p \times \cancel{8}^4$
   $= 4p$ cm^2

Perform

Exercise 1

1. **(2)**
   $4x + 2x - x + 5$
   $= 6x - x + 5$
   $= \underline{5x + 5}$

2. **(1)**
   Number of stamps Bryan collected
   $= \underline{q + 5}$

3. **(3)**
   When $p = 9$,
   $9p + 12 - p$
   $= 9(9) + 12 - 9$
   $= 81 + 12 - 9$
   $= 93 - 9$
   $= \underline{84}$

4. **(1)**
   $7w + 15 - w + 7$
   $= 7w - w + 15 + 7$
   $= \underline{6w + 22}$

5. **(2)**
   Perimeter of square
   $= 4 \times b$
   $= \underline{4b \text{ cm}}$

6. **(2)**
   $9t + 4 - 3t - 2$
   $= 9t - 3t + 4 - 2$
   $= \underline{6t + 2}$

7. **(1)**
   When $r = 5$,
   $\frac{8r + 20}{5} = \frac{8(5) + 20}{5}$
   $= \frac{40 + 20}{5}$
   $= \frac{60}{5}$
   $= \underline{12}$

8. **(1)**
   Area of square base
   $= 2 \times 2$
   $= 4$ cm^2

   Height
   $= 12a \div 4$
   $= \frac{12a}{4}$
   $= \underline{3a \text{ cm}}$

9. **(3)**
$7g - g + 6 - 3g$
$= 6g + 6 - 3g$
$= \underline{3g + 6}$

10. **(3)**
When $d = 12$,
$20d + 25 - 5d$
$= 20(12) + 25 - 5(12)$
$= 240 + 25 - 60$
$= 265 - 60$
$= \underline{205}$

Exercise 2

1. Amount she had at first
$= t \times \$29 + \$123$
$= \$29t + \$123$
$= \mathbf{\$(29t + 123)}$

2. Amount of change
$= \$50 - (12 \times \$f)$
$= \mathbf{\$(50 - 12f)}$

3. Mass of 1 packet of sugar
$= 6h$ kg $\div 10$
$= \frac{6h}{10}$ kg
$= \frac{3h}{5}$ kg

Total mass of 45 such packets of sugar
$= 45 \times \frac{3h}{5}$ kg
$= \mathbf{27h}$ kg

4. Brother's age
$= (p - 5)$ years

Total age
$= p + p - 5$
$= \mathbf{(2p - 5)}$ years

5. Number of badges Alex had
$= 2 \times 3k$
$= 6k$ badges

Number of badges Brenda had
$= \mathbf{(6k + 4)}$ badges

6. Length + Breadth $= (\frac{4h + 12}{2})$ cm
$= (2h + 6)$ cm
Length + 2 $= 2h + 6$
Length $= 2h + 6 - 2$
$= \mathbf{(2h + 4)}$ cm

Achieve

Exercise 1

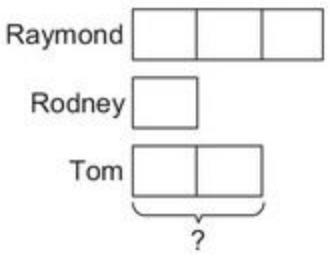
1. Capacity of container
$= 75k$
$= 75(8)$
$= 600\ l$

Half the container
$= 600\ l \div 2$
$= 300\ l$

$5\ l \longrightarrow 1$ min
$1\ l \longrightarrow \frac{1}{5}$ min
$300\ l \longrightarrow 300 \times \frac{1}{5}$ min $= 60$ min
$= 1$ h

It will take **1 hour** to fill half the container.

2.



1 unit $= 62a$ kg
2 units $= 2 \times 62a$ kg
$= 124a$ kg

Tom's mass is **$124a$ kg**.

3. Total number of stamps
$= (7 \times p) + 6$
$= 7p + 6$

When $p = 105$,

$7p + 6 = 7(105) + 6$
$= 735 + 6$
$= 741$

The total number of stamps is **741**.

4. Perimeter of rectangle $= 24n$
Length + Breadth $= 24n \div 2$
$= 12n$

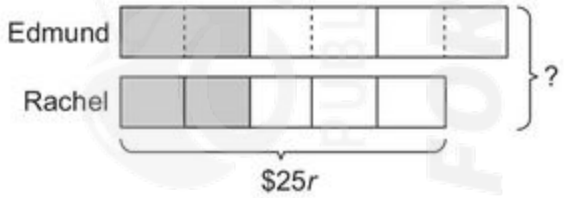
$18 +$ Breadth $= 12n$
Breadth $= (12n - 18)$ cm

Its breadth is **$(12n - 18)$ cm**.

5. $6 \times \$3 = \$18$
$\$122 + \$18 = \$140$
$\$140 \div 14 = \$10$
$\$10 - \$3 = \$7$

The admission fee to the Science Centre is **\$7**.

6.



5 units = $25r

1 unit = $\$\left(\frac{25r}{5}\right) = \$5r$

11 units $= 11 \times \$5r$
$= \$55r$

They save **\$55*r*** in all.

7. Total number of T-shirts sold
$= 3y + (5y + 7)$
$= 8y + 7$

$8y + 7 = 135$
$8y = 135 - 7$
$= 128$
$y = 128 \div 8$
$= 16$

The value of y is **16**.

8. Number of postcards George had
$= (5 + 2x) + 4x$
$= 6x + 5$

Number of postcards Tim had
$= \frac{6x + 5}{2}$

Tim had $\left(\frac{6x + 5}{2}\right)$ postcards.

9. Number of stickers Ben has
$= (p + 5) + p$
$= 2p + 5$

Total number of stickers both children have
$= p + 5 + (2p + 5)$
$= 3p + 10$

$3p + 10 = 64$
$3p = 64 - 10$
$3p = 54$
$p = 54 \div 3$
$= 18$

The value of p is **18**.

10. (a) Number of beads left
$= n - 9$

Number of beads in each bottle
$= \frac{n - 9}{5}$

The number of beads in each bottle is $\left(\frac{\boldsymbol{n - 9}}{\boldsymbol{5}}\right)$.

(b) When $n = 144$,

$$\frac{n - 9}{5} = \frac{144 - 9}{5}$$
$$= \frac{135}{5}$$
$$= 27$$

There were **27** beads in each bottle.

Unit 2 Fractions

Drills

Exercise 1

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

2. $1 \div \frac{1}{4}$
$= 1 \times 4$
$= \mathbf{4}$

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

4. $9 \div \frac{6}{7}$
$= {}^{3}\cancel{9} \times \frac{7}{\cancel{6}_{2}}$
$= \frac{21}{2}$
$= \mathbf{10\frac{1}{2}}$

5. $5 \div \frac{2}{3}$
$= 5 \times \frac{3}{2}$
$= \frac{15}{2}$
$= \mathbf{7\frac{1}{2}}$

6. $8 \div \frac{4}{5}$
$= {}^{2}\cancel{8} \times \frac{5}{\cancel{4}_{1}}$
$= \mathbf{10}$

7. $\frac{2}{3} \div 9$

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

$= \mathbf{\frac{2}{27}}$

8. $\frac{1}{4} \div 3$

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

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

9. $\frac{5}{7} \div 10$

$= \frac{5}{7} \times \frac{1}{10_2}$

$= \mathbf{\frac{1}{14}}$

10. $\frac{3}{4} \div 6$

$= \frac{3}{4} \times \frac{1}{6_2}$

$= \mathbf{\frac{1}{8}}$

11. $\frac{2}{5} \div 12$

$= \frac{2}{5} \times \frac{1}{12_6}$

$= \mathbf{\frac{1}{30}}$

12. $\frac{5}{8} \div 15$

$= \frac{5}{8} \times \frac{1}{15_3}$

$= \mathbf{\frac{1}{24}}$

13. $\frac{1}{2} \div \frac{1}{8}$

$= \frac{1}{2_1} \times \frac{8}{1_4}$

$= \mathbf{4}$

14. $\frac{3}{5} \div \frac{3}{10}$

$= \frac{3^1}{5_1} \times \frac{10^2}{3_1}$

$= \mathbf{2}$

15. $\frac{2}{3} \div \frac{5}{6}$

$= \frac{2}{3_1} \times \frac{6^2}{5}$

$= \mathbf{\frac{4}{5}}$

16. $\frac{1}{4} \div \frac{1}{10}$

$= \frac{1}{2_1} \times \frac{10^5}{1}$

$= \frac{5}{2}$

$= \mathbf{2\frac{1}{2}}$

17. $\frac{4}{9} \div \frac{2}{3}$

$= \frac{4^2}{9_3} \times \frac{3^1}{2_1}$

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

18. $\frac{9}{10} \div \frac{2}{5}$

$= \frac{9}{2_1 10} \times \frac{5^1}{2}$

$= \frac{9}{4}$

$= \mathbf{2\frac{1}{4}}$

19. $\frac{5}{8} \div \frac{5}{11}$

$= \frac{1}{\cancel{5}_{8}} \times \frac{11}{\cancel{5}_{1}}$

$= \frac{11}{8}$

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

20. $\frac{8}{15} \div \frac{4}{9}$

$= \frac{\cancel{8}^{2}}{\cancel{15}_{5}} \times \frac{\cancel{9}^{3}}{\cancel{4}_{1}}$

$= \frac{6}{5}$

$= 1\frac{1}{5}$

Exercise 2

1. $\frac{3}{4} \div \frac{1}{4}$

$= \frac{3}{\cancel{4}_{1}} \times \cancel{4}_{1}$

$= 3$

There are **3** quarters in $\frac{3}{4}$.

2. $\frac{2}{3} \div \frac{1}{6}$

$= \frac{2}{\cancel{3}_{1}} \times \cancel{6}^{2}$

$= 4$

There are **4** sixths in $\frac{2}{3}$.

3. $\frac{4}{5} \div \frac{1}{10}$

$= \frac{4}{\cancel{5}_{1}} \times \cancel{10}^{2}$

$= 8$

There are **8** tenths in $\frac{4}{5}$.

4. $\frac{2}{3} \div \frac{1}{9}$

$= \frac{2}{\cancel{3}_{1}} \div \cancel{9}^{3}$

$= 6$

There are **6** ninths in $\frac{2}{3}$.

Perform

Exercise 1

1. **(1)**

$6 \div \frac{2}{3}$

$= \cancel{6}^{3} \times \frac{3}{\cancel{2}_{1}}$

$= \underline{9}$

2. **(3)**

$\frac{2}{3} \div \frac{1}{3}$

$= \frac{2}{\cancel{3}_{1}} \times \cancel{3}^{1}$

$= \underline{2}$

3. **(4)**

$24 \div \frac{1}{2}$

$= \underline{24 \times 2}$

4. **(4)**

$\frac{3}{4} \div 12$

$= \underline{\frac{3}{4} \times \frac{1}{12}}$

5. **(2)**

Option (1): $\frac{1}{2} + \frac{1}{4}$

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

$= \frac{3}{4}$

Option (2): $\frac{1}{2} \div \frac{1}{4}$

$= \frac{1}{\cancel{2}_1} \times \frac{\cancel{4}^2}{1}$

$= 2$ (✓)

Option (3): $\frac{1}{2} \times \frac{1}{4}$

$= \frac{1}{8}$

Option (4): $\frac{1}{2} - \frac{1}{4}$

$= \frac{2}{4} - \frac{1}{4}$

$= \frac{1}{4}$

6. **(4)**

Amount of orange juice in each bottle

$= \frac{3}{5}\ l \div 9$

$= \frac{\cancel{3}^1}{5}\ l \times \frac{1}{\cancel{9}_3}$

$= \frac{1}{15}\ l$

Exercise 2

1. $\frac{5}{\square} \div \frac{5}{6} = \frac{1}{2}$

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

$= \frac{5}{12}$

The missing number in the box is **12**.

2. Other fraction

$= \frac{1}{4} \div \frac{5}{8}$

$= \frac{1}{\cancel{4}_1} \times \frac{\cancel{8}^2}{5}$

$= \mathbf{\frac{2}{5}}$

3. $\frac{3}{10}$ of fraction $\longrightarrow \frac{3}{14}$

$\frac{1}{10}$ of fraction $\longrightarrow \frac{3}{14} \div 3$

$= \frac{\cancel{3}^1}{14} \times \frac{1}{\cancel{3}_1}$

$= \frac{1}{14}$

$\frac{10}{10}$ of fraction $\longrightarrow 10 \times \frac{1}{14}$

$= \frac{10}{14}$

$= \mathbf{\frac{5}{7}}$

4. Number of pieces

$= 12 \div \frac{3}{10}$

$= \overset{4}{\cancel{12}} \times \frac{10}{\cancel{3}_1}$

$= \mathbf{40}$

5. Length of square

$= \frac{3}{5}$ m $\div 4$

$= \frac{3}{5}$ m $\times \frac{1}{4}$

$= \mathbf{\frac{3}{20}}$ **m**

6. Length of each piece

$= \frac{8}{9}$ m $\div 16$

$= \frac{\cancel{8}^1}{9}$ m $\times \frac{1}{\cancel{16}_2}$

$= \mathbf{\frac{1}{18}}$ **m**

7. Number of bottles

$= \frac{3}{4} \div \frac{1}{8}$

$= \frac{3}{\cancel{4}_{1}} \times \cancel{8}^{2}$

$= \mathbf{6}$

8. Number of children

$= \frac{2}{3} \div \frac{1}{6}$

$= \frac{2}{\cancel{3}_{1}} \times \cancel{6}^{2}$

$= \mathbf{4}$

9. $1 - \frac{2}{5} = \frac{3}{5}$

Fraction of each slice

$= \frac{3}{5} \div 6$

$= \frac{\cancel{3}^{1}}{5} \times \frac{1}{\cancel{6}_{2}}$

$= \mathbf{\frac{1}{10}}$

Achieve

Exercise 1

1. $1 - \frac{1}{6} = \frac{5}{6}$

Fraction of jug left with orange juice

$= \frac{\cancel{5}^{1}}{\cancel{6}_{2}} \times \frac{\cancel{3}^{1}}{\cancel{5}_{1}}$

$= \frac{1}{2}$

$\mathbf{\frac{1}{2}}$ of the jug is still left with orange juice.

2. $1 - \frac{1}{3} = \frac{2}{3}$

$\frac{2}{3} \div 3 = \frac{2}{3} \times \frac{1}{3}$

$= \frac{2}{9}$

Dan paid $\mathbf{\frac{2}{9}}$ of the cost.

3. Number of packets

$= 45 \div \frac{2}{3}$

$= 45 \times \frac{3}{2}$

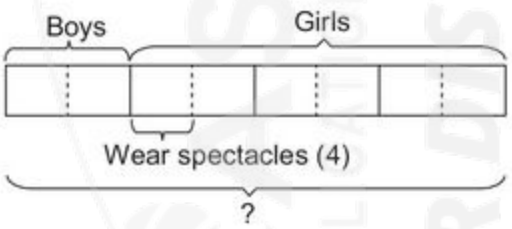
$= \frac{135}{2}$

$= 67\frac{1}{2}$

$\frac{\cancel{1}}{\cancel{2}_{1}} \times \frac{\cancel{2}^{1}}{3}$ kg $= \frac{1}{3}$ kg

67 packets can be packed and $\mathbf{\frac{1}{3}}$ kg of salt remains.

4.



1 unit = 4 pupils

8 units = 8×4

= 32 pupils

There are **32** pupils in the class.

5. $1 - \frac{2}{5} = \frac{3}{5}$

Fraction of beads used to make 3 bracelets

$= \frac{\cancel{5}^{1}}{\cancel{6}_{2}} \times \frac{\cancel{3}^{1}}{\cancel{5}_{1}}$

$= \frac{1}{2}$

Fraction of beads used to make 1 bracelet

$= \frac{1}{2} \div 3$

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

$= \frac{1}{6}$

She used $\frac{1}{6}$ of her beads to make 1 bracelet.

6. $11\frac{3}{5}$ m $- 2\frac{3}{5}$ m $= 9$ m

75 cm $= \frac{75}{100}$ m

$= \frac{3}{4}$ m

Number of cushions

$= 9 \div \frac{3}{4}$

$= {}^{3}\cancel{9} \times \frac{4}{\cancel{3}_{1}}$

$= 12$

He made **12** cushions.

7. Number of bags of rice
= \$120 ÷ \$8
= 15

Total mass of rice
= 15 × 5 kg
= 75 kg

Number of packets

$= 75 \div \frac{3}{4}$

$= {}^{25}\cancel{75} \times \frac{4}{\cancel{3}_{1}}$

$= 100$

He would get **100** packets.

8. $5\frac{1}{2}\ l - 4\frac{3}{4}\ l$

$= 5\frac{2}{4}\ l - 4\frac{3}{4}\ l$

$= 4\frac{6}{4}\ l - 4\frac{3}{4}\ l$

$= \frac{3}{4}\ l$

Amount of milk in each cup

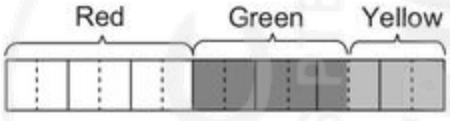
$= \frac{3}{4}\ l \div 6$

$= {}^{1}\cancel{\frac{3}{4}}\ l \times \frac{1}{\cancel{6}_{2}}$

$= \frac{1}{8}\ l$

She poured $\frac{1}{8}$ l milk into each cup.

9.

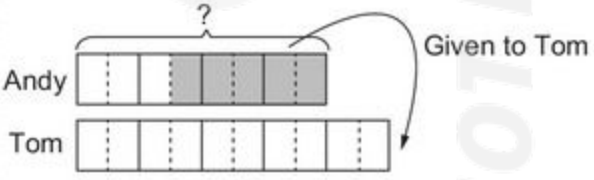


6 units − 3 units = 3 units

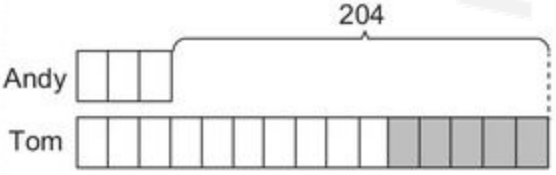
3 units = 36 marbles
1 unit = 36 ÷ 3
= 12 marbles
5 units = 5 × 12
= 60 marbles

He had 60 green marbles.

10. Before:



After:



12 units = 204 marbles
1 unit = 204 ÷ 12
= 17 marbles
8 units = 8 × 17
= 136 marbles

Andy had **136** marbles at first.

11. $\frac{3}{\cancel{4}_1} \times \cancel{160}^{40}$ kg = 120 kg

160 kg – 120 kg = 40 kg

Number of packets
= 40 ÷ $\frac{4}{5}$
= $\cancel{40}^{10} \times \frac{5}{\cancel{4}_1}$
= 50

Amount received
= (120 × \$1.05) + (50 × \$0.80)
= \$126 + \$40
= \$166

He received **\$166** from selling all the sugar.

Unit 3 Ratio

Drills

Exercise 1

1. \$100 – \$70 = \$30
Charles : Jordan
70 : 30
= **7** : **3**

2. 42 + 36 = 78
Sean : Total
36 : 78
= **6** : **13**

3. Number of red beads
= 22 + 8
= 30
Red : Green : Blue
30 : 22 : 18
= **15** : **11** : **9**

4. 9 – 2 – 3 = 4
Mother : Sister : Matthew
4 : **2** : **3**

5. 33 + 24 = 57
Mason : Total
33 : 57
= **11** : **19**

6. \$480 – \$80 – \$240 = \$160
Transport : Food : Games
160 : 80 : 240
= 16 : 8 : 24
= **2** : **1** : **3**

7. 4 + 7 = 11
String A : String B : Total
4 : **7** : **11**

Exercise 2

1. Black : Coloured
   7 : 5
   7 units + 5 units = 12 units
   Fraction of black buttons
   $= \frac{7}{12}$

2. (a) Adults : Children
   11 : 6
   Required fraction = $\frac{6}{11}$

   (b) 11 units + 6 units = 17 units
   Required fraction = $\frac{11}{17}$

3. Julie : Matthias : Joe
   3 : 7 : 8

   3 units + 7 units + 8 units = 18 units
   Fraction of money Matthias received
   $= \frac{7}{18}$

4. Bracelets : Necklaces
   4 : 5

   4 units + 5 units = 9 units
   Required fraction = $\frac{4}{9}$

Perform

Exercise 1

1. **(2)**
   Alice : John : Tom
   7 : 3 : 2

   7 units + 3 units + 2 units
   = 12 units
   12 units = \$3600
   1 unit = \$3600 ÷ 12
   = \$300
   2 units = 2 × \$300
   = \$600

   Tom received \$600.

2. **(2)**
   125 : 70
   ÷5 ↓ ÷5
   = 25 : 14

   The missing number is 25.

3. **(4)**
   Charles : Megan : Anthony
   2 : 5 : 6

   2 units + 5 units + 6 units
   = 13 units

   Fraction of candies Anthony received
   $= \frac{6}{13}$

4. **(3)**
   54 + 30 = 84
   There are 84 red apples.

   54 + 84 = 138
   There 138 green and red apples altogether.

   Red : Total
   84 : 138
   = 14 : 23

5. **(1)**
   Number of girls left
   = 90 − 12
   = 78

   Total number of children left
   = 63 + 78
   = 141

   Boys : Total
   63 : 141
   = 21 : 47

6. **(2)**

Orange syrup : Water
4 : 9

9 units = 324 *l*
1 unit = 324 *l* ÷ 9
= 36 *l*
4 units = 4 × 36 *l*
= 144 *l*

144 *l* of orange syrup are required.

7. **(3)**

Leslie : Lena
1 : 3

3 units − 1 unit = 2 units
2 units = $428
1 unit = $428 ÷ 2
= $214
3 units = 3 × $214
= $642

Lena has $642.

Exercise 2

1. Bag A : Bag B
7 : 6

$\frac{2}{7}$ × 7 units = 2 units
2 units = 40 pens
1 unit = 40 ÷ 2
= 20 pens

7 units + 6 units = 13 units
13 units = 13 × 20
= 260 pens

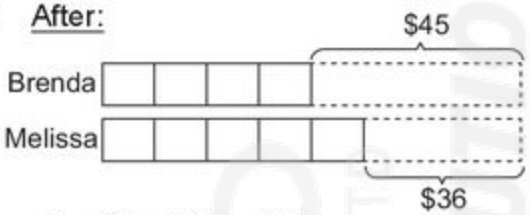
There are **260** pens in all.

2. White : Red
3 : 7
3 units + 7 units = 10 units

7 units = 91 roses
1 unit = 91 ÷ 7
= 13 roses
10 units = 10 × 13
= 130 roses

There are **130** roses altogether.

3. After:



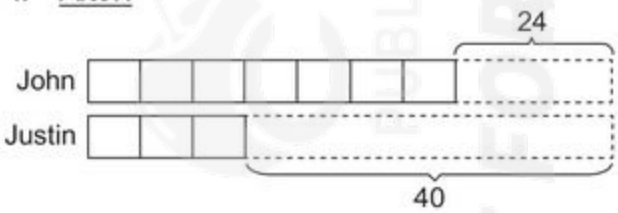
1 unit = $45 − $36
= $9
4 units = 4 × $9
= $36

$36 + $45 = $81
Brenda had $81 at first.

2 × $81 = $162

They had **$162** at first.

4. After:



4 units = 40 − 24
= 16 stickers
1 unit = 16 ÷ 4
= 4 stickers
7 units = 7 × 4
= 28 stickers

28 + 24 = 52

John had **52** stickers at first.

Exercise 3

1. (a) Flour : Sugar
5 : 2

1 kg = 1000 g
5 units = 1000 g
1 unit = 1000 g ÷ 5
= 200 g
2 units = 2 × 200 g
= 400 g

She used **400 g** of sugar.

(b) 2 parts = 240 g
1 part = 240 g ÷ 2
= 120 g
5 parts = 5 × 120 g
= 600 g

600 g of flour was needed.

2. Boys : Girls
5 : 6

6 units = 156 children
1 unit = 156 ÷ 6
= 26 children
5 units = 5 × 26
= 130 children

There were **130** boys.

3. Teachers : Children
3 : 5

Girls Boys
3 : 1

3 units = 1500 children
1 unit = 1500 ÷ 3
= 500 children
4 units = 4 × 500 children
= 2000 children

There are 2000 children.

5 parts = 2000 people
1 part = 2000 ÷ 5
= 400 people
8 parts = 8 × 400
= 3200 people

There are **3200** people altogether.

4. Tulips : Roses
3 : 5

Pink Yellow
2 : 1

Pink tulips : Yellow tulips : Roses
2 : 1 : 5

2 units = 10 flowers
1 unit = 10 ÷ 2
= 5 flowers
6 units = 6 × 5
= 30 flowers

The total numbers of yellow tulips and roses is **30**.

Exercise 4

1. Men : Women
3 : 7

7 units – 3 units = 4 units

4 units = 36 people
1 unit = 36 ÷ 4
= 9 people
10 units = 10 × 9
= 90 people

There are **90** people altogether.

2. Matthew : Ray
4 : 9

9 units – 4 units = 5 units

5 units = 25 sweets
1 unit = 25 ÷ 5
= 5 sweets
13 units = 13 × 5
= 65 sweets

The total number of sweets shared was **65**.

3. Length + Breadth = 360 cm ÷ 2
= 180 cm

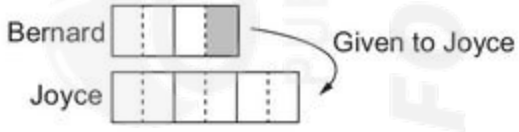
Length : Breadth
7 : 3

7 units + 3 units = 10 units

10 units = 180 cm
1 unit = 180 ÷ 10
= 18 cm
3 units = 3 × 18 cm
= 54 cm

Its breadth is **54 cm**.

4. Before:



New ratio:

Bernard : Joyce
3 : **7**

5. Boys : Girls
5 : 3

8 units = 280 children
1 unit = 280 ÷ 8
= 35 children

5 units – 3 units = 2 units

2 units = 2 × 35
= 70 children

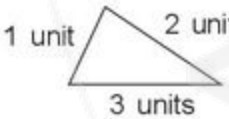
There were **70** more boys than girls.

6. Red : Yellow
1 : 3

1 unit + 3 units = 4 units

4 units = 24 *l*
1 unit = 24 *l* ÷ 4
= 6 *l*
3 units = 3 × 6 *l*
= 18 *l*

He used **18** ***l*** of yellow paint.

7. 

1 unit + 2 units + 3 units = 6 units

6 units = 126 cm
1 unit = 126 cm ÷ 6
= 21 cm

3 units – 1 unit = 2 units

2 units = 2 × 21 cm
= 42 cm

The difference between the longest and shortest sides is **42 cm**.

Achieve

Exercise 1

1. Blue : Green and Red
   $1^{\times 5}$: $2^{\times 5}$
   = 5 : 10

   Green : Red
   $2^{\times 2}$: $3^{\times 2}$
   4 : 6

   Blue : Green : Red
   5 : 4 : 6

   5 units + 4 units + 6 units = 15 units

   Fraction of blue marbles
   $= \frac{5}{15}$
   $= \frac{1}{3}$

2. Cindy : Natalie
   3 : 7 (Beginning)
   9 : 9 (End)

   9 units − 3 units = 6 units

   6 units = 72 buttons
   1 unit = 72 ÷ 6
   = 12 buttons
   18 units = 18 × 12
   = 216 buttons

   The total number of buttons they had in the end was **216**.

3. Ducks : Chickens
   $4^{\times 2}$: $5^{\times 2}$
   = 8 : 10

   Roosters : Hens
   3 : 7

   Ducks : Roosters : Hens
   8 : 3 : 7

   7 units = 42 animals
   1 unit = 42 ÷ 7
   = 6 animals
   8 units = 8 × 6
   = 48 animals

   There are **48** ducks.

4. Adults : Children
   5 : 4

   Boys : Girls
   3 : 1

   Adults : Boys : Girls
   5 : 3 : 1

   5 units − 1 unit = 4 units

   4 units = 72 people
   1 unit = 72 ÷ 4
   = 18 people

   5 units + 3 units + 1 unit = 9 units

   9 units = 9 × 18
   = 162 people

   There were **162** people at the book fair.

5. Red : Pink : White
   $4^{\times 2}$: $3^{\times 2}$

   $2^{\times 3}$: $5^{\times 3}$

   8 : 6 : 15

   8 units + 15 units = 23 units

   23 units = 92 beads
   1 unit = 92 ÷ 23
   = 4 beads
   6 units = 6 × 4
   = 24 beads

   She has **24** pink beads.

6. After:

Box B	:	Box A
4	:	3

4 units + 3 units = 7 units

7 units = 238 postcards
1 unit = 238 ÷ 7
= 34 postcards
3 units = 3 × 34
= 102 postcards

There were 102 postcards in Box A in the end.

102 + 42 = 144

There were **144** postcards in Box A at first.

7. Before:

Pens	:	Pencils
3	:	5
= 15	:	25

(× 5 on Pens, × 5 on Pencils)

After:

Pens	:	Pencils
5	:	3
= 15	:	9

(× 3 on Pens, × 3 on Pencils)

25 units – 9 units = 16 units

16 units = 48 items
1 unit = 48 ÷ 16
= 3 items
15 units = 15 × 3
= 45 items

The shopkeeper had **45** pens.

8.

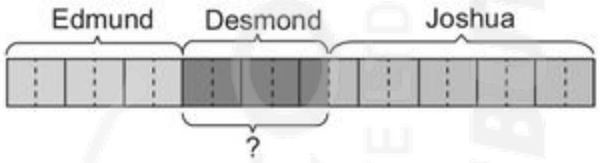
Tin A	:	Tin B
1	:	3
3	:	9
5	:	7

(× 3 on Tin A, × 3 on Tin B; + 2 units on Tin A, – 2 units on Tin B)

2 units = 14 biscuits
1 unit = 14 ÷ 2
= 7 biscuits
3 units = 3 × 7
= 21 biscuits

There were **21** biscuits in Tin A at first.

9.

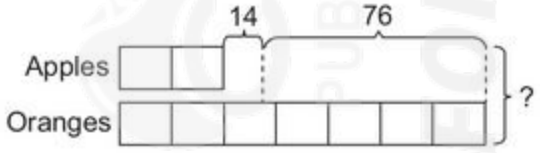


9 units – 6 units = 3 units

3 units = $900
1 unit = $900 ÷ 3
= $300
5 units = 5 × $300
= $1500

Desmond donated **$1500**.

10.



5 units = 14 + 76
= 90 fruits
1 unit = 90 ÷ 5
= 18 fruits
9 units = 9 × 18
= 162 fruits

There were **162** fruits in the basket at first.

11. Total value of 1 set of 4 \$2 notes, 2 \$5 notes and 3 \$10 notes
= (4 × \$2) + (2 × \$5) + (3 × \$10)
= \$8 + \$10 + \$30
= \$48

Number of sets
= \$336 ÷ \$48
= 7

Number of \$5 notes
= 7 × 2
= 14

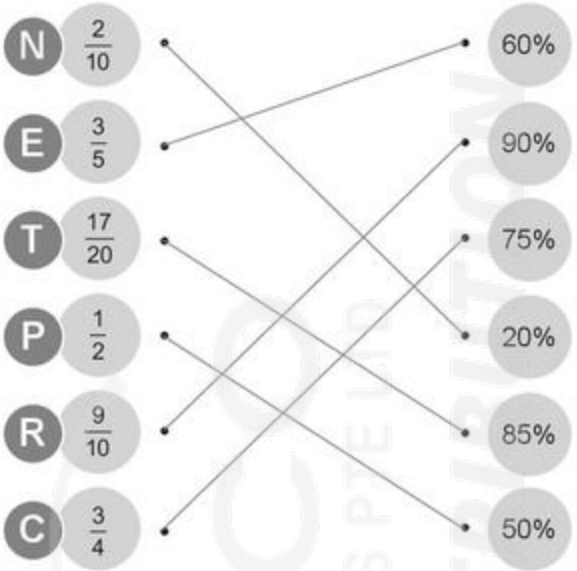
14 × \$5 = \$70

The total value of the \$5 notes is **\$70**.

Unit 4 Percentage

Drills

Exercise 1



P	E	R	C	E	N	T
50%	60%	90%	75%	60%	20%	85%

Exercise 2

No.	Fraction	Decimal	Percentage
1.	$\frac{58}{100} = \frac{\mathbf{29}}{\mathbf{50}}$	0.58	58%
2.	$\frac{3}{5}$	**0.6**	60%
3.	$2\frac{35}{100} = \mathbf{2}\frac{\mathbf{7}}{\mathbf{20}}$	2.35	235%
4.	$\frac{76}{100} = \frac{\mathbf{19}}{\mathbf{25}}$	**0.76**	76%
5.	$\frac{7}{10}$	**0.7**	**70%**
6.	$8\frac{18}{100} = \mathbf{8}\frac{\mathbf{9}}{\mathbf{50}}$	8.18	**818%**

Exercise 3

1. Percentage increase
   $= \frac{50}{2500} \times 100\%$
   $= \mathbf{2\%}$

2. $\$25 - \$20 = \$5$
   Percentage decrease
   $= \frac{5}{25} \times 100\%$
   $= \mathbf{20\%}$

3. $\frac{60}{100} \times 15 = 9$
   $15 - 9 = 6$
   6 fire disasters occurred in August.

4. $1400 - 1200 = 200$
   Percentage increase
   $= \frac{200}{1200} \times 100\%$
   $= \mathbf{16\frac{2}{3}\%}$

5. $180 - 160 = 20$
   Percentage decrease
   $= \frac{20}{180} \times 100\%$
   $= \mathbf{11\frac{1}{9}\%}$

6. $120\% \longrightarrow \$1980$
   $1\% \longrightarrow \$(\frac{1980}{120})$
   $20\% \longrightarrow 20 \times \$(\frac{1980}{120}) = \$330$
   His increase in salary was **$330**.

Perform

Exercise 1

1. **(2)**
   $40\% \longrightarrow 248$
   $1\% \longrightarrow \frac{248}{40}$
   $100\% \longrightarrow 100 \times \frac{248}{40} = 620$
   $\frac{1}{4} \times 620 = \underline{155}$

2. **(1)**
   $\frac{1}{2} \longrightarrow 166$
   $\frac{2}{2} \longrightarrow 2 \times 166 = 332$
   $\frac{30}{100} \times 332 = \underline{99.6}$

3. **(3)**
   $100\% + 3\% = 103\%$
   $\frac{103}{100} \times \$500 = \underline{\$515}$

4. **(1)**
   Percentage of boys
   $= 100\% - 55\%$
   $= 45\%$
   $55\% - 45\% = 10\%$
   $\frac{10}{100} \times 40 = \underline{4}$

5. **(2)**
   $100\% - 20\% = 80\%$
   $\frac{80}{100} \times \$1500 = \underline{\$1200}$

6. **(4)**
   $\frac{625}{500} \times 100\% = \underline{125\%}$

7. **(2)**
100% – 18% = 82%

$\frac{82}{100} \times 150 = \underline{123}$

8. **(3)**
40 – 18 – 10 = 12

$\frac{12}{40} \times 100\% = \underline{30\%}$

Exercise 2

1. \$100 – \$89 = \$11
Percent discount
$= \frac{11}{100} \times 100\%$
$=$ **11%**

2. \$70 – \$42 = \$28

$\frac{28}{42} \times 100\% = 66\frac{2}{3}\%$

Mary saved $\mathbf{66\frac{2}{3}\%}$ more than Monica.

3. 120 – 84 = 36
Percentage decrease
$= \frac{36}{120} \times 100\%$
$=$ **30%**

4. 54 kg – 48 kg = 6 kg
Percentage decrease
$= \frac{6}{54} \times 100\%$
$=$ **11.11% (correct of 2 d.p.)**

5. 100% – 20% = 80%
80% ⟶ \$600

1% ⟶ $\$(\frac{600}{80})$

100% ⟶ $100 \times \$(\frac{600}{80}) = \$750$

The original price of the dress was \$750.

\$750 – \$630 = \$120

Percentage discount Mrs Tan received
$= \frac{120}{750} \times 100\%$
$=$ **16%**

6. Percentage painted dark blue
= 100% – 80% – 15%
= 5%

15% ⟶ 300 cm^2
1% ⟶ 300 cm^2 ÷ 15 = 20 cm^2
5% ⟶ 5 × 20 cm^2 = 100 cm^2

100 cm^2 of the wall is painted dark blue.

Achieve

Exercise 1

1. 100% – 36% = 64%
64% – 36% = 28%

28% ⟶ 15 736 books
1% ⟶ 15 736 ÷ 28 = 562 books
100% ⟶ 100 × 562 = 56 200 books

The total number of books in the library is **56 200**.

2. 100% – 12% = 88%
88% – 12% = 76%

76% ⟶ 38 beads

1% ⟶ $(\frac{38}{76})$ beads

100% ⟶ $100 \times \frac{38}{76} = 50$ beads

There are **50** beads in the bag.

3. Number of red apples left
= 250 – 40
= 210

Number of green apples left
= 308 – 210
= 98

Percentage of green apples left
= 100% – 30%
= 70%

70% ⟶ 98 apples

1% ⟶ $(\frac{98}{70})$ apples

100% ⟶ $100 \times \frac{98}{70}$ = 140 apples

He had **140** green apples at first.

4. 100% – 55% = 45%

45% ⟶ 360 marbles
1% ⟶ 360 ÷ 45 = 8 marbles
100% ⟶ 100 × 8 = 800 marbles
He had 800 marbles in the end.

Percentage of yellow marbles
$= \frac{240}{800} \times 100\%$
= 30%

30% of his marbles were yellow in the end.

5. Percentage of monthly salary that she saves
= (100% – 20%) of (100% – 40%)
= 80% of 60%
$= \frac{80}{100} \times 60\%$
= 48%

48% ⟶ $1200
1% ⟶ $1200 ÷ 48 = $25
100% ⟶ 100 × $25 = $2500

Her monthly salary is **$2500**.

6. At first:

White	:	Black
40%	:	60%
= 2	:	3

After:

White	:	Black
75%	:	25%
= 3	:	1
× 3		× 3
= 9	:	3

3 units + 2 units = 5 units

5 units = 240 buttons
1 unit = 240 ÷ 5
= 48 buttons
9 units – 2 units = 7 units
7 units = 7 × 48
= 336 buttons

He put **336** white buttons into the box.

7. 100% + 25% = 125%
125% ⟶ 280 T-shirts

1% ⟶ $(\frac{280}{125})$ T-shirts

100% ⟶ $100 \times \frac{280}{125}$ = 224 T-shirts

There were 224 T-shirts in Box B at first.

280 – 224 = 56

35% ⟶ 56 T-shirts

1% ⟶ $(\frac{56}{35})$ T-shirts

100% ⟶ $100 \times \frac{56}{35}$ = 160 T-shirts

There are **160** T-shirts in Box A at first.

8. Percentage of purple beads
= 100% – 45%
= 55%

55% – 45% = 10%

10% ⟶ 60 – 40 = 20 beads
1% ⟶ 20 ÷ 10 = 2 beads
55% ⟶ 55 × 2 = 110 beads

She had **110** purple beads.

9. Mass of red apples at first
$= \frac{20}{100} \times 70$ kg
= 14 kg

Mass of green apples at first
= 70 kg – 14 kg
= 56 kg

100% – 30% = 70%

70% ⟶ 56 kg

1% ⟶ $(\frac{56}{70})$ kg

30% ⟶ $30 \times \frac{56}{70} = 24$ kg

He had 24 kg of red apples in the end.

24 kg – 14 kg = 10 kg

He bought **10 kg** of red apples.

10. 100% – 20% = 80%
Discounted price of scarf
$= \frac{80}{100} \times \$25$
= \$20

Normal price	:	Discounted price
40%	:	60%
= 2	:	3

Total cost of 1 set of 2 scarves (normal price) and 3 scarves (discounted price)
= 2 × \$25 + 3 × \$20
= \$110

Number of sets
= \$1980 ÷ \$110
= 18

Total number of scarves sold
= 5 × 18
= 90

She sold **90** scarves altogether.

11. 100% – 20% = 80%
80% – 20% = 60%

60% ⟶ 180 kg
1% ⟶ 180 kg ÷ 60 = 3 kg
100% ⟶ 100 × 3 kg = 300 kg

Mass of beans in red-bean bag in the end
$= \frac{30}{100} \times 300$ kg
= 90 kg

There were **90 kg** of beans in the red-bean bag in the end.

12. Pens : Pencils : Rulers
25% : 2 : 5
(Pencils + Rulers = 75%)

5 units – 2 units = 3 units

3 units = 45 items
1 unit = 45 ÷ 3
= 15 items
7 units = 7 × 15
= 105 items

There were 105 pencils and rulers altogether.

75% ⟶ 105 items
1% ⟶ $(\frac{105}{75})$ items
100% ⟶ $100 \times \frac{105}{75} = 140$ items

There were **140** stationery items in all in the box.

Unit 5 Speed

Drills

Exercise 1

1. Distance
   = 50 m/min × 15 min
   = **750 m**

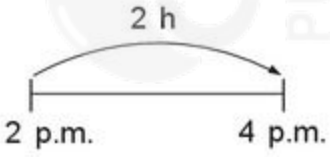
2. Time taken
   = 137.5 km ÷ 55 km/h
   = **2.5 h**

3. 1 h 20 min = $1\frac{20}{60}$ h
   = $1\frac{1}{3}$ h

   Average speed
   = 120 km ÷ $1\frac{1}{3}$ h
   = **90 km/h**

4. Average speed
   = 1350 m ÷ 9 min
   = **150 m/min**

5. Time taken
   = 900 m ÷ 45 m/min
   = **20 min**

6. 

   Average speed
   = 4 km ÷ 2 h
   = **2 km/h**

Perform

Exercise 1

1. **(3)**
   Average speed
   = 240 cm ÷ 12 s
   = 20 cm/s

2. **(1)**
   Distance
   = 650 km/h × 6 h
   = 3900 km

3. **(2)**
   Time taken
   = 605 km ÷ 110 km/h
   = 5.5 h

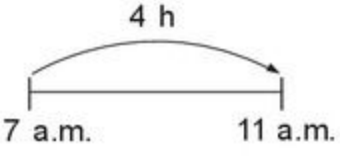
4. **(4)**
   3 × 450 m = 1350 m

   Average speed
   = 1350 m ÷ 12 min
   = 112.5 m/min

5. **(3)**
   45 min = $\frac{45}{60}$ h = $\frac{3}{4}$ h

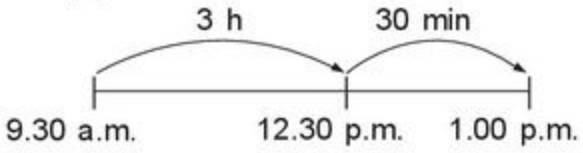
   Distance
   = 72 km/h × $\frac{3}{4}$ h
   = 54 km

6. **(2)**
   Time taken
   = 300 km ÷ 75 km/h
   = 4 h



It reached Station B at 11 a.m.

7. **(4)**



3 h 30 min = $3\frac{1}{2}$ h

Distance
= 80 km/h × $3\frac{1}{2}$ h
= 280 km

Exercise 2

1. Speed
= 42 km ÷ $1\frac{1}{2}$ h
= 28 km/h

28 km/h – 4 km/h = 24 km/h

Distance
= 24 km/h × $2\frac{3}{4}$ h
= 66 km

She can travel **66 km** in $2\frac{3}{4}$ h.

2. Distance
= 45 km/h × 4 h
= 180 km

4 h + $\frac{1}{2}$ h = $4\frac{1}{2}$ h

Jerry's average speed
= 180 km ÷ $4\frac{1}{2}$ h
= **40 km/h**

3. Distance
= 60 km/h × 5 h
= 300 km

Jimmy's average speed
= 300 km ÷ $7\frac{1}{2}$ h
= **40 km/h**

4. Distance (1st part)
= 10 km/h × $\frac{3}{4}$ h
= 7.5 km

Distance (2nd part)
= 6 km/h × $\frac{1}{2}$ h
= 3 km

Total distance covered
= 7.5 km + 3 km
= **10.5 km**

5. Distance travelled by Thomas in $1\frac{1}{2}$ h
= 50 km/h × $1\frac{1}{2}$ h
= 75 km

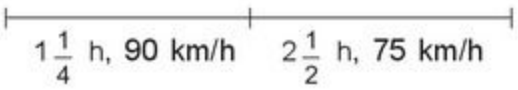
Distance travelled by Brian in $1\frac{1}{2}$ h
= 65 km/h × $1\frac{1}{2}$ h
= 97.5 km

97.5 km – 75 km = 22.5 km

Their distance apart after $1\frac{1}{2}$ h was **22.5** km.

Exercise 3

1.



Distance travelled (1st part)

$= 90 \text{ km/h} \times 1\frac{1}{4} \text{ h}$

$= 112.5 \text{ km}$

Distance travelled (2nd part)

$= 75 \text{ km/h} \times 2\frac{1}{2} \text{ h}$

$= 187.5 \text{ km}$

Total distance travelled

$= 112.5 \text{ km} + 187.5 \text{ km}$

$= 300 \text{ km}$

Total time taken

$= 1\frac{1}{4} \text{ h} + 2\frac{1}{2} \text{ h}$

$= 1\frac{1}{4} \text{ h} + 2\frac{2}{4} \text{ h}$

$= 3\frac{3}{4} \text{ h}$

Average speed for whole journey

$= 300 \text{ km} \div 3\frac{3}{4} \text{ h}$

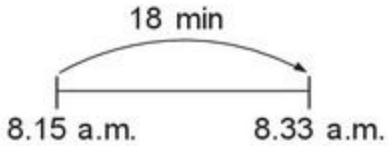
$= \mathbf{80 \text{ km/h}}$

2. Time taken

$= 13.5 \text{ km} \div 45 \text{ km/h}$

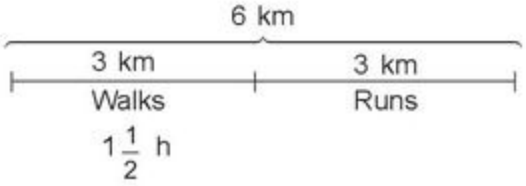
$= 0.3 \text{ h}$

$= 18 \text{ min}$



She reached her office at **8.33 a.m.**

3.



$6 \text{ km} \div 2 = 3 \text{ km}$

Walking speed

$= 3 \text{ km} \div 1\frac{1}{2} \text{ h}$

$= 2 \text{ km/h}$

Running speed

$= 2 \text{ km/h} + 4 \text{ km/h}$

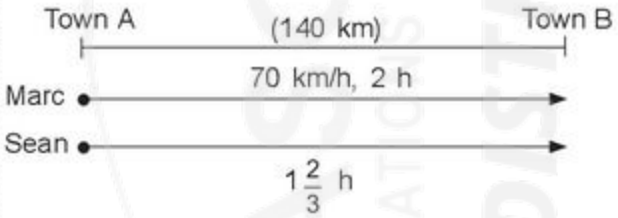
$= 6 \text{ km/h}$

Time he spends running

$= 3 \text{ km} \div 6 \text{ km/h}$

$= \mathbf{\frac{1}{2} \text{ h}}$

4.



Distance between Town A and Town B

$= 70 \text{ km/h} \times 2 \text{ h}$

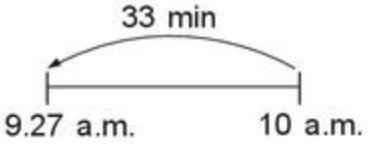
$= 140 \text{ km}$

Sean's average speed

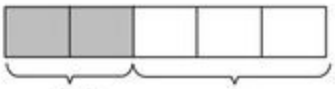
$= 140 \text{ km} \div 1\frac{2}{3} \text{ h}$

$= \mathbf{84 \text{ km/h}}$

5. Time taken
= 2.2 km ÷ 4 km/h
= 0.55 h
= 33 min



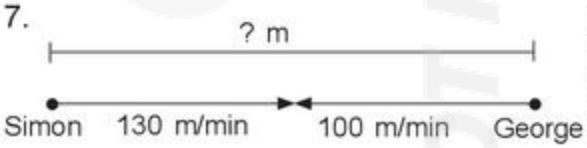
He left the library at **9.27 a.m.**

6. 

3 units = 180 km
1 unit = 180 km ÷ 3
= 60 km
5 units = 5 × 60 km
= 300 km

Total time taken
= 2 h + $2\frac{1}{2}$ h
= $4\frac{1}{2}$ h

Average speed for whole journey
= 300 km ÷ $4\frac{1}{2}$ h
= **$66\frac{2}{3}$ km/h**

7. 

130 m + 100 m = 230 m

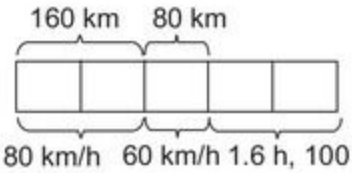
In 1 min, both of them covered a distance of 230 m.

1 min ⟶ 230 m
4 min ⟶ 4 × 230 m = 920 m

The distance of the track was **920 m.**

Achieve

Exercise 1

1. 

Distance (last part)
= 100 km/h × 1.6 h
= 160 km

2 units = 160 km
1 unit = 160 ÷ 2
= 80 km

Time taken (1st part)
= 160 km ÷ 80 km/h
= 2 h

Time taken (2nd part)
= 80 km ÷ 60 km/h
= $1\frac{1}{3}$ h

Total time taken
= 2 h + $1\frac{1}{3}$ h + 1.6 h
= 2 h + 1 h 20 min + 1 h 36 min
= 4 h 56 min

The total time Janet took for the whole journey was **4 h 56 min.**

2. 60 km/h,
1 h 20 min 160 km

Distance (1st part)
$= 60 \text{ km/h} \times 1\frac{1}{3} \text{ h}$
$= 80 \text{ km}$

1 unit = 80 km
2 units = 2×80 km
$= 160$ km

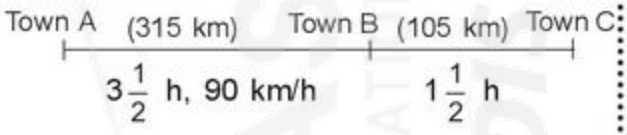
$3 \text{ h} - 1\frac{1}{3} \text{ h} = 1\frac{2}{3} \text{ h}$

Average speed (2nd part)

$= 160 \text{ km} \div 1\frac{2}{3} \text{ h}$
$= 96 \text{ km/h}$

He must travel at an average speed of **96 km/h** for the rest of the journey.

3.



$3\frac{1}{2}$ h, 90 km/h $\qquad$ $1\frac{1}{2}$ h

Distance between Town A and Town B
$= 90 \text{ km/h} \times 3\frac{1}{2} \text{ h}$
$= 315 \text{ km}$

Total time taken
$= 3\frac{1}{2} \text{ h} + 1\frac{1}{2} \text{ h}$
$= 5 \text{ h}$

Total distance between Town A and Town C
$= 84 \text{ km/h} \times 5 \text{ h}$
$= 420 \text{ km}$

Distance between Town B and Town C
$= 420 \text{ km} - 315 \text{ km}$
$= 105 \text{ km}$

Speed (Town B to Town C)
$= 105 \text{ km/h} \div 1\frac{1}{2} \text{ h}$
$= 70 \text{ km/h}$

His speed was **70 km/h** when he was travelling from Town B to Town C.

4. 1 min $\longrightarrow$ 20 m
45 min $\longrightarrow 45 \times 20 \text{ m} = 900 \text{ m}$

Marc had jogged 900 m more than Ben when Marc completed the journey.

$1 - \frac{7}{8} = \frac{1}{8}$

$\frac{1}{8} \longrightarrow 900 \text{ m}$

$\frac{8}{8} \longrightarrow 8 \times 900 \text{ m} = 7200 \text{ m}$

The park is **7200 m** from their home.

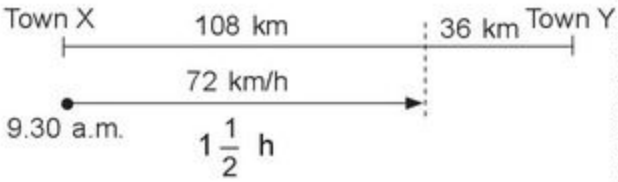
5. Difference between their speed
$= 6 \text{ m/s} - 4 \text{ m/s}$
$= 2 \text{ m/s}$

Time taken for Tim to catch up with Jane
$= 80 \text{ m} \div 2 \text{ m/s}$
$= 40 \text{ s}$

Distance Tim cycled when he caught up with Jane
$= 6 \text{ m/s} \times 40 \text{ s}$
$= 240 \text{ m}$

Tim should have cycled **240 m** when he caught up with Jane.

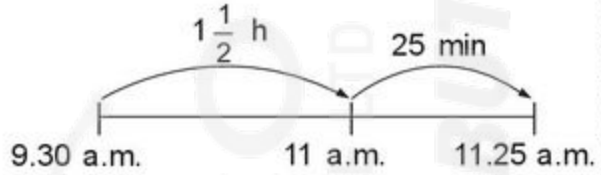
6.



Distance travelled (1st part)
$= 72 \text{ km/h} \times 1\frac{1}{2} \text{ h}$
$= 108 \text{ km}$

$\frac{3}{4} \longrightarrow 108 \text{ km}$

$\frac{1}{4} \longrightarrow 108 \text{ km} \div 3 = 36 \text{ km}$



$25 \text{ min} = \frac{25}{60} \text{ h}$

$= \frac{5}{12} \text{ h}$

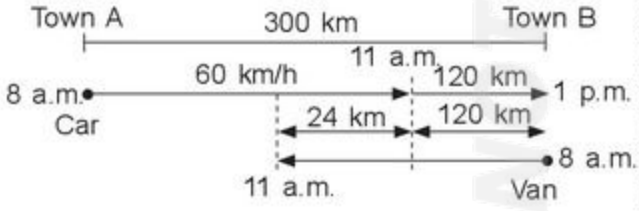
Average speed for remaining journey

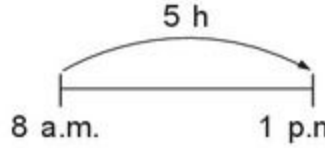
$= 36 \text{ km} \div \frac{5}{12} \text{ h}$

$= 86\frac{2}{5} \text{ km/h}$

She must drive at a speed of $86\frac{2}{5}$ **km/h** to reach Town Y at 11.25 a.m.

7.





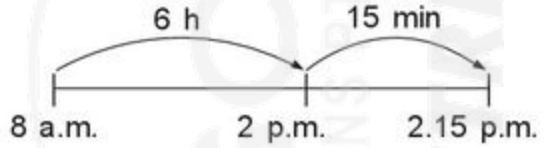
Distance between Town A and Town B
$= 60 \text{ km/h} \times 5 \text{ h}$
$= 300 \text{ km}$

Distance travelled by car from 11 a.m. to 1 p.m.
$= 60 \text{ km/h} \times 2 \text{ h}$
$= 120 \text{ km}$

$120 \text{ km} + 24 \text{ km} = 144 \text{ km}$

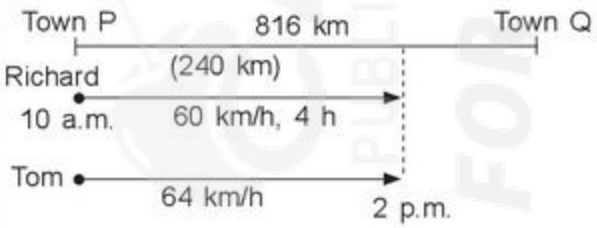
Average speed of van
$= 144 \text{ km} \div 3 \text{ h}$
$= 48 \text{ km/h}$

Time taken by van for whole journey
$= 300 \text{ km} \div 48 \text{ km/h}$
$= 6\frac{1}{4} \text{ h}$
$= 6 \text{ h } 15 \text{ min}$

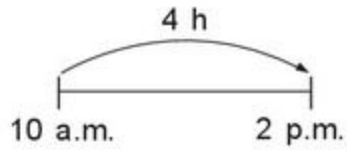


The van arrived at Town A at **2.15 p.m.**

8.

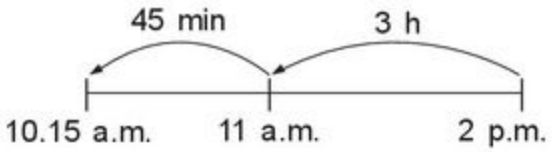


(a)



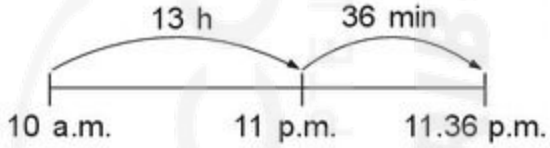
Distance travelled when they passed each other
$= 60 \text{ km/h} \times 4 \text{ h}$
$= 240 \text{ km}$

Time taken by Tom
= 240 km ÷ 64 km/h
= 3.75 h
= 3 h 45 min

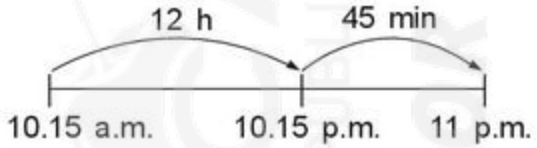


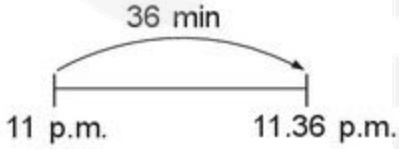
Tom left Town P at **10.15 a.m.**

(b) Time taken by Richard for the whole journey
= 816 km ÷ 60 km/h
= 13.6 h
= 13 h 36 min



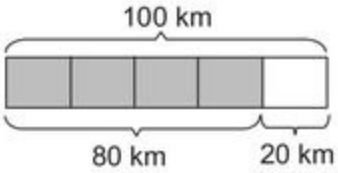
Time taken by Tom for the whole journey
= 816 km ÷ 64 km/h
= 12.75 h
= 12 h 45 min





Tom had arrived for **36 min** when Richard reached Town Q.

9.



4 units = 80 km
1 unit = 80 km ÷ 4
= 20 km
5 units = 5 × 20 km
= 100 km

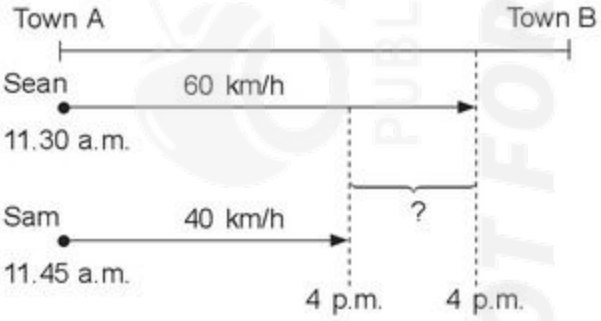
Time taken (Travelling at 75 km/h)
= 100 km ÷ 75 km/h
$= 1\frac{1}{3}$ h

Time taken (Travelling at 80 km/h)
= 100 km ÷ 80 km/h
$= 1\frac{1}{4}$ h

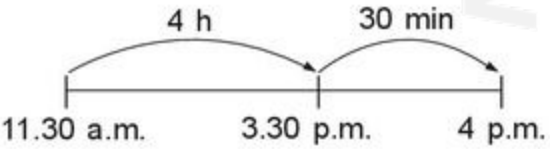
$1\frac{1}{3}$ h $- 1\frac{1}{4}$ h $= \frac{1}{12}$ h
= 5 min

He would have saved **5 min**.

10.



Sean:

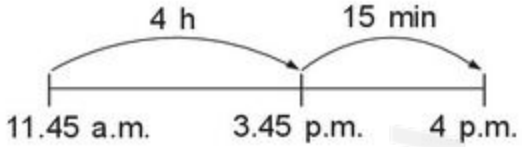


4 h + 30 min $= 4\frac{1}{2}$ h

Distance travelled by Sean

$= 60 \text{ km/h} \times 4\frac{1}{2} \text{ h}$
$= 270 \text{ km}$

Sam:



$4 \text{ h} + 15 \text{ min} = 4\frac{1}{4} \text{ h}$

Distance travelled by Sam

$= 40 \text{ km/h} \times 4\frac{1}{4} \text{ h}$
$= 170 \text{ km}$

$270 \text{ km} - 170 \text{ km} = 100 \text{ km}$

The distance between Sean and Sam at 4 p.m. was **100 km**.

Unit 6 Circles

Drills

Exercise 1

Circle	Radius	Diameter	Circumference	Area
A	6 cm	**12 cm**	**37.68 cm**	**113.04 cm²**
B	**12 cm**	**24 cm**	75.36 cm	**452.16 cm²**
C	**10 cm**	20 cm	**62.8 cm**	**314 cm²**
D	**7 cm**	**14 cm**	**43.96 cm**	153. 86 cm²

1. Circle A
2. Circle B
3. Circle A
4. Circle B

Exercise 2

1. Circumference $= \pi \times 60$
   $= 3.14 \times 60$
   $= \mathbf{188.4 \text{ cm}}$

2. Circumference $= \frac{22}{7} \times 56$
   $= \mathbf{176 \text{ cm}}$

3. Circumference $= 3.14 \times 36$
   $= \mathbf{113.04 \text{ cm}}$

4. Circumference $= \frac{22}{7} \times 75$
   $= \mathbf{235\frac{5}{7} \text{ cm}}$

5. Diameter = 18 cm
   Circumference $= 3.14 \times 18$
   $= \mathbf{56.52 \text{ cm}}$

6. Diameter = 24 cm

$$\text{Circumference} = \frac{22}{7} \times 24$$

$$= \mathbf{75\frac{3}{7}\ cm}$$

7. Diameter = 30 cm

$$\text{Circumference} = 3.14 \times 30$$

$$= \mathbf{94.2\ cm}$$

8. Diameter = 19 cm

$$\text{Circumference} = \frac{22}{7} \times 19$$

$$= \mathbf{59\frac{5}{7}\ cm}$$

Exercise 3

1. $\text{Area of circle} = \pi \times 8 \times 8$

$$= 3.14 \times 64$$

$$= \mathbf{200.96\ cm^2}$$

2. $\text{Area of circle} = \frac{22}{7} \times 5 \times 5$

$$= \frac{22}{7} \times 25$$

$$= \mathbf{78\frac{4}{7}\ cm^2}$$

3. $\text{Area of circle} = 3.14 \times 6 \times 6$

$$= 3.14 \times 36$$

$$= \mathbf{113.04\ cm^2}$$

4. Area of circle

$$= \frac{22}{7} \times 12\frac{1}{2} \times 12\frac{1}{2}$$

$$= \frac{22}{7} \times 156\frac{1}{4}$$

$$= \mathbf{491\frac{1}{14}\ cm^2}$$

Exercise 4

1. Area of semicircle

$$= \frac{1}{2} \times 3.14 \times 8 \times 8$$

$$= \frac{1}{2} \times 200.96$$

$$= \mathbf{100.48\ cm^2}$$

2. Area of semicircle

$$= \frac{1}{2} \times \frac{22}{7} \times 3 \times 3$$

$$= \frac{1}{2} \times 28\frac{2}{7}$$

$$= \frac{1}{2} \times \frac{198}{7}^{99}$$

$$= \mathbf{14\frac{1}{7}\ cm^2}$$

3. Area of quarter circle

$$= \frac{1}{4} \times 3.14 \times 10 \times 10$$

$$= \frac{1}{4} \times 314$$

$$= \mathbf{78.5\ cm^2}$$

4. Area of quarter circle

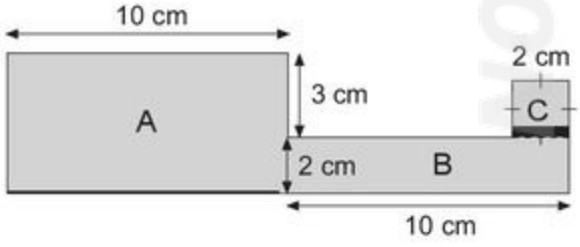
$$= \frac{1}{4} \times \frac{22}{7} \times 7 \times 7$$

$$= \frac{1}{4} \times 154$$

$$= \mathbf{38.5\ cm^2}$$

Exercise 5

1.



Area of Rectangle A
$= 10 \times 5$
$= 50 \text{ cm}^2$

Area of Rectangle B
$= 10 \times 2$
$= 20 \text{ cm}^2$

Area of Square C
$= 2 \times 2$
$= 4 \text{ cm}^2$

Area of figure
$= 50 + 20 + 4$
$= \mathbf{74 \text{ cm}^2}$

2. Area of triangle
$= \frac{1}{2} \times 42 \times 42$
$= \frac{1}{2} \times 1764$
$= 882 \text{ cm}^2$

Area of circle
$= \frac{22}{7} \times 7 \times 7$
$= 154 \text{ cm}^2$

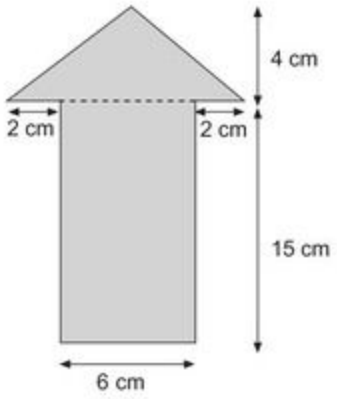
Shaded area of figure
$= 882 - 154$
$= \mathbf{728 \text{ cm}^2}$

3. Area of semicircle
$= \frac{1}{2} \times 3.14 \times 5 \times 5$
$= \frac{1}{2} \times 78.5$
$= 39.25 \text{ cm}^2$

Area of triangle
$= \frac{1}{2} \times 10 \times 8$
$= 40 \text{ cm}^2$

Area of figure
$= 39.25 + 40$
$= \mathbf{79.25 \text{ cm}^2}$

4.



Area of triangle
$= \frac{1}{2} \times (2 + 6 + 2) \times 4$
$= \frac{1}{2} \times 10 \times 4$
$= \frac{1}{2} \times 40$
$= 20 \text{ cm}^2$

Area of rectangle
$= 15 \times 6$
$= 90 \text{ cm}^2$

Area of arrow
$= 20 + 90$
$= \mathbf{110 \text{ cm}^2}$

5. Area of rectangle
$= 18 \times 9$
$= 162 \text{ cm}^2$

Area of triangle
$= \frac{1}{2} \times 9 \times 9$
$= \frac{1}{2} \times 81$
$= 40.5 \text{ cm}^2$

Area of shaded part
$= 162 - 40.5$
$= \mathbf{121.5 \text{ cm}^2}$

6. Curved part of small semicircle

$= \frac{1}{2} \times 3.14 \times 14$

$= \frac{1}{2} \times 43.96$

$= 21.98$ cm

Curved part of big semicircle

$= \frac{1}{2} \times 3.14 \times 20$

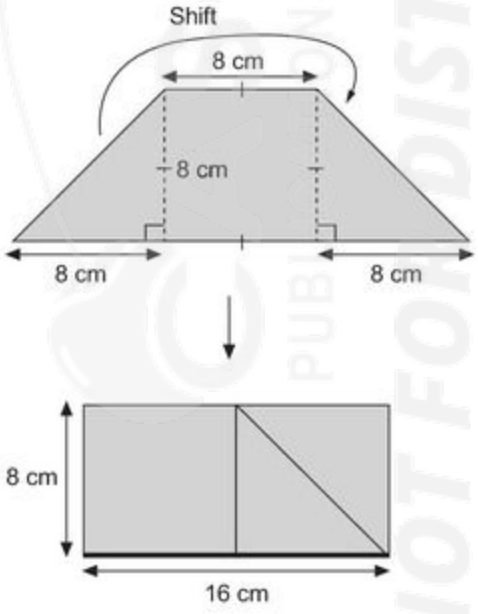
$= \frac{1}{2} \times 62.8$

$= 31.4$ cm

Perimeter of figure
$= 21.98 + 31.4 + 6$
$=$ **59.38 cm**

7. Perimeter of figure
$= 2 + 6 + 6 + 6 + 2 + 16 + 6 + 6 + 4 + 10$
$=$ **64 cm**

8.



Area of figure
$= 16 \times 8$
$=$ **128 cm²**

Perform

Exercise 1

1. **(3)**
Diameter $= 2 \times 120$ cm
$= 240$ cm

Circumference $= 3.14 \times 240$
$=$ 753.6 cm

2. **(4)**
Area of semicircle

$= \frac{1}{2} \times 3.14 \times 8 \times 8$

$= \frac{1}{2} \times 200.96$

$= 100.48$ cm²

Area of triangle

$= \frac{1}{2} \times 16 \times 4$

$= 32$ cm²

Area of figure
$= 100.48 + 32$
$=$ 132.48 cm²

3. **(2)**
Curved part of small semicircle

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

$= 5\pi$ cm

Curved part of big semicircle

$= \frac{1}{2} \times \pi \times 14$

$= 7\pi$ cm

Perimeter of shaded figure
$= 5\pi + 7\pi + 2 + 2$
$=$ $(12\pi + 4)$ cm

4. **(3)**
Length of square = $\sqrt{81}$
= 9 cm
Circumference of circle
= $\frac{22}{7} \times 9$
= $28\frac{2}{7}$ cm

5. **(2)**
Area of 1 circle
= $128\pi \div 2$
= 64π cm^2

$\pi \times$ Radius $\times$ Radius = 64π

Radius = $\sqrt{64}$
= 8 cm

Diameter = 2×8 cm
= 16 cm

Circumference of circle
= $\pi \times 16$
= 16π cm

6. **(1)**
Area of square
= 10×10
= 100 cm^2

Area of circle
= $3.14 \times 5 \times 5$
= 78.5 cm^2

Total area of shaded portions
= 100 – 78.5
= 21.5 cm^2

7. **(2)**
Circumference of circle
= $\frac{22}{7} \times 56$
= 176 cm

Length of one side of square
= 176 cm ÷ 4
= 44 cm

8. **(1)**
Area of 1 quarter circle
= $\frac{1}{4} \times \frac{22}{7} \times 24 \times 24$
= $452\frac{4}{7}$ cm^2

Area of 7 quarter circles
= $7 \times 452\frac{4}{7}$
= 3168 cm^2

9. **(2)**
Curved part of semicircle
= $\frac{1}{2} \times 3.14 \times 8$
= 12.56 cm

Perimeter of figure
= 12.56 + 20 + 8 + 20
= 60.56 cm

Exercise 2

1. Area of big circle
= $3.14 \times 10 \times 10$
= 314 cm^2

Area of small circle
= $3.14 \times 7 \times 7$
= 153.86 cm^2

Shaded area of figure
= 314 – 153.86
= **160.14 cm^2**

2. Area of semicirlce
= $\frac{1}{2} \times 3.14 \times 25 \times 25$
= 981.25 cm^2

Area of rectangle
= 80×50
= 4000 cm^2

Area of shaded part
= 4000 – 981.25
= **3018.75 cm^2**

3. Circumference of each circle
$= 36\pi \div 2$
$= 18\pi$ cm

Diameter of each circle = 18 cm
Radius of each circle = 9 cm

Area of one circle
$= \pi \times 9 \times 9$
$= \mathbf{81\pi\ cm^2}$

4. Area of triangle
$= \frac{1}{2} \times 6 \times 8$
$= 24\ cm^2$

Area of semicircle
$= \frac{1}{2} \times 3.14 \times 5 \times 5$
$= 39.25\ cm^2$

Shaded area of figure
$= 39.25 - 24$
$= \mathbf{15.25\ cm^2}$

Exercise 3

1. Curved part of semicircle
$= \frac{1}{2} \times 3.14 \times 7$
$= 10.99$ m

Perimeter of figure
$= 10.99$ m + 7 m
$= \mathbf{17.99\ m}$

2. Area of big semicircle
$= \frac{1}{2} \times \frac{22}{7} \times 7 \times 7$
$= 77\ cm^2$

Area of small semicircle
$= \frac{1}{2} \times \frac{22}{7} \times 3.5 \times 3.5$
$= 19.25\ cm^2$

Area of shaded part
$= 77 - 19.25$
$= \mathbf{57.75\ cm^2}$

3. Curved part of each semicircle
$= \frac{1}{2} \times \pi \times 8$
$= 4\pi$ cm

Length of wire
$= 3 \times 4\pi$
$= \mathbf{12\pi\ cm}$

4. Area of big semicircle
$= \frac{1}{2} \times \pi \times 6 \times 6$
$= 18\pi\ cm^2$

Area of small semicircle
$= \frac{1}{2} \times \pi \times 3 \times 3$
$= 4\frac{1}{2}\pi\ cm^2$

Area of shaded part
$= 18\pi - 4\frac{1}{2}\pi$
$= \mathbf{13\frac{1}{2}\pi\ cm^2}$

5. Area of triangle
$= \frac{1}{2} \times 12 \times 18$
$= 108\ cm^2$

Area of rectangle
$= 45 \times 18$
$= 810\ cm^2$

Area of semicircle
$= \frac{1}{2} \times 3.14 \times 9 \times 9$
$= 127.17\ cm^2$

Area of figure
$= 108 + 810 + 127.17$
$= \mathbf{1045.17\ cm^2}$

6. Length of square
= 2 × 40 cm
= 80 cm

Area of square
= 80 × 80
= 6400 cm^2

Area of circle
= 3.14 × 40 x 40
= 5024 cm^2

Area of shaded region
= 6400 – 5024
= **1376 cm^2**

7. Circumference of circle
= 3.14 × 15
= 47.1 cm

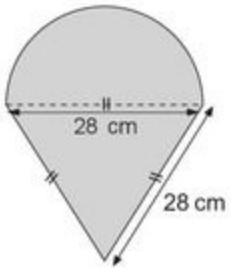
Perimeter of figure
= 47.1 + 25 + 25
= **97.1 cm**

8. Curved part of quarter circle
$= \frac{1}{4} \times \pi \times 24$
$= 6\pi$ cm

Curved part of semicircle
$= \frac{1}{2} \times \pi \times 12$
$= 6\pi$ cm

Perimeter of figure
$= 6\pi + 6\pi + 12$
$= (12\pi + 12)$ **cm**

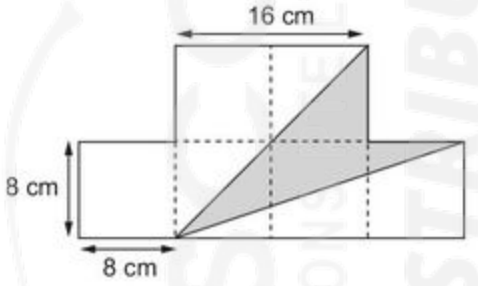
9.



Perimeter of figure
= Curved part of semicircle + 28 + 28
$= (\frac{1}{2} \times \pi \times 28) + 56$
$= (14\pi + 56)$ **cm**

Exercise 4

1.



Area of each small square
= 8 × 8
= 64 cm^2

Total area of unshaded parts
$= 4\frac{1}{2} \times 64$ cm^2
= **288** cm^2

2. Area of big square
= 11 × 11
= 121 cm^2

Area of 1 small square
= 3 × 3
= 9 cm^2

Area of figure
= 121 – (4 × 9)
= 121 – 36
= **85 cm^2**

3. Radius of circle
= 20 cm ÷ 2
= 10 cm

Area of circle
= 3.14 × 10 × 10
= 314 cm^2

Area of square
= 5 × 5
= 25 cm^2

Shaded area
= 314 – 25
= **289 cm^2**

4. Area of rectangle
= 17 × 11
= 187 cm^2

Total area of 2 triangles
= $(\frac{1}{2} \times 7 \times 3) + (\frac{1}{2} \times 10 \times 3)$
= 10.5 + 15
= 25.5 cm

Area of shaded part
= 187 – 25.5
= **161.5 cm^2**

5. Perimeter
= 24 × 2 cm
= **48** cm

6. Area of triangle
= $\frac{1}{2} \times 15 \times 15$
= 112.5 cm^2

Unshaded area
= $\frac{2}{3} \times 112.5$ cm^2
= **75 cm^2**

7. Area of figure
= (8 × 3) + (5 × 4) + (8 × 3)
= 24 + 20 + 24
= **68 cm^2**

Perimeter of figure
= 3 + 4 + 5 + 2 + 3 + 8 + 3 + 2 + 8 + 8
= **46 cm**

8. Area of square
= 7 × 7
= 49 cm^2

Area of circle
= $\frac{22}{7} \times 3.5 \times 3.5$
= 38.5 cm^2

Area of triangle
= $\frac{1}{2} \times 7 \times 3.5$
= 12.25 cm^2

Total area of shaded parts
= (49 – 38.5) + 12.25
= 10.5 + 12.25
= **22.75 cm^2**

Achieve

Exercise 1

1. Diameter = 2 × 105 m
= 210 m

Curved part of semicircle
= $\frac{1}{2} \times \frac{22}{7} \times 210$
= 330 m

330 m – 210 m = 120 m

The man has to travel **120 m** further.

2. Diameter = 2×12 cm = 24 cm

Circumference of circle
= 3.14×24
= 75.36 cm

60 min $\longrightarrow$ 75.36 cm

1 min $\longrightarrow$ $(\frac{75.36}{60})$ cm

38 min $\longrightarrow$ $38 \times \frac{75.36}{60}$ = 47.728 cm

The tip of the minute hand moves **47.728 cm**.

3. (a) Area of rectangle
= 16×14
= 224 cm^2

Area of big semicircle
= $\frac{1}{2} \times 3.14 \times 3.5 \times 3.5$
= 19.2325 cm^2

Area of small semicircle
= $\frac{1}{2} \times 3.14 \times 2 \times 2$
= 6.28 cm^2

Area of figure
= 224 + 19.2325 + 6.28
= 249.5125
= 249.51 cm^2 (correct to 2 d.p.)

The area of the figure is **249.51 cm^2**.

(b) Curved part of big semicircle
= $\frac{1}{2} \times 3.14 \times 7$
= 10.99 cm

Curved part of small semicircle
= $\frac{1}{2} \times 3.14 \times 4$
= 6.28 cm

Perimeter of figure
= 16 + 10.99 + 7 + 12 + 6.28 + 14
= 66.27 cm

The perimeter of the figure is **66.27 cm**.

4. Breadth of rectangle
= 40 $cm^2 \div 8$ cm
= 5 cm

Area of semicircle
= $\frac{1}{2} \times 3.14 \times 2.5 \times 2.5$
= 9.8125 cm^2

Area of triangle
= $\frac{1}{2} \times 4 \times 5$
= 10 cm^2

Area of figure
= 9.8125 + 40 + 10
= 59.8125
= 59.81 cm^2 (correct to 2 d.p.)

The area of the figure is **59.81 cm^2**.

5. Circumference of circle = 50π cm
$\pi \times$ Diameter = 50π
Diameter = 50 cm
Radius = 50 cm $\div$ 2
= 25 cm

The radius of the circle is **25 cm**.

Area of circle
= $\pi \times 25 \times 25$
= 625π cm^2

The area of the circle is **625π cm^2**.

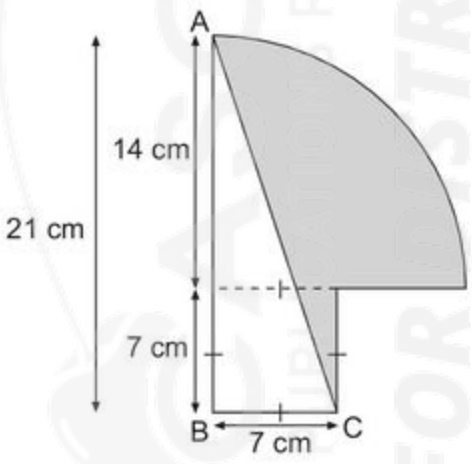
6. Area of square
$= 14 \times 14$
$= 196 \text{ cm}^2$

Area of quarter circle
$= \frac{1}{4} \times \frac{22}{7} \times 14 \times 14$
$= 154 \text{ cm}^2$

Area of triangle
$= \frac{1}{2} \times 14 \times 14$
$= 98 \text{ cm}^2$

Total area of shaded parts
$= (196 - 154) + 98$
$= 42 + 98$
$= 140 \text{ cm}^2$

The total area of the shaded parts of the square is **140 cm²**.

7. 

Length of square
$= 21 \text{ cm} \div 3$
$= 7 \text{ cm}$

Radius of quarter circle
$= 2 \times 7 \text{ cm}$
$= 14 \text{ cm}$

Area of square
$= 7 \times 7$
$= 49 \text{ cm}^2$

Area of quarter circle
$= \frac{1}{4} \times \frac{22}{7} \times 14 \times 14$
$= 154 \text{ cm}^2$

Area of $\triangle ABC$
$= \frac{1}{2} \times 7 \times 21$
$= 73.5 \text{ cm}^2$

Area of shaded part
$= (49 + 154) - 73.5$
$= 203 - 73.5$
$= 129.5 \text{ cm}^2$

The area of the shaded part of the figure is **129.5 cm²**.

8. Area of big square
$= 26 \times 26$
$= 676 \text{ cm}^2$

Area of 1 isosceles triangle
$= \frac{1}{2} \times 13 \times 13$
$= 84.5 \text{ cm}^2$

Area of 4 isosceles triangles
$= 4 \times 84.5 \text{ cm}^2$
$= 338 \text{ cm}^2$

Area of circle
$= \frac{22}{7} \times 7 \times 7$
$= 154 \text{ cm}^2$

Area of shaded part
$= 676 - 338 - 154$
$= 184 \text{ cm}^2$

The area of the shaded part of the figure is **184 cm²**.

9. (a) Length of painting
= 24.5 – 3 – 3
= 18.5 cm

Breadth of painting
= 12 – 3 – 3
= 6 cm

Area of painting
= 18.5 × 6
= 111 cm^2

The area of the painting is **111 cm^2**.

(b) Area of big rectangle
= 24.5 × 12
= 294 cm^2

Area of border
= 294 – 111
= 183 cm^2

The area of the border is **183 cm^2**.

10. Radius of 1 circle
= 21 cm ÷ 6
= 3.5 cm

Area of 1 circle
$= \frac{22}{7} \times 3.5 \times 3.5$
= 38.5 cm^2

Area of 6 circles
= 6 × 38.5 cm^2
= 231 cm^2

Area of rectangle
= 21 × 14
= 294 cm^2

Total shaded area
= 294 – 231
= 63 cm^2

The total shaded area is **63 cm^2**.

11. Base : Height
4 : 3

3 units = 6 cm
1 unit = 6 cm ÷ 3
= 2 cm
4 units = 4 × 2 cm
= 8 cm

The height of the triangle is 8 cm.
Length of square = 8 cm

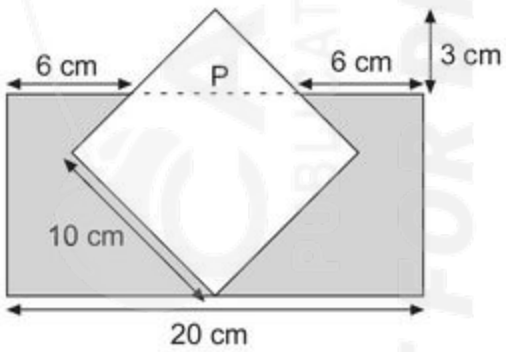
Area of triangle
$= \frac{1}{2} \times 8 \times 6$
= 24 cm^2

Area of square
= 8 × 8
= 64 cm^2

Area of figure
= 24 + 64
= 88 cm^2

The area of the figure is **88 cm^2**.

12.



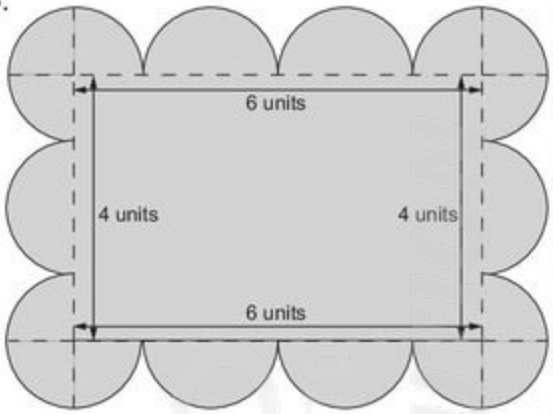
Area of 1 square
= 10 × 10
= 100 cm^2

Area of △P
$= \frac{1}{2} \times (20 - 6 - 6) \times 3$
$= \frac{1}{2} \times 8 \times 3$
= 12 cm^2

Area of overlap part
= 100 – 12
= 88 cm^2

The area of the overlap is **88 cm^2**.

13.



Let the radius of each circle be 1 unit.
Perimeter of rectangle = 70 cm

6 units + 4 units + 6 units + 4 units
= 70 cm
20 units = 70 cm
1 unit = 70 cm ÷ 20
= 3.5 cm

Length of rectangle
= 6 × 3.5 cm
= 21 cm

Breadth of rectangle
= 4 × 3.5 cm
= 14 cm

Area of rectangle
= 21 × 14
= 294 cm^2

Area of a quarter circle
$= \frac{1}{4} \times \frac{22}{7} \times 3.5 \times 3.5$
= 9.625 cm^2

Area of 24 quarter circles
= 24 × 9.625 cm^2
= 231 cm^2

Area of figure
= 294 + 231
= 525 cm^2

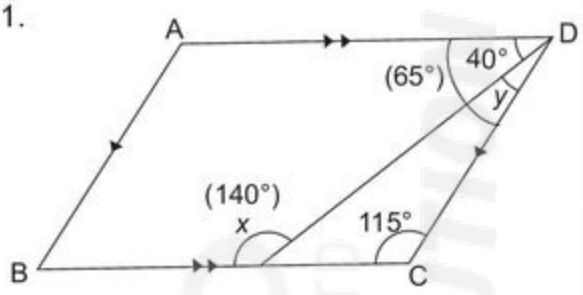
The area of the figure is **525 cm^2**.

Unit 7 Angles in Geometric Figures

Drills

Exercise 1

1.

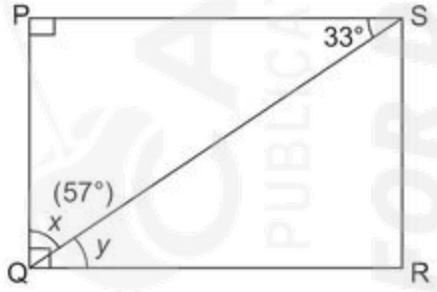


$\angle x = 180° - 40°$ ($\angle$s between // lines)
$= \mathbf{140°}$

$\angle ADC = 180° - 115°$ ($\angle$s between // lines)
$= 65°$

$\angle y = 65° - 40°$
$= \mathbf{25°}$

2.



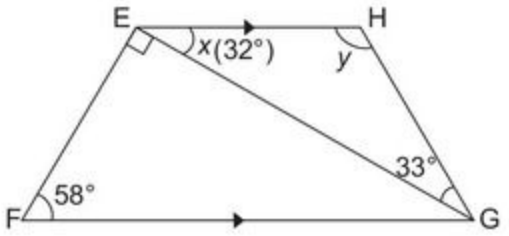
$\angle QPS = 90°$ ($\angle$s of a rectangle)

$\angle x = 180° - 90° - 33°$ ($\angle$ sum of $\triangle$)
$= \mathbf{57°}$

$\angle PQR = 90°$ ($\angle$s of a rectangle)

$\angle y = 90° - 57°$
$= \mathbf{33°}$

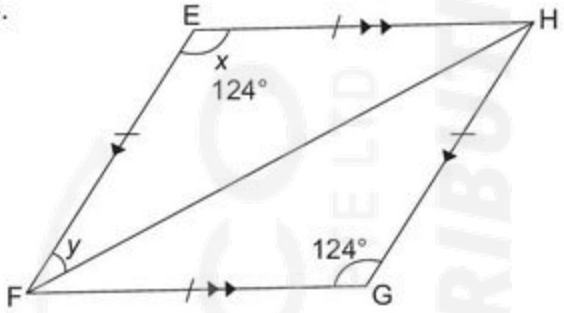
3.



$\angle x = 180° - 90° - 58°$ ($\angle$s between // lines)
$= \mathbf{32°}$

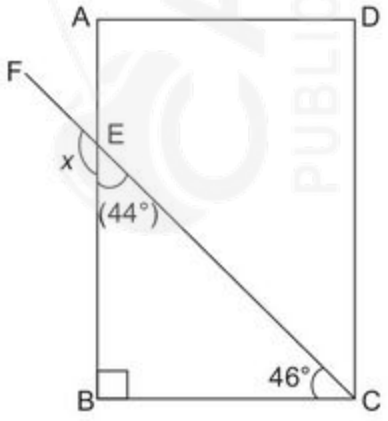
$\angle y = 180° - 33° - 32°$ ($\angle$ sum of $\triangle$)
$= \mathbf{115°}$

4.



$\angle x = \mathbf{124°}$ (opp. $\angle$s of a rhombus)
$\angle y = (180° - 124°) \div 2$ (isos. $\triangle$)
$= 56° \div 2$
$= \mathbf{28°}$

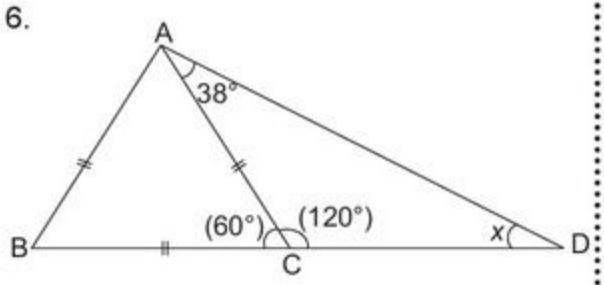
5.



$\angle ABC = 90°$ ($\angle$s of a rectangle)
$\angle BEC = 180° - 90° - 46°$ ($\angle$ sum of $\triangle$)
$= 44°$

$\angle x = 180° - 44°$ ($\angle$s on a straight line)
$= \mathbf{136°}$

6.



$\angle ACB = 180° \div 3$ (equi. $\triangle$)
$= 60°$

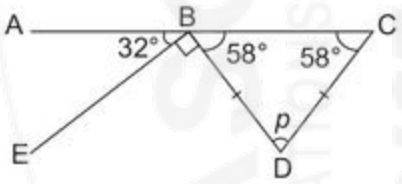
$\angle ACD = 180° - 60°$ ($\angle$s on a straight line)
$= 120°$

$\angle x = 180° - 120° - 38°$ ($\angle$ sum of $\triangle$)
$= \mathbf{22°}$

Perform

Exercise 1

1.

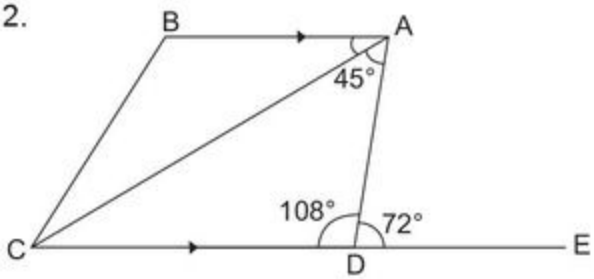


$\angle DBC = 180° - 90° - 32°$ ($\angle$s on a straight line)
$= 58°$

$\angle DCB = 58°$ (isos. $\triangle$)

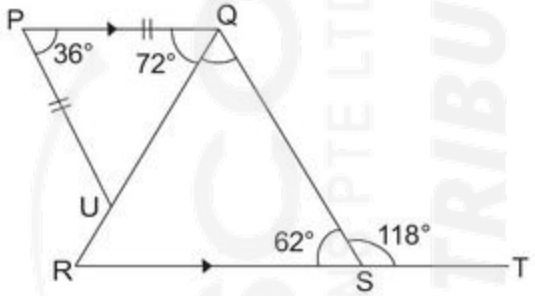
$\angle p = 180° - 58° - 58°$ ($\angle$ sum of $\triangle$)
$= \mathbf{64°}$

2.



$\angle ADC = 180° - 72°$ ($\angle$s on a straight line)
$= 108°$
$\angle BAC = 180° - 45° - 108°$
($\angle$s between // lines)
$= \mathbf{27°}$

3.

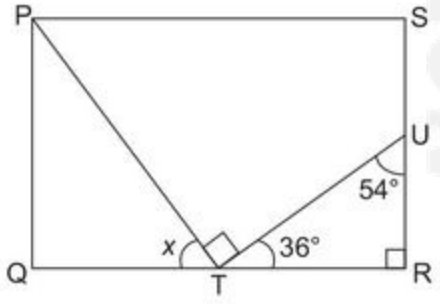


$\angle PQU = (180° - 36°) \div 2$ (isos. $\triangle$)
$= 144° \div 2$
$= 72°$

$\angle QSR = 180° - 118°$ ($\angle$s on a straight line)
$= 62°$

$\angle RQS = 180° - 72° - 62°$ ($\angle$s between // lines)
$= \mathbf{46°}$

4.

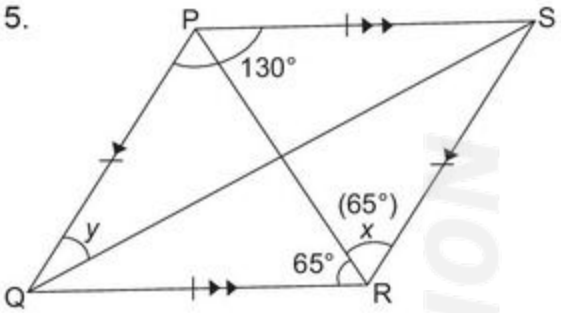


$\angle QRS = 90°$ ($\angle$s of a rectangle)

$\angle RTU = 180° - 90° - 54°$ ($\angle$ sum of $\triangle$)
$= 36°$

$\angle x = 180° - 90° - 36°$ ($\angle$s on a straight line)
$= \mathbf{54°}$

5.

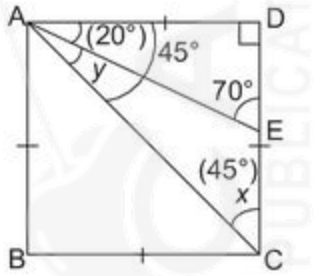


$\angle x = \angle QRP$ (PR divides the rhombus into half)
$= \mathbf{65°}$

$\angle QPS = \angle QRS$ (opp. $\angle$s of rhombus)
$= 65° + 65°$
$= 130°$

$\angle y = (180° - 130°) \div 2$ (isos. $\triangle$)
$= 50° \div 2$
$= \mathbf{25°}$

6.



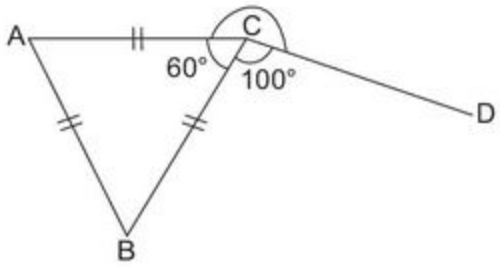
$\angle ADC = 90°$ ($\angle$s of a square)

$\angle x = (180° - 90°) \div 2$ (isos. $\triangle$)
$= 90° \div 2$
$= \mathbf{45°}$

$\angle DAE = 180° - 90° - 70°$ ($\angle$ sum of $\triangle$)
$= 20°$
$\angle DAC = 45°$

$\angle y = 45° - 20°$
$= \mathbf{25°}$

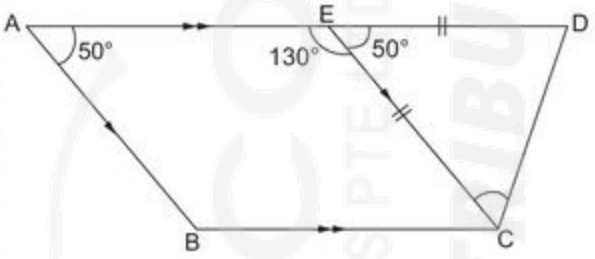
7.



$\angle ACB = 180° \div 3$ (equi. $\triangle$)
$= 60°$

$\angle ACD = 360° - 60° - 100°$ ($\angle$s at a point)
$= \mathbf{200°}$

8.

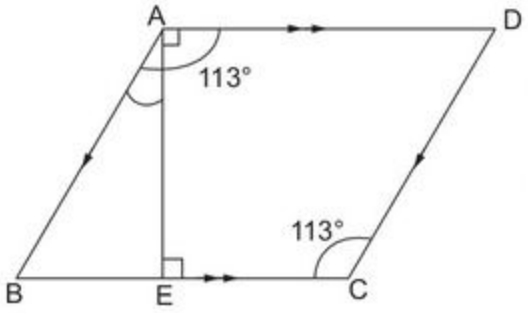


$\angle AEC = 180° - 50°$ ($\angle$s between // lines)
$= 130°$

$\angle CED = 180° - 130°$ ($\angle$s on a straight line)
$= 50°$

$\angle ECD = (180° - 50°) \div 2$ (isos. $\triangle$)
$= 130° \div 2$
$= \mathbf{65°}$

9.

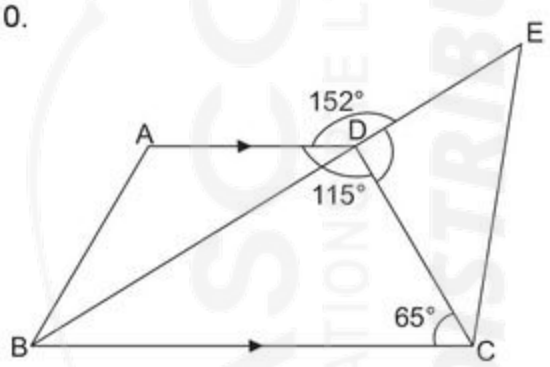


$\angle DAE = 180° - 90°$ ($\angle$s between // lines)
$= 90°$

$\angle BAD = 113°$ (opp. $\angle$s of a parallelogram)

$\angle BAE = 113° - 90°$
$= \mathbf{23°}$

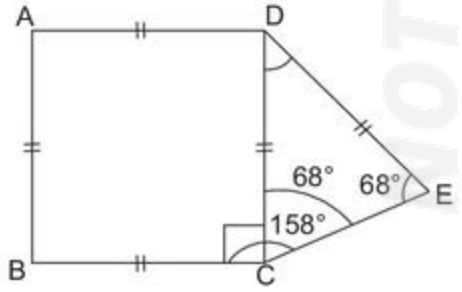
10.



$\angle ADC = 180° - 65°$ ($\angle$s between parallel lines)
$= 115°$

$\angle CDE = 360° - 152° - 115°$ ($\angle$s at a point)
$= \mathbf{93°}$

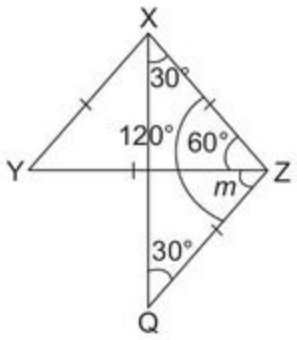
11.



$\angle BCD = 90°$ ($\angle$s of a square)
$\angle DCE = 158° - 90°$
$= 68°$

$\angle DEC = 68°$ (isos. $\triangle$)
$\angle CDE = 180° - 68° - 68°$ ($\angle$ sum of $\triangle$)
$= \mathbf{44°}$

12.



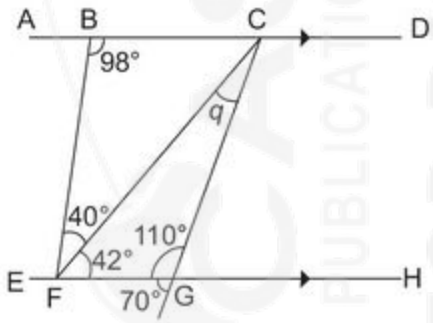
$\angle ZXQ = 30°$ (isos. $\triangle$)

$\angle QZX = 180° - 30° - 30°$ ($\angle$ sum of $\triangle$)
$= 120°$

$\angle XZY = 180° \div 3$ (equi. $\triangle$)
$= 60°$

$\angle m = 120° - 60°$
$= \mathbf{60°}$

13.

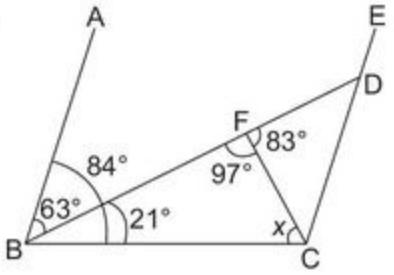


$\angle CFG = 180° - 98° - 40°$ ($\angle$s between // lines)
$= 42°$

$\angle FGC = 180° - 70°$ ($\angle$s on a straight line)
$= 110°$

$\angle q = 180° - 42° - 110°$ ($\angle$ sum of $\triangle$)
$= \mathbf{28°}$

14.

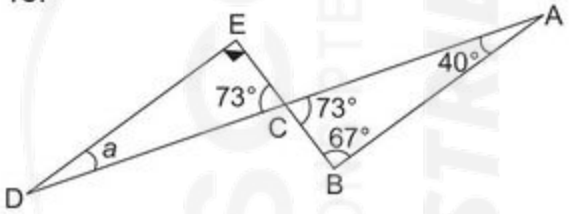


$\angle CBF = 84° - 63°$
$= 21°$

$\angle BFC = 180° - 83°$ ($\angle$s on a straight line)
$= 97°$

$\angle x = 180° - 21° - 97°$ ($\angle$ sum of $\triangle$)
$= \mathbf{62°}$

15.



$\angle ACB = 180° - 67° - 40°$ ($\angle$ sum of $\triangle$)
$= 73°$

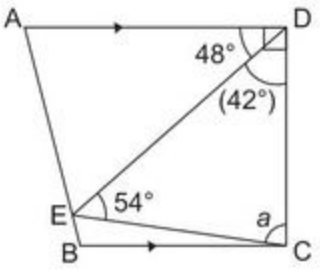
$\angle DCE = 73°$ (vert. opp. $\angle$s)

$\angle CDE = 180° - 90° - 73°$ ($\angle$ sum of $\triangle$)
$= \mathbf{17°}$

Achieve

Exercise 1

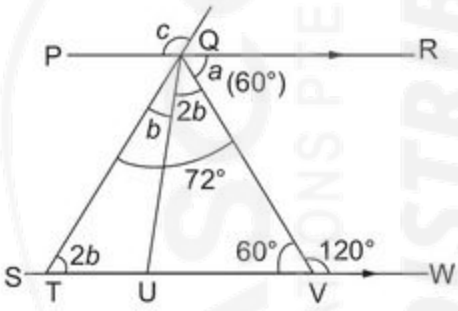
1.



$\angle CDE = 90° - 48°$
$= 42°$

$\angle a = 180° - 42° - 54°$ ($\angle$ sum of $\triangle$)
$= \mathbf{84°}$

2.



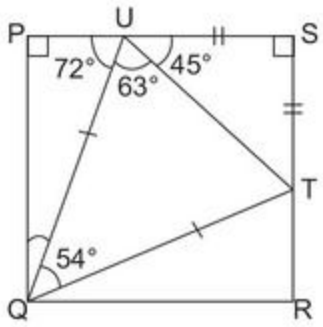
$\angle a = 180° - 120°$ ($\angle$s between // lines)
$= \mathbf{60°}$

$\angle QVT = 180° - 120°$ ($\angle$s on a straight line)
$= 60°$

$\angle b = (180° - 60°) \div 5$ ($\angle$ sum of $\triangle$)
$= 120° \div 5$
$= \mathbf{24°}$

$\angle c = 60° + (3 \times 24°)$ (vert. opp. $\angle$s)
$= 60° + 72°$
$= \mathbf{132°}$

3.



$\angle QUT = (180° - 54°) \div 2$ (isos. $\triangle$)
$= 126° \div 2$
$= 63°$

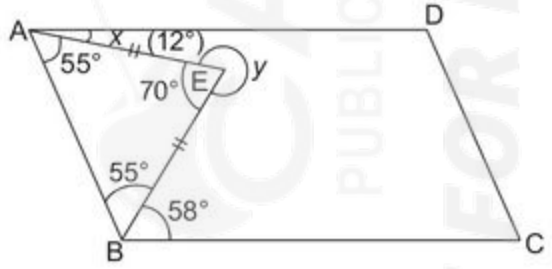
$\angle PSR = 90°$ ($\angle$s of a square)

$\angle SUT = (180° - 90°) \div 2$ (isos. $\triangle$)
$= 90° \div 2$
$= 45°$

$\angle QUP = 180° - 45° - 63°$ ($\angle$s on a straight line)
$= 72°$

$\angle QPS = 90°$ ($\angle$s of a square)
$\angle PQU = 180° - 90° - 72°$ ($\angle$ sum of $\triangle$)
$= \mathbf{18°}$

4.



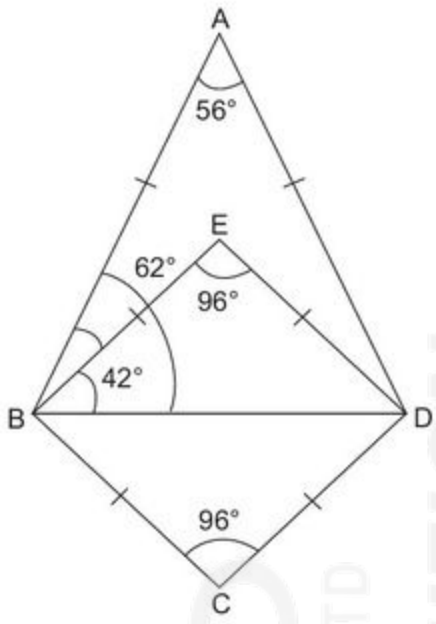
$\angle EBA = 55°$ (isos. $\triangle$)

$\angle x = 180° - 58° - 55° - 55°$ ($\angle$s between // lines)
$= \mathbf{12°}$

$\angle AEB = 180° - 55° - 55°$ ($\angle$ sum of $\triangle$)
$= 70°$

$\angle y = 360° - 70°$ ($\angle$s at a point)
$= \mathbf{290°}$

5.



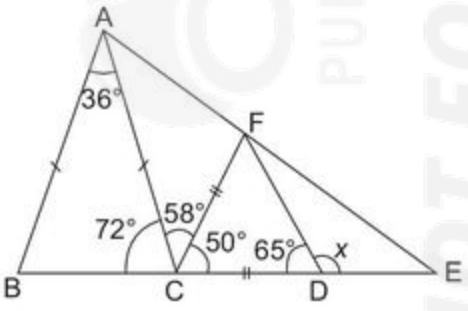
$\angle BED = 96°$ (opp. $\angle$s of a rhombus)

$\angle EBD = (180° - 96°) \div 2$ (isos. $\triangle$)
$= 84° \div 2$
$= 42°$

$\angle ABD = (180° - 56°) \div 2$ (isos. $\triangle$)
$= 124° \div 2$
$= 62°$

$\angle ABE = 62° - 42°$
$= \mathbf{20°}$

6.



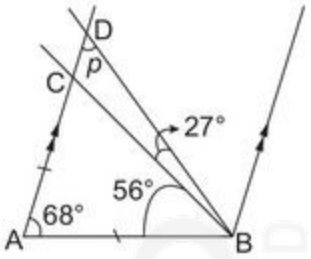
$\angle ACB = (180° - 36°) \div 2$ (isos. $\triangle$)
$= 144° \div 2$
$= 72°$

$\angle FCD = 180° - 72° - 58°$ ($\angle$s on a straight line)
$= 50°$

$\angle CDF = (180° - 50°) \div 2$ (isos. $\triangle$)
$= 130° \div 2$ (isos. $\triangle$)
$= 65°$

$\angle x = 180° - 65°$ ($\angle$s on a straight line)
$= \mathbf{115°}$

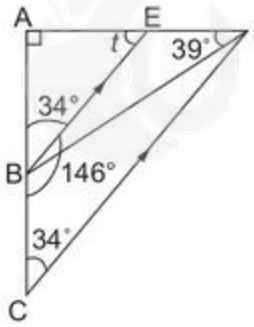
7.



$\angle ABC = (180° - 68°) \div 2$ (isos. $\triangle$)
$= 112° \div 2$
$= 56°$

$\angle p = 180° - 68° - 56° - 27°$ ($\angle$ sum of $\triangle$)
$= \mathbf{29°}$

8.

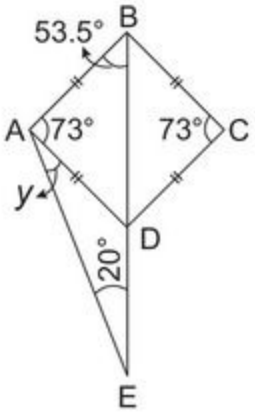


$\angle CBE = 180° - 34°$ ($\angle$s between // lines)
$= 146°$

$\angle ABE = 180° - 146°$ ($\angle$s on a straight line)
$= 34°$

$\angle t = 180° - 90° - 34°$ ($\angle$ sum of $\triangle$)
$= \mathbf{56°}$

9.

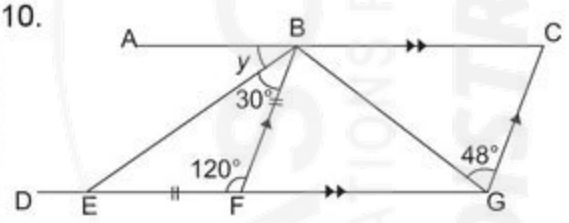


$\angle BAD = 73°$ (opp. $\angle$s of a rhombus)

$\angle ABD = (180° - 73°) \div 2$ (isos. $\triangle$)
$= 107° \div 2$
$= 53.5°$

$\angle y = 180° - 53.5° - 73° - 20°$ ($\angle$ sum of $\triangle$)
$= \mathbf{33.5°}$

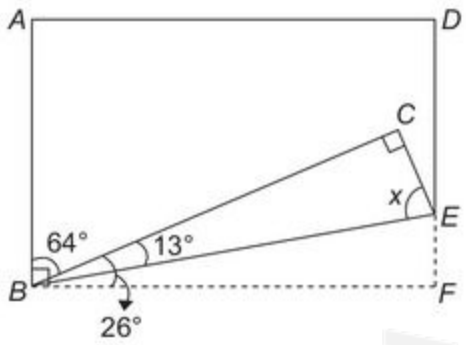
10.



$\angle EBF = (180° - 120°) \div 2$ (isos. $\triangle$)
$= 60° \div 2$
$= 30°$

$\angle y = 180° - 120° - 30°$ ($\angle$s between // lines)
$= \mathbf{30°}$

11.



$\angle ABF = 90°$ ($\angle$s of a rectangle)

$\angle CBF = 90° - 64°$
$= 26°$

$\angle CBE = 26° \div 2$
$= 13°$

$\angle BCE = 90°$ ($\angle$s of a rectangle)

$\angle x = 180° - 90° - 13°$ ($\angle$ sum of $\triangle$)
$= \mathbf{77°}$

Unit 8 Solid Figures and Nets

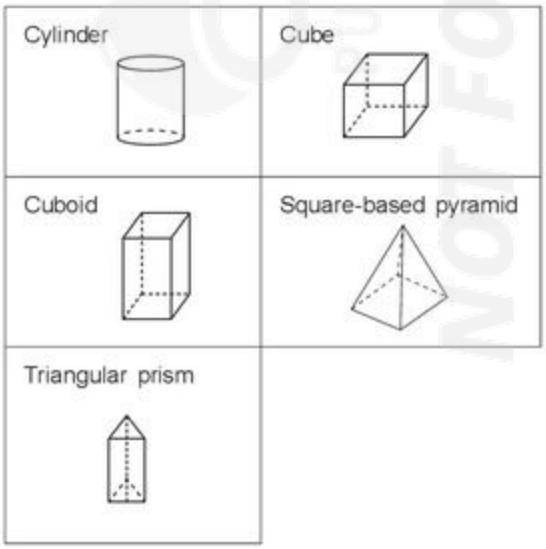
Drills

Exercise 1

1.

Property \ Figure	Cylinder	Cube	Rectangular Cuboid	Pyramid (Square-based	Pyramid (Triangle-based
Number of flat surface(s)	2	6	6	5	4
Number of curved surface(s)	1	0	0	0	0
Number of faces	3	6	6	5	4
Number of square face(s)	0	6	0	1	0
Number of rectangular face(s)	0	0	6	0	0
Number of triangular face(s)	0	0	0	4	4

2.



Perform

Exercise 1

Length of one edge	Number of unit cubes with 3 painted faces	Number of unit cubes with 2 painted faces	Number of unit cubes with 1 painted face	Number of unit cubes with no painted faces
3	**8**	**12**	**6**	**1**
5	**8**	**36**	**54**	**27**
7	**8**	**60**	**150**	**125**

Exercise 2

1. (a) Cuboid
   (b) Pyramid (square-based)
   (c) Cube
   (d) Triangular prism

2. (a) ✓ (b) ✗
   (c) ✓ (d) ✓

3. C

4. D

5. A

6. A

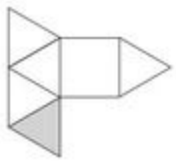
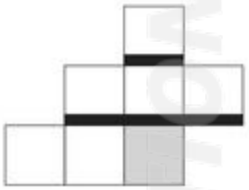
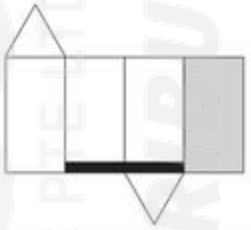
7. A and C

8. B, C and E

9. D

10. C

Exercise 3

Solid	Net
 Pyramid	
 Cube	
 Prism	

Achieve

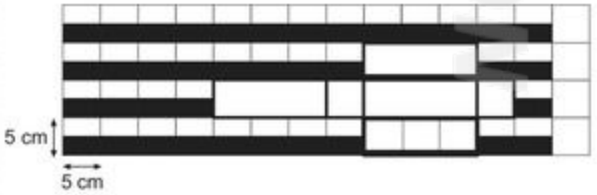
Exercise 1

1. A = **1** and B = **5**.

2. D

3. Volume of cuboid
   = 6 × 3 × 2
   = **36 cm³**

4. (a)



(b) Total area of the faces

$= 4 \times (15 \times 5) + 2 \times (5 \times 5)$
$= 300 + 50$
$= \mathbf{350\ cm^2}$

5. E

6. (a) Total surface area of solid

$= (4 \times 4) + 4 \times (\frac{1}{2} \times 4 \times 10)$
$= 16 + (4 \times 20)$
$= 16 + 80$
$= \mathbf{96\ cm^2}$

(b) $\frac{1}{10} \times 96\ cm^2 = 9.6\ cm^2$

$96\ cm^2 + 9.6\ cm^2 = 105.6\ cm^2$

105.6 cm² of cardboard is required to make the solid.

Unit 9 Pie Charts

Drills

Exercise 1

1. (a) Fraction he spends on rent

$= \frac{1}{2} - \frac{1}{6} - \frac{1}{6}$
$= \frac{3}{6} - \frac{1}{6} - \frac{1}{6}$
$= \frac{1}{6}$

Amount he spends on rent

$= \frac{1}{6} \times \$1800$
$= \mathbf{\$300}$

(b) Amount he saves

$= \frac{25}{100} \times \$1800$
$= \mathbf{\$450}$

(c) Amount he spends on car instalment

$= \frac{1}{4} \times \$1800$
$= \$450$

$\$450 - \$300 = \$150$

He spends **$150** more on car instalment than rent.

(d) $\frac{1}{6} + \frac{1}{6} = \frac{2}{6}$
$= \frac{1}{3}$

Amount he spends on food and clothing

$= \frac{1}{3} \times \$1800$
$= \mathbf{\$600}$

(e) 100% – 25% = 75%
Monthly expenditure
$= \frac{75}{100} \times \$1800$
$= \mathbf{\$1350}$

2. (a) 100% – 75% = 25%

$25\% = \frac{25}{100} = \frac{1}{4}$

Fraction of Malay pupils

$= \frac{1}{4} - \frac{1}{12} - \frac{1}{12}$

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

$= \frac{1}{12}$

$\frac{1}{12} \longrightarrow 75$ pupils

There are **75** Indian pupils.

(b) $75\% = \frac{75}{100} = \frac{3}{4} = \frac{9}{12}$

$\frac{1}{12} \longrightarrow 75$ pupils

$\frac{9}{12} \longrightarrow 9 \times 75 = 675$ pupils

There are **675** Chinese pupils.

(c) 675 – 75 = 600
There are **600** more Chinese than Malay pupils.

(d) $\frac{1}{12} \longrightarrow 75$ pupils

$\frac{12}{12} \longrightarrow 12 \times 75 = 900$ pupils

There are **900** pupils altogether.

(e) 900 – 675 = 225
There are **225** non-Chinese pupils.

3. (a) Fraction of game cards

$= \frac{1}{2} - \frac{1}{4}$

$= \frac{1}{4}$

$= \frac{2}{8}$

$\frac{2}{8} \longrightarrow 720$ items

$\frac{1}{8} \longrightarrow 720 \div 2 = 360$ items

Raymond collected **360** erasers.

(b) $\frac{1}{8} \longrightarrow 360$ items

$\frac{8}{8} \longrightarrow 8 \times 360 = 2880$ items

The total number of items Raymond collected was **2880**.

(c) He had the same number of **game cards** and **stickers**.

(d) Number of stamps

$= \frac{37.5}{100} \times 2880$

$= \mathbf{1080}$

(e) 1080 – 720 = 360
He collected **360** more stamps than stickers.

Perform

Exercise 1

1. (a) **(4)**
25% – 12.5% = 12.5%
12.5% ⟶ 90 children
1% ⟶ $\frac{90}{12.5} = 7.2$ children
37.5% ⟶ 37.5×7.2
$= 270$ children

270 children prefer apples.

(b) **(1)**
90 children prefer mangoes.

(c) **(2)**
The same number of children prefer oranges as apples.

$270 - 90 = 180$

180 more children prefer oranges to grapes.

(d) **(3)**
Required fraction

$= \frac{37.5}{100}$

$= \frac{75}{200}$

$= \frac{3}{8}$

(e) **(1)**

Grapes	:	Oranges
90	:	270
= 1	:	3

2. (a) **(1)**

$1 - \frac{1}{8} - \frac{1}{4}$

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

$= \frac{5}{8}$

$\frac{5}{8} \longrightarrow \$2000$

$\frac{1}{8} \longrightarrow \$2000 \div 5 = \$400$

Aunt Jessie spent $400 on the doll house.

(b) **(2)**

$\frac{1}{4} = \frac{2}{8}$

$\frac{1}{8} \longrightarrow \$400$

$\frac{2}{8} \longrightarrow 2 \times \$400 = \$800$

Aunt Jessie spent $800 on the wallet.

(c) **(3)**
$\$2000 - \$800 = \$1200$

She spent $1200 more on the computer than the wallet.

(d) **(4)**

$\frac{1}{8} \longrightarrow \$400$

$\frac{8}{8} \longrightarrow 8 \times \$400 = \$3200$

Aunt Jessie spent $3200 altogether.

(e) **(4)**

Doll house	:	Total
$400	:	$3200
= 4	:	32
= 1	:	8

3. (a) **(1)**

$\frac{1}{2} - \frac{3}{8} = \frac{4}{8} - \frac{3}{8}$

$= \frac{1}{8}$

$\frac{1}{4} = \frac{2}{8}$

$\frac{2}{8} \longrightarrow 18$ items

$\frac{1}{8} \longrightarrow 18 \div 2 = 9$

Baby Keith received 9 bibs.

(b) **(2)**

$\frac{3}{8} - \frac{1}{4}$

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

$= \frac{1}{8}$

Baby Keith received 9 more pieces of clothes than games.

(c) **(3)**

Required percentage

$= \frac{3}{8} \times 100\%$

$= 37.5\%$

(d) **(1)**

Required fraction

$= \frac{1}{8}$ ← From part (a).

(e) **(2)**

$\frac{1}{8} \longrightarrow 9$ items

$\frac{3}{8} \longrightarrow 3 \times 9 = 27$ items

Baby Keith received 27 pieces of clothing.

Milk bottles	:	Bibs	:	Clothing
18	:	9	:	27
= 2	:	1	:	3

Achieve

Exercise 1

1. (a) $\frac{1}{4} = 25\%$

Percentage of scouts
$= 100\% - 25\% - 25\% - 20\%$
$= 30\%$

30% of the pupils were scouts.

(b) $30\% \longrightarrow 180$ pupils

$1\% \longrightarrow 180 \div 30 = 6$ pupils

$25\% \longrightarrow 25 \times 6 = 150$ pupils

150 pupils joined the Drama Club as their CCA.

(c) $20\% = \frac{20}{100} = \frac{1}{5}$

$\frac{1}{5}$ of the pupils joined the Mathematics Club as their CCA.

(d) $25\% - 20\% = 5\%$

$1\% \longrightarrow 6$ pupils

$5\% \longrightarrow 5 \times 6 = 30$ pupils

The difference between the number of pupils who took up IT Club and Mathematics Club was **30**.

(e) $100\% \longrightarrow 100 \times 6 = 600$ pupils

600 pupils took part in various CCA.

$30\% \longrightarrow 600$ pupils

$1\% \longrightarrow 600 \div 30 = 20$ pupils

$100\% \longrightarrow 100 \times 20$

$= 2000$ pupils

There were **2000** pupils in the school.

2. (a) $\frac{1}{8} \times 600 = 75$

75 pupils eat noodles.

(b) $\frac{1}{4} \times 600 = 150$

150 pupils eat mee goreng.

(c) $10\% = \frac{10}{100} = \frac{1}{10}$

$\frac{1}{10}$ of the pupils eat chicken rice.

(d) $\frac{1}{8} = \frac{1}{8} \times 100\% = 12.5\%$

$\frac{1}{4} = \frac{1}{4} \times 100\% = 25\%$

Percentage of pupils who eat curry puffs
$= 100\% - 25\% - 20\% - 11\% - 10\% - 12.5\%$
$= 21.5\%$

$21.5\% - 20\% = 1.5\%$

$\frac{1.5}{100} \times 600 = 9$

The difference between the number of pupils who choose curry puffs and those who choose porridge is **9**.

(e) Number of plates of chicken rice
$= \frac{10}{100} \times 600$
$= 60$

Number of curry puffs
$= \frac{21.5}{100} \times 600$
$= 129$

Total amount spent
$= (60 \times \$1.50) + (129 \times \$0.80)$
$= \$90 + \$103.20$
$= \$193.20$

\$193.20 is spent on these food items.

3. (a) $\frac{1}{2} - \frac{1}{6} - \frac{1}{6}$
$= \frac{3}{6} - \frac{1}{6} - \frac{1}{6}$
$= \frac{1}{6}$

$\frac{1}{6} \longrightarrow \$390$

He spends **\$390** on clothing.

(b) $\frac{1}{9} \times 100\% = 11.11\%$ (correct to 2 d.p.)

He spends **11.11%** of his total expenditure on food.

(c) $\frac{1}{2} - \frac{1}{9}$
$= \frac{9}{18} - \frac{2}{18}$
$= \frac{7}{18}$

He spends $\frac{7}{18}$ of his income on his car instalment.

(d) $\frac{1}{6} \longrightarrow \$390$

$\$390 \div 3 = \$130$

Each of his children receives **\$130**.

(e) $\frac{1}{6} \longrightarrow \$390$

$\frac{6}{6} \longrightarrow 6 \times \$390 = \$2340$

His monthly expenditure is **\$2340**.

4. (a) $\frac{25}{100} \times 300 = 75$

25% of the pupils chose **vanilla** ice-cream.

(b) The most popular ice-cream flavour was chocolate.

Percentage of pupils who chose chocolate
$= \frac{105}{300} \times 100\%$
$= 35\%$

35% of the pupils chose the most popular ice-cream flavour.

5. 55% ⟶ 32 + 12 = 44 fruits

1% ⟶ $(\frac{44}{55})$ fruits

100% ⟶ $100 \times \frac{44}{55}$ = 80 fruits

Lisa bought 80 fruits altogether.

Number of pears
= 80 – (21 + 32 + 12)
= 80 – 65
= 15

She bought **15** pears.

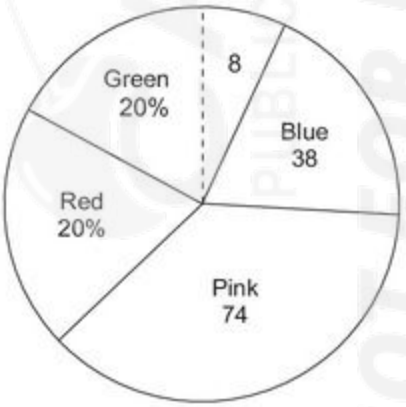
6. $\frac{1}{5}$ = 20%

Percentage of blue beads
= 100% – 40% – 25% – 20%
= 15%

Number of blue beads
= $\frac{15}{100} \times 80$
= 12

There are **12** blue beads.

7.



100% – 20% – 20% = 60%

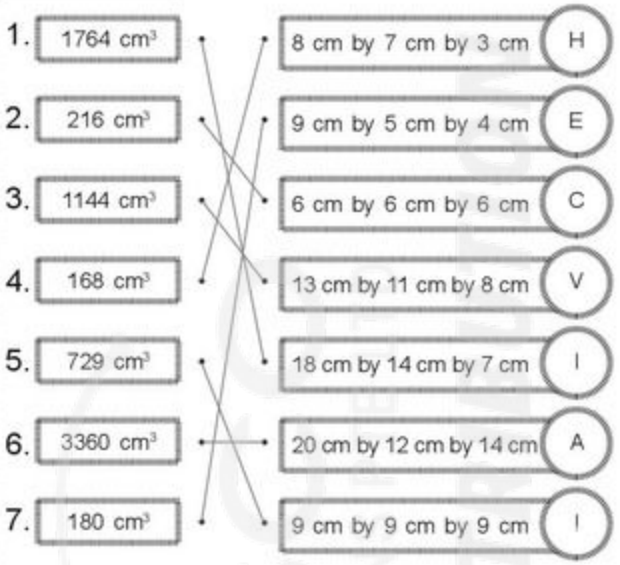
60% ⟶ 8 + 38 + 74 = 120 scarves
1% ⟶ 120 ÷ 60 = 2 scarves
100% ⟶ 100 × 2 = 200 scarves

She sold **200** scarves altogether that day.

Unit 10 Volume of Solids and Liquids

Drills

Exercise 1



A	C	H	I	E	V	E	I
3360	216	168	1764	180	1144	180	729

Exercise 2

No.	Length	Breadth	Base Area	Height	Volume
1.			65 cm²	3 cm	**195 cm³**
2.	12 cm	11 cm		4 cm	**528 cm³**
3.	14 cm	**9 cm**		7 cm	882 cm³
4.	8 cm	7 cm		5 cm	**280 cm³**
5.			192 cm²	**6 cm**	1152 cm³
6.	21 cm	**12 cm**		15 cm	3780 cm³
7.			184 cm²	9 cm	**1656 cm³**
8.			156 cm²	**8 cm**	1248 cm³
9.			102 cm²	4 cm	**408 cm³**
10.	17 cm	13 cm		8 cm	**1768 cm³**

Perform

Exercise 1

1. **(4)**
$11 \times 19 = 209 \text{ cm}^2$

Breadth
$= 2926 \text{ cm}^3 \div 209 \text{ cm}^2$
$= \underline{14 \text{ cm}}$

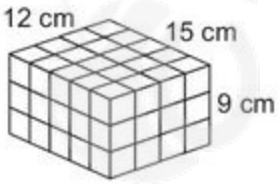
2. **(1)**
Height
$= 224 \text{ cm}^3 \div 56 \text{ cm}^2$
$= \underline{4 \text{ cm}}$

3. **(1)**
$25 \times 8 = 200 \text{ cm}^2$

Height
$= 3200 \text{ cm}^3 \div 200 \text{ cm}^2$
$= \underline{16 \text{ cm}}$

4. **(2)**
Length of side
$= \sqrt[3]{2197}$
$= \underline{13 \text{ cm}}$

5. **(3)**



Number of cubes along its length
$= 15 \text{ cm} \div 3 \text{ cm}$
$= 5$

Number of cubes along its breadth
$= 12 \text{ cm} \div 3 \text{ cm}$
$= 4$

Number of cubes along its height
$= 9 \text{ cm} \div 3 \text{ cm}$
$= 3$

Number of cubes needed
$= 5 \times 4 \times 3$
$= \underline{60}$

6. **(3)**
Number of cubes along its length
$= 18 \text{ cm} \div 2 \text{ cm}$
$= 9$

Number of cubes along its breadth
$= 18 \text{ cm} \div 2 \text{ cm}$
$= 9$

Number of cubes along its height
$= 12 \text{ cm} \div 2 \text{ cm}$
$= 6$

Number of cubes needed
$= 9 \times 9 \times 6$
$= \underline{486}$

7. **(2)**
Breadth
$= \frac{1}{3} \times 18 \text{ cm}$
$= 6 \text{ cm}$

Area of base
$= 18 \times 6$
$= 108 \text{ cm}^2$

Height
$= 756 \text{ cm}^3 \div 108 \text{ cm}^2$
$= \underline{7 \text{ cm}}$

8. **(1)**
$\frac{1}{3} \longrightarrow 530 \ l$

$1 = \frac{3}{3} \longrightarrow 3 \times 530 \ l = 1590 \ l$

$\frac{1}{2} \longrightarrow 1590 \ l \div 2 = 795 \ l$
$= \underline{795\,000 \text{ cm}^3}$

Exercise 2

1. Breadth $= \frac{1}{4} \times 24$ cm
$= 6$ cm

Area of base
$= 24 \times 6$
$= 144$ cm^2

Height
$= 1152$ cm$^3 \div 144$ cm^2
$=$ **8 cm**

2. Area of base
$= 13 \times 9$
$= 117$ cm^2

Height
$= 585$ cm$^3 \div 117$ cm^2
$=$ **5 cm**

3. $12 \times 9 = 108$ cm^2

Length
$= 1620$ cm$^3 \div 108$ cm^2
$=$ **15 cm**

4. Area of rectangle
$= 10 \times 5$
$= 50$ cm^2

Area of square
$= 2 \times 50$
$= 100$ cm^2

Length of square
$= \sqrt{100}$
$=$ **10 cm**

5. Area of each square tile
$= 10 \times 10$
$= 100$ cm^2

Height of 40 tiles
$= 2000$ cm$^3 \div 100$ cm^2
$= 20$ cm

Thickness of each tile
$= 20$ cm $\div 40$
$=$ **0.5 cm**

6. Length of square face
$= 20$ cm $\div 4$
$= 5$ cm

Area of square face
$= 5 \times 5$
$= 25$ cm^2

Length of cuboid
$= 525$ cm$^3 \div 25$ cm^2
$= 21$ cm

$\therefore p =$ **21**

7. Length of cube
$= \sqrt[3]{512}$
$= 8$ cm

Perimeter of shaded face
$= 4 \times 8$ cm
$=$ **32 cm**

8. Area of base
$= 540$ cm$^3 \div 15$ cm
$= 36$ cm^2

Length of square base
$= \sqrt{36}$
$=$ **6 cm**

9. Area of base
$= 15 \times 10$
$= 150$ cm^2

Height of water level
$= 1800$ cm$^3 \div 150$ cm^2
$=$ **12 cm**

10. Volume of water
$= \frac{3}{5} \times (40 \times 30 \times 25)$
$= \frac{3}{5} \times 30\,000$
$=$ **18 000 cm^3**

11. 9 l = 9000 cm^3

Base area
= 30 × 15
= 450 cm^2

Height of water level
= 9000 cm^3 ÷ 450 cm^2
= **20 cm**

Exercise 3

1. $1 - \frac{1}{3} = \frac{2}{3}$

$\frac{2}{3} \longrightarrow$ 1536 cm^3

$\frac{1}{3} \longrightarrow$ 1536 cm^3 ÷ 2 = 768 cm^3

$\frac{3}{3} \longrightarrow$ 3 × 768 cm^3 = 2304 cm^3

Height of tank
= 2304 cm^3 ÷ 256 cm^2
= **9 cm**

2. Volume of each 4-cm cube
= 4 × 4 × 4
= 64 cm^3

Volume of large cubic box
= 32 × 64 cm^3
= 2048 cm^3

Volume of each 2-cm cube
= 2 × 2 × 2
= 8 cm^3

Number of 2-cm cubes used
= 2048 cm^3 ÷ 8 cm^3
= **256**

3. $\frac{1}{2} - \frac{1}{3} = \frac{3}{6} - \frac{2}{6}$

$= \frac{1}{6}$

$\frac{1}{6} \longrightarrow$ 612 cm^3

$\frac{6}{6} \longrightarrow$ 6 × 612 cm^3 = 3672 cm^3

Height of tank
= 3672 cm^3 ÷ 204 cm^2
= **18 cm**

4. Volume of water in tank
$= \frac{1}{2} \times (48 \times 15 \times 12)$
$= \frac{1}{2} \times 8640$
= 4320 cm^3

Volume of water in each smaller tank
= 4320 cm^3 ÷ 3
= 1440 cm^3

Base area of smaller tank
= 24 × 12
= 288 cm^2

Height of water in smaller tank
= 1440 cm^3 ÷ 288 cm^2
= **5 cm**

5. Volume of water in tank at first
= 15 × 6 × 7
= 630 cm^3

$\frac{1}{3} \longrightarrow$ 630 cm^3 – 30 cm^3 = 600 cm^3

$\frac{3}{3} \longrightarrow$ 3 × 600 cm^3 = 1800 cm^3

The capacity of the container is **1800 cm^3**.

6. Volume of water in Tank A

$= \frac{1}{3} \times (60 \times 45 \times 60)$

$= \frac{1}{3} \times 162\,000$

$= 54\,000\ cm^3$

Base area of Tank B
$= 80 \times 50$
$= 4000\ cm^2$

Height of water level in Tank B
$= 54\,000\ cm^3 \div 4000\ cm^2$
$= 13.5$ cm

The height of the water level in Tank B is **13.5 cm.**

7. Number of cubes in container now
$= 12 + 4 + 2 + 2$
$= 20$

Number of cubes that lie along the length = 8
Number of cubes that lie along the breadth = 4
Number of cubes that lie along the height = 4

Number of cubes that container can hold
$= 8 \times 4 \times 4$
$= 128$

$128 - 20 = 108$

108 more 1-cm cubes are needed to completely fill the container.

Achieve

Exercise 1

1. (a) $3\ l = 3000\ cm^3$

Volume of water in tank (15 cm high)
$= 60 \times 40 \times 15$
$= 36\,000\ cm^3$

$3000\ cm^3 \longrightarrow 1$ min

$1\ cm^3 \longrightarrow \frac{1}{3000}$ min

$36\,000\ cm^3 \longrightarrow 36\,000 \times \frac{1}{3000}$ min
$= 12$ min

It will take **12 minutes** to fill the tank to a height of 15 cm.

(b) 12 min + 20 min = 32 min

1 min $\longrightarrow 3000\ cm^3$
32 min $\longrightarrow 32 \times 3000\ cm^3$
$= 96\,000\ cm^3$

Base area of tank
$= 60 \times 40$
$= 2400\ cm^2$

Height of tank
$= 96\,000\ cm^3 \div 2400\ cm^2$
$= 40$ cm

The height of the tank is **40 cm.**

2. $2\ l + 5\ l = 7\ l$
Both taps can fill the tank at 7 *l*/min.

1 min $\longrightarrow 7\ l$
4 min $\longrightarrow 4 \times 7\ l = 28\ l$

The capacity of the tank is 28 *l*.

$5\ l \longrightarrow 1$ min

$1\ l \longrightarrow \frac{1}{5}$ min

$28\ l \longrightarrow 28 \times \frac{1}{5}$ min $= 5.6$ min

Tap B will take **5.6 min** to fill up the empty tank on its own.

3. (a) 64 units – 1 unit = 63 units

63 units = 504 cm^3

1 unit = 504 $cm^3 \div 63$

= 8 cm^3

The volume of the smaller cube is **8 cm^3**.

(b) 64 units = $64 \times 8\ cm^3$

= 512 cm^3

The volume of the larger cube is 512 cm^3.

Length of each side of larger cube

$= \sqrt[3]{512}$

= 8 cm

The length of each side of the larger cube is **8 cm**.

4. (a) Area of square base

$= 20 \times 20$

= 400 cm^2

$\frac{3}{4} \longrightarrow 9.6\ l$

$\frac{1}{4} \longrightarrow 9.6\ l \div 3 = 3.2\ l$

$\frac{4}{4} \longrightarrow 4 \times 3.2\ l = 12.8\ l$

$= 12\ 800\ cm^3$

Height of tank

= 12 800 $cm^3 \div 400\ cm^3$

= 32 cm

The height of the tank is **32 cm**.

(b) Volume of water when $\frac{3}{8}$ full

$= \frac{3}{8} \times 12\ 800\ cm^3$

= 4800 cm^3

$8\ l$ – 4800 cm^3

= 8000 cm^3 – 4800 cm^3

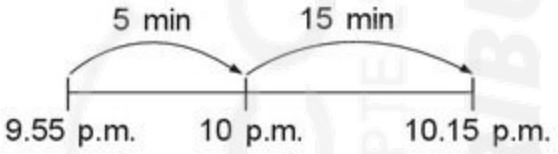
= 3200 cm^3

160 $cm^3 \longrightarrow 1$ min

1 $cm^3 \longrightarrow \frac{1}{160}$ min

3200 $cm^3 \longrightarrow 3200 \times \frac{1}{160}$ min

= 20 min



10.15 p.m. = 22 15

The tank will be $\frac{3}{8}$ full at **22 15**.

5. (a) Volume of water in tank at first

$= \frac{1}{2} \times (40 \times 30 \times 50)$

$= \frac{1}{2} \times 60\ 000$

= 30 000 cm^3

$1\frac{1}{4}$ h = 75 min

1 min $\longrightarrow$ 120 cm^3

75 min $\longrightarrow 75 \times 120\ cm^3$

= 9000 cm^3

30 000 cm^3 – 9000 cm^3

= 21 000 cm^3

21 000 cm^3 of water was left in the tank.

(b) Base area of tank
$= 40 \times 30$
$= 1200 \text{ cm}^2$

Height of new water level
$= 21\,000 \text{ cm}^3 \div 1200 \text{ cm}^2$
$= 17.5 \text{ cm}$

The height of the new water level is **17.5 cm**.

6. $1 - \frac{3}{5} = \frac{2}{5}$

Height of water level in Container B
$= 10 \text{ cm} \div 2$
$= 5 \text{ cm}$

Volume of water transferred to Container A
$= \frac{2}{5} \times (25 \times 15 \times 5)$
$= \frac{2}{5} \times 1875$
$= 750 \text{ cm}^3$
$= 0.75 \ l$

$2 \ l - 0.75 \ l = 1.25 \ l$

The original volume of water in Container A was **1.25 *l***.

7. (a) Length of square base
$= \sqrt{9}$
$= 3 \text{ cm}$

$\frac{2}{5} \text{ m} = \frac{2}{5} \times 100 \text{ cm}$
$= 40 \text{ cm}$

$40 \text{ cm} \div 2 \text{ cm} = 20$ (Height)
$3 \text{ cm} \div 2 \text{ cm} = 1 \text{ R } 1 \text{ cm}$ (Breadth)
$3 \text{ cm} \div 2 \text{ cm} = 1 \text{ R } 1 \text{ cm}$ (Length)

Number of cubes
$= 1 \times 1 \times 20$
$= 20$

The greatest number of 2-cm cubes than can be cut is **20**.

(b) Volume of wood at first
$= 9 \text{ cm}^2 \times 40 \text{ cm}$
$= 360 \text{ cm}^3$

Volume of each 2-cm cube
$= 2 \times 2 \times 2$
$= 8 \text{ cm}^3$

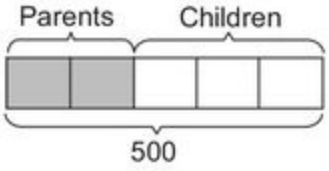
Volume of wood used
$= 20 \times 8 \text{ cm}^3$
$= 160 \text{ cm}^3$

$360 \text{ cm}^3 - 160 \text{ cm}^3 = 200 \text{ cm}^3$

200 cm³ of the block of wood is left.

Challenging Problems

1. Number of people
$= \frac{4}{10} \times 1250$
$= 500$



5 units = 500 people
1 unit = 500 ÷ 5
= 100 people
2 units = 2 × 100
= 200 people (Parents)
3 units = 3 × 100
= 300 people (Children)

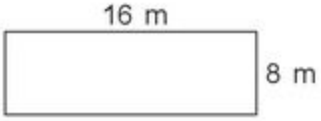
Total amount collected
= (200 × $6) + (300 × $3)
= $1200 + $900
= $2100

The total amount of money collected during that concert was **$2100**.

2. $\underline{\text{Length}} : \underline{\text{Breadth}}$
$8 : 4$

8 units + 4 units = 12 units

12 units = 24 m
1 unit = 24 m ÷ 12
= 2 m
8 units = 8 × 2 m
= 16 m (Length)
4 units = 4 × 2 m
= 8 m (Breadth)
Area of rectangular garden
= 16 × 8
= 128 m²



Area of flower bed
$= \frac{25}{100} \times 128 \text{ m}^2$
$= 32 \text{ m}^2$

The area of the flower bed is **32 m²**.

3. (a) $1 - \frac{3}{4} = \frac{1}{4}$

$\frac{1}{4}$ of Square EFGH is shaded.

$\underline{\text{Area X}} : \underline{\text{Area Y}} : \underline{\text{Area Z}}$
$7 : 2 : 6$

The required ratio is **7 : 2 : 6**.

(b) Area of Square ABCD
= 12 × 12
= 144 cm²

Area of Y
$= \frac{2}{9} \times 144 \text{ cm}^2$
$= 32 \text{ cm}^2$

$\frac{1}{4} \longrightarrow 32 \text{ cm}^2$

$\frac{3}{4} \longrightarrow 3 \times 32 \text{ cm}^2 = 96 \text{ cm}^2$

The area of the unshaded part of Square EFGH is **96 cm²**.

4. $\underline{\text{Raymond}} : \underline{\text{Mary}} : \underline{\text{Paul}} : \underline{\text{Jimmy}}$
$7\frac{1}{2} : 5 : 3 : 2$
$= 15 : 10 : 6 : 4$

15 units + 10 units + 6 units + 4 units
= 35 units

35 units = 1400 stickers
1 unit = 1400 ÷ 35
= 40 stickers

35 units – 10 units = 25 units

25 units = 25 × 40
= 1000 stickers

The boy's received **1000** stickers altogether.

5. Capacity of tank
= 50 × 40 × 8
= 16 000 cm^3

Tank : Pail
24 : 1

1 unit = 500 cm^3
24 units = 24 × 500 cm^3
= 12 000 cm^3

Amount of water required to fill the tank to its brim
= 16 000 cm^3 – 12 000 cm^3
= 4000 cm^3

Number of pails of water
= 4000 cm^3 ÷ 500 cm^3
= 8

8 pails full of water were needed to fill the tank to its brim.

6. (a) Men : Women
3 : 4

3 units + 4 units = 7 units

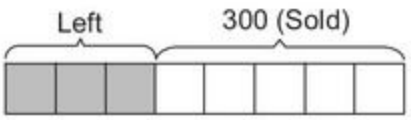
7 units = 350 seats
1 unit = 350 ÷ 7
= 50 seats
4 units = 4 × 50
= 200 seats

200 seats are solely reserved for women before the renovation.

(b) $\frac{120}{100} \times 350 = 420$

The number of seats reserved for adults after the renovation is **420**.

7.



5 units = 300 pens
1 unit = 300 ÷ 5
= 60 pens
3 units = 3 × 60
= 180 pens

Number of pens sold on Sunday
= $\frac{25}{100} \times 180$
= 45

Number of pens sold on Monday
= 180 – 45
= 135

Amount collected on Sunday
= \$1200 – (300 × \$2.50) – (135 × \$3)
= \$1200 – \$750 – \$405
= \$45

\$45 ÷ 45 = \$1

The sale price of each pen on Sunday was \$1.

8. (a) 25% – 12% = 13%
13% of the children prefer mangoes.

(b) 50% – 12% = 38%
Fraction of children who prefer apples
= $\frac{38}{100}$
= $\frac{19}{50}$

$\frac{19}{50}$ of the children surveyed prefer apples.

(c) 50% – 13% – 25% = 12%
12% of the children prefer strawberries.

25% – 12% = 13%

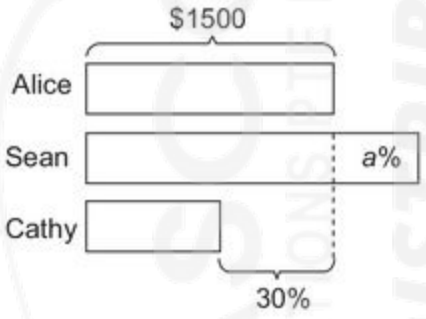
$\frac{13}{100} \times 5000 = 650$

650 more children prefer oranges to strawberries.

(d) Mangoes : Apples
13% : 38%
= 13 : 38

The ratio of the number of children who prefer mangoes to apples is **13 : 38**.

9.



a% of \$1500 = $\frac{a}{100} \times$ \$1500
= \$15a

Amount Sean earned
= \$1500 + \$15a

Amount Cathy earned
= $\frac{70}{100} \times$ \$1500
= \$1050

Total amount
= \$1500 + \$1500 + \$15a + \$1050
= \$4050 + \$15a
= \$(4050 + 15a)

The total amount of money earned by Alice, Cathy and Sean is **\$(4050 + 15a)**.

10. (a) Area of triangle
$= \frac{1}{2} \times 9 \times 12$
$= 54$ cm^2

Area of small semicircle
$= \frac{1}{2} \times 3.14 \times 3 \times 3$
$= 14.13$ cm^2

Shaded area of triangle
$= 54 - 14.13$
$= 39.87$ cm^2

The shaded area of the right-angled triangle is **39.87 cm²**.

(b) Curved part of small semicircle
$= \frac{1}{2} \times 3.14 \times 6$
$= 9.42$ cm

Perimeter of shaded part
$= 9.42 + (15 - 6) + 9 + 12$
$= 9.42 + 9 + 9 + 12$
$= 39.42$ cm

The perimeter of the shaded part of the figure is **39.42 cm**.

11. Angela : Jason
×7 (5 : 6) ×7
= 35 : 42

Jason:

$\frac{2}{7} \times 42$ units = 12 units (given to Angela)

$\frac{5}{14} \times 42$ units = 15 units (spent on food)

42 units – 12 units – 15 units = 15 units
15 units = \$360
1 unit = \$360 ÷ 15
= \$24
35 units = 35 × \$24
= \$840

$\frac{123}{100} \times$ \$840 = \$1033.20

Ben had **\$1033.20**.

12. Perimeter of running track
$= (\frac{22}{7} \times 21) + 300 + 300$
$= 66 + 300 + 300$
$= 666$ m

2×666 m $= 1332$ m

180 m $\longrightarrow$ 1 min

1 m $\longrightarrow$ $(\frac{1}{180})$ min

1332 m $\longrightarrow$ $1332 \times \frac{1}{180} = 7.4$ min

She took **7.4 min** to jog the whole distance.

13. Area of $\triangle PTS$
$= \frac{1}{2} \times 7 \times 7$
$= 24.5$ cm^2

Area of quadrant QSR
$= \frac{1}{4} \times \frac{22}{7} \times 7 \times 7$
$= 38.5$ cm^2

Area of semicircle
$= \frac{1}{2} \times \frac{22}{7} \times 3.5 \times 3.5$
$= 19.25$ cm^2

Total area of shaded parts
$= 24.5 + 38.5 + 19.25$
$= 82.25$ cm^2

The total area of the shaded parts is **82.25 cm^2**.

14. $\underline{\text{Tank A}} : \underline{\text{Tank B}}$
$5 : 2$

5 units – 2 units = 3 units

3 units = 4500 cm^3
1 unit = 4500 cm^3 ÷ 3
= 1500 cm^3
5 units = 5×1500 cm^3
= 7500 cm^3 (Tank A)
2 units = 2×1500 cm^3
= 3000 cm^3 (Tank B)

Base area of each tank
$= 50 \times 30$
$= 1500$ cm^2

Height of water level of Tank A
= 7500 cm^3 ÷ 1500 cm^2
= 5 cm

Height of water level of Tank B
= 3000 cm^3 ÷ 1500 cm^2
= 2 cm

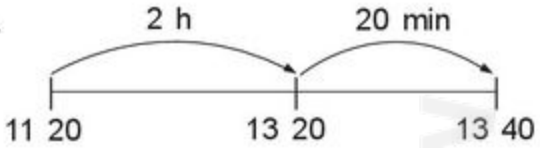
5 cm – 2 cm = 3 cm

The difference in the heights of the water levels of Tank A and Tank B is **3 cm**.

Revision of P4 and P5 Topics

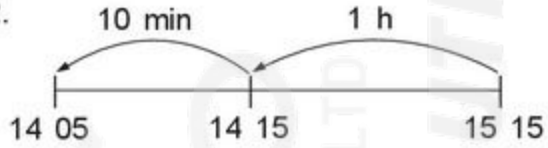
Exercise 1

1.



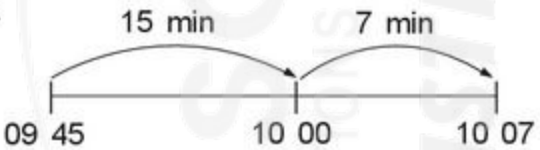
The movie was **2 h 20 min** long.

2.



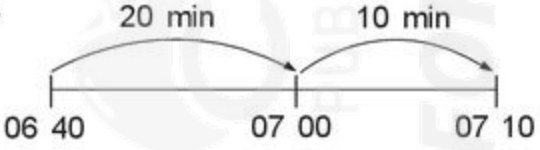
He started doing his homework at **14 05**.

3.



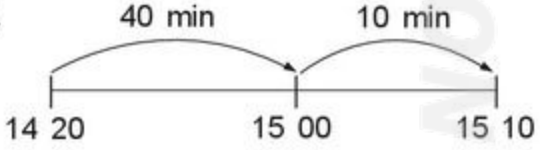
He arrived at Little India station at **10 07**.

4.



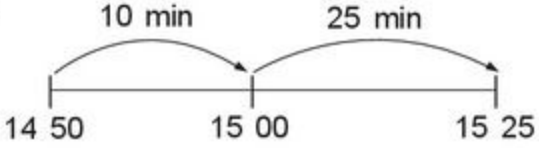
Joyce took **30 min** to travel to school.

5.



She finished baking at **15 10**.

6.



Janet reached home at **15 25**.

Exercise 2

1.

560 – 120 = 440
Thomas had 440 stamps in the end.

440 – 26 = 414
Sam had 414 stamps in the end.

414 – 120 = 294
Sam had **294** stamps at first.

2. $1 - \frac{3}{4} = \frac{1}{4}$

$\frac{3}{5} \times \frac{3}{4} = \frac{9}{20}$

$\frac{1}{4} + \frac{9}{20} = \frac{5}{20} + \frac{9}{20}$

$= \frac{14}{20}$

$= \frac{7}{10}$

$\frac{7}{10} \longrightarrow \$210$

$\frac{1}{10} \longrightarrow \$210 \div 7 = \$30$

$\frac{10}{10} \longrightarrow 10 \times \$30 = \$300$

She had **$300** at first.

3. Length of square
$= \sqrt{64}$
$= 8$ cm

4. Cost of 5 T-shirts
$= 5 \times \$5.20$
$= \$26$

Cost of 7 bags
$= \$26 + \$42$
$= \$68$

$\$68 - \$5.20 = \$62.80$

The required difference is **$62.80**.

5. Before:

Jennifer	:	Gloria	Total Units
7	:	5	7 + 5 = 12 units

After:

Jennifer	:	Gloria	Total Units
1 ($\times 2$)	:	5 ($\times 2$)	2 + 10 = 12 units
= 2	:	10	

7 units – 2 units = 5 units

5 units = 500 bracelets
1 unit = 500 ÷ 5
= 100 bracelets
12 units = 12 × 100
= 1200 bracelets

The total number of bracelets they made altogether was **1200**.

6. Before:

Leslie	:	Rachel	Total units
5 ($\times 2$)	:	1 ($\times 2$)	10 + 2 = 12 units
= 10	:	2	

After:

Leslie	:	Rachel	Total units
3 ($\times 3$)	:	1 ($\times 3$)	9 + 3 = 12 units
= 9	:	3	

10 units – 9 units = 1 unit

1 unit = 14 stickers
2 units = 2 × 14
= 28 stickers

Rachel had **28** stickers at first.

7. Area of big rectangle
$= 25 \times 14$
$= 350 \text{ cm}^2$

Area of small rectangle
$= 21 \times 10$
$= 210 \text{ cm}^2$

Area of shaded figure
$= 350 - 210$
$= \mathbf{140 \text{ cm}^2}$

8. 2 kg of lamb + 2 kg of beef ⟶ $53.20
4 kg of lamb + 2 kg of beef ⟶ $78.80

2 kg of lamb ⟶ $78.80 – $53.20
= $25.60
2 kg of beef ⟶ $53.20 – $25.60
= $27.60

1 kg of beef = $27.60 ÷ 2
= $13.80

5 kg of beef = 5 × $13.80
= $69

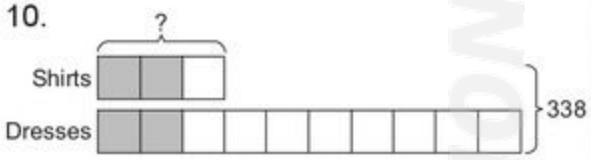
The cost of 5 kg of beef is **$69**.

9. Number of eggs left
= 989 – 53 – 768
= 168

Number of cartons
= 168 ÷ 12
= 14

He had **14** cartons of eggs.

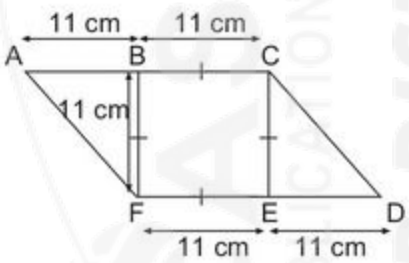
10.



13 units = 338 items
1 unit = 338 ÷ 13
= 26 items
3 units = 3 × 26 items
= 78 items

There are **78** shirts in the store.

11.



Area of Square BCEF
= 11 × 11
= 121 cm^2

Area of figure
= 2 × 121 cm^2
= **242 cm^2**

12. $1 - \frac{3}{5} = \frac{2}{5}$

$\frac{2}{5} \times \$2400 = \$960$

$1 - \frac{1}{5} = \frac{4}{5}$

$\frac{4}{5} \times \$960 = \$768$

She saves $768 every month.

12 × $768 = $9216

She will save **$9216** in a year.

13. Total height of 5 children
= 5 × 163 cm
= 815 cm

Jason's height
= 163 cm + 24 cm
= 187 cm

Total height of 6 children
= 815 cm + 187 cm
= 1002 cm

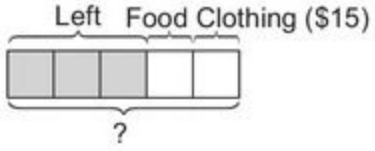
Average height of 6 children
= 1002 cm ÷ 6
= **167 cm**

14. 185 × $2 = $370
185 ÷ 15 = 12 R 5
12 × $5 = $60

Amount he will get
= $370 + $60
= **$430**

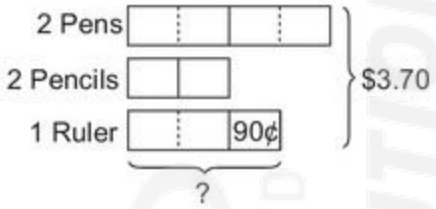
15. Area of floor
= 24 × 20
= 480 m^2

Cost of carpeting the floor
= 480 × $35
= **$16 800**

16. 

1 unit = $15
5 units = 5 × $15
= $75

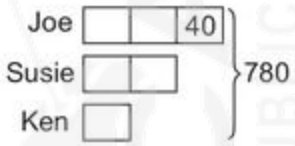
He had **$75** at first.

17. 

8 units = $3.70 – $0.90
= $2.80
1 unit = $2.80 ÷ 8
= $0.35
2 units = 2 × $0.35
= $0.70

$0.70 + $0.90 = $1.60.

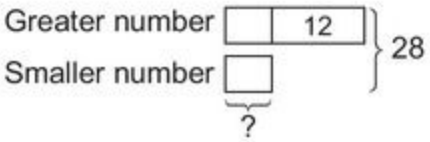
A ruler costs **$1.60**.

18. 

5 units = 780 – 40
= 740 stamps
1 unit = 740 ÷ 5
= 148 stamps
2 units = 2 × 148
= 296 stamps

Susie had **296** stamps.

19. Perimeter of shaded part
= Perimeter of Rectangle ABCD
= 17 + 8 + 17 + 8
= **50 cm**

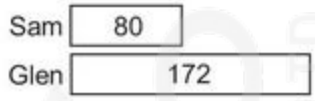
20. 

2 units = 28 – 12
= 16
1 unit = 16 ÷ 2
= 8

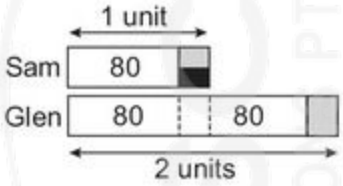
The other number is **8**.

Exercise 3

1. Before:



After:



172 – 80 – 80 = 12
Mother gave 12 stickers to each of them.

2 × 12 = 24
Mother gave **24** stickers to both of them.

2. (a) Perimeter of Rectangle A
= 15 + 9.6 + 15 + 9.6
= 49.2 cm

Perimeter of Square B
= 49.2 cm

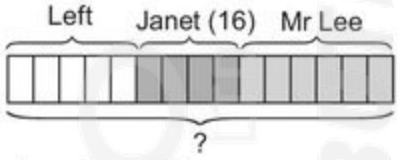
Length of Square B
= 49.2 cm ÷ 4
= **12.3 cm**

(b) Area of Rectangle A
= 15 × 9.6
= 144 cm²

Area of Square B
= 12.3 × 12.3
= 151.29 cm²

Total area of both figures
= 144 + 151.29
= **295.29 cm²**

3. (a) $\frac{2}{5} = \frac{6}{15}$, $\frac{1}{3} = \frac{5}{15}$



4 units = 16 pens
1 unit = 16 ÷ 4
= 4 pens
15 units = 15 × 4
= 60 pens

Daniel had **60** pens at first.

(b) 5 units = 5 × 4
= 20 pens
He had 20 pens left.

20 ÷ 4 = 5

5 boxes were required to pack the remaining pens.

4. 1 – 0.15 = 0.85

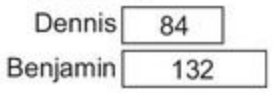
0.85 × 4 *l* = 3.4 *l*
= 3400 ml

He had 3400 ml of orange juice left.

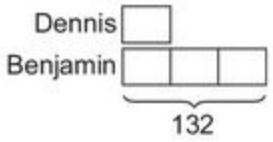
3400 ml ÷ 450 ml = 7 R 250 ml
450 ml – 250 ml = 200 ml

200 ml more orange juice is needed to fill the last bottle completely.

5. Before :



After :



3 units = 132 stamps
1 unit = 132 ÷ 3
= 44 stamps

Dennis had 44 stamps in the end.

84 – 44 = 40
Dennis gave away **40** stamps.

6. Before:

Men	:	Women
1	:	2
×3		×3
3	:	6

After:

Men	:	Women
1	:	3
×2		×2
2	:	6

3 units – 2 units = 1 unit

1 unit = 20 people
6 units = 6 × 20
= 120 people

There were **120** women in the concert hall at first.

7. Length of cloth used to sew a pair of shorts
= $\frac{3}{5}$ × 2.5 m
= 1.5 m

Length of cloth used to sew 6 shirts
= 6 × 2.5 m
= 15 m

Length of cloth used to sew the shorts
= 28.5 m – 15 m – 1.5 m
= 12 m

Number of pairs of shorts
= 12 m ÷ 1.5 m
= 8

She sewed **8** pairs of shorts.

8. Area of △ACF
$= \frac{1}{2} \times 12 \times 5$
$= 30 \text{ cm}^2$

Area of △ACF : Area of Rectangle ABDE
1 : 4

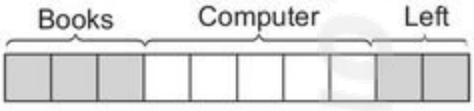
1 unit = 30 cm^2
4 units = $4 \times 30 \text{ cm}^2$
$= 120 \text{ cm}^2$

The area of Rectangle ABDE is 120 cm^2.

Breadth of rectangle
= $120 \text{ cm}^2 \div 12$
= 10 cm

Perimeter of Rectangle ABDE
= 12 + 10 + 12 + 10
= **44 cm**

9. (a) $0.3 = \frac{3}{10}$, $\frac{1}{5} = \frac{2}{10}$



5 units = \$1400
1 unit = \$1400 ÷ 5
= \$280
8 units = 8 × \$280
= \$2240

She spent **\$2240** altogether.

(b) 10 units = 10 × \$280
= \$2800

Her original sum of money was **\$2800**.

10. Mass of marshmallows
= 13 × 5 kg
= 65 kg

Total mass of candies and marshmallows
= 37.8 kg + 65 kg
= 102.8 kg

Mass of each packet
= 102.8 kg ÷ 20
= 5.14 kg

The mass of each packet that he had repacked **5.14** kg.

11. (a) Area of △F
$= \frac{1}{2} \times 3 \times 10$
$= 15 \text{ cm}^2$

Area of △F : Shaded triangle
1 : 5

1 unit = 15 cm^2
5 units = $5 \times 15 \text{ cm}^2$
$= 75 \text{ cm}^2$

The area of the shaded triangle is 75 cm^2.

(b) Area of △F : Area of △G
1 : 4

4 units = $4 \times 15 \text{ cm}^2$
$= 60 \text{ cm}^2$

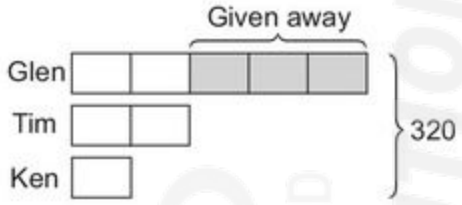
Area of Rectangle ABCD
= 15 + 75 + 60
= 150 cm^2

Length of Rectangle ABCD
$= 150 \text{ cm}^2 \div 10 \text{ cm}$
$= 15 \text{ cm}$

Perimeter of Rectangle ABCD
$= 15 + 10 + 15 + 10$
$= 50 \text{ cm}$

The perimeter of Rectangle ABCD is **50 cm**.

12.



8 units = 320 game cards
1 unit = 320 ÷ 8
= 40 game cards
3 units = 3 × 40
= 120 game cards

Glen gave away **120** game cards.

Trial Examination 1

PAPER 1

Booklet A:

1. **(3)**
When $a = 5$,

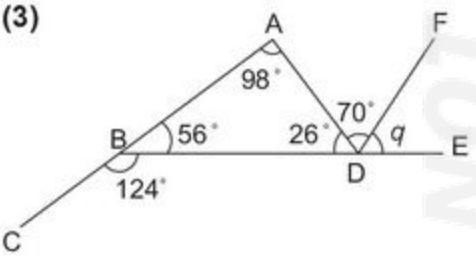
$$\frac{3a + 6}{7} = \frac{3(5) + 6}{7}$$
$$= \frac{15 + 6}{7}$$
$$= \frac{21}{7}$$
$$= \underline{3}$$

2. **(1)**
It has $\underline{6}$ rectangular faces.

3. **(3)**
$48 \text{ min} = \frac{48}{60} \text{ h}$
$= \frac{4}{5} \text{ h}$

Average speed
$= 6.4 \text{ km} \div \frac{4}{5} \text{ h}$
$= 6\frac{2}{5} \text{ km} \div \frac{4}{5} \text{ h}$
$= \frac{\overset{8}{\cancel{32}}}{\underset{1}{\cancel{5}}} \text{ km} \times \frac{\cancel{5}^{1}}{\underset{1}{\cancel{4}}} \text{ h}$
$= \underline{8 \text{ km/h}}$

4. **(3)**



$\angle ABD = 180° - 124°$ ($\angle$s on a straight line)
$= 56°$

$\angle ADB = 180° - 98° - 56°$ ($\angle$sum of $\triangle$)
$= 26°$

$\angle q = 180° - 70° - 26°$ ($\angle$s on a straight line)
$= \underline{84°}$

5. **(1)**

$\frac{9}{5} \longrightarrow 45$

$\frac{1}{5} \longrightarrow 45 \div 9 = \underline{5}$

6. **(2)**

Number of adults
$= \frac{3}{5} \times 60$
$= 36$

$100\% - 25\% = 75\%$

Number of adults who do not wear glasses
$= \frac{75}{100} \times 36$
$= \underline{27}$

7. **(1)**

Tom : Amy : Johnson
1 : 3 : 8

1 unit + 3 units + 8 units = 12 units

12 units = 204 stickers
1 unit = 204 ÷ 12
= 17 stickers

Tom received $\underline{17}$ stickers.

8. **(4)**

15 cm ÷ 3 cm = 5 (Length)
12 cm ÷ 3 cm = 4 (Breadth)
7 cm ÷ 3 cm = 2 R 1 cm (Height)

Number of 3-cm cubes
$= 5 \times 4 \times 2$
$= 40$

9. **(3)**

Circumference of circle
$= 4 \times 11$ cm
$= 44$ cm

$\frac{22}{7} \times$ Diameter $= 44$

Diameter $= 44 \div \frac{22}{7}$

$= \cancel{44}^{2} \times \frac{7}{\cancel{22}_{1}}$

$= 14$ cm

Radius $= 14$ cm $\div 2$
$= 7$ cm (BC)

Area of square
$= 7 \times 7$
$= 49$ cm^2

10. **(3)**

$100\% - 55\% = 45\%$

$45\% \longrightarrow \$36$

$1\% \longrightarrow \$(\frac{36}{45})$

$155\% \longrightarrow 155 \times \$(\frac{36}{45}) = \underline{\$124}$

11. **(4)**

Red : Yellow

$\frac{1}{2} : \frac{1}{8}$

$= \frac{4}{8} : \frac{1}{8}$

$= \underline{4 : 1}$

12. **(1)**

$\frac{1}{4} - \frac{1}{8} = \frac{2}{8} - \frac{1}{8}$

$= \frac{1}{8}$

$\frac{1}{8} \times 40 = 5$

$\underline{5}$ more children prefer blue than green.

13. **(2)**
32 m ÷ 4 m = 8
8 × 13 = 104

She can make 104 scarves.

14. **(4)**
Number of stamps in 1 album
= 15 × 22
= 330

Number of stamps in 4 albums
= 4 × 330
= 1320

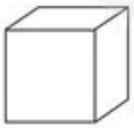
15. **(1)**
Area of square
= 10 × 10
= 100 cm^2

Area of circle
= 3.14 × 5 × 5
= 78.5 cm^2

Total area of shaded parts
= 100 – 78.5
= 21.5 cm^2

Booklet B:

16. $14r + 9 - 7 + 2r + 8 - 5r$
$= 14r + 2r - 5r + 9 - 7 + 8$
$= \mathbf{11}r + \mathbf{10}$

17. 

18. 36% ⟶ 720
1% ⟶ 720 ÷ 36 = 20
100% ⟶ 100 × 20 = 2000

The number is 2000.

$\frac{4}{5} \times 2000 =$ **1600**

19. Square D : Square E
5 : 8

8 units = 640 cm^2
1 unit = 640 cm^2 ÷ 8
= 80 cm^2
5 units = 5 × 80 cm^2
= 400 cm^2

The area of Square D is 400 cm^2.

Length of Square D
= $\sqrt{400}$
= 20 cm

Perimeter of Square D
= 4 × 20 cm
= **80 cm**

20. Cost 5 bags
= 5 × $78.90
= $394.50

12 ÷ 3 = 4

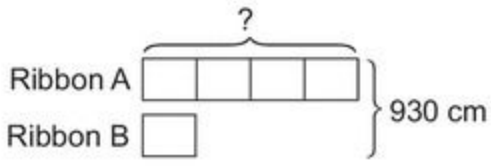
Cost of 12 T-shirts
= 4 × $19
= $76

Total cost
= $394.50 + $76
= $470.50

Change
= $500 – $407.50
= **$29.50**

21. 4 m 65 cm = 465 cm

Total length of 2 ribbons
= 2 × 465 cm
= 930 cm



5 units = 930 cm
1 unit = 930 ÷ 5
= 186 cm
4 units = 4 × 186 cm
= 744 cm

The length of Ribbon A is **744 cm**.

22. Length of cube
= $\sqrt{144}$
= 12 cm

Volume of cube
= 12 × 12 × 12
= **1728 cm³**

23. Curved part of semicircle
= $\frac{1}{2} \times \frac{22}{7} \times 14$
= 22 cm

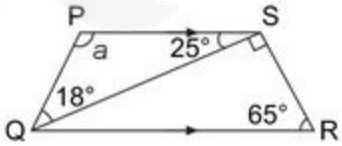
Perimeter of semicircle
= 22 + 14
= **36 cm**

24. 6% ⟶ \$15
1% ⟶ \$($\frac{15}{6}$)
100% ⟶ 100 × \$($\frac{15}{6}$) = \$250

12 × \$250 = \$3000

His allowance in a year is **\$3000**.

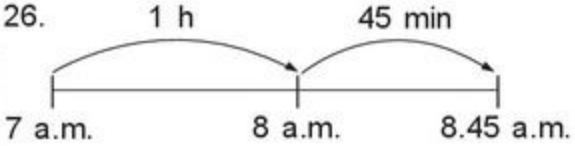
25.



∠PSQ = 180° − 90° − 65° (∠s between // lines)
= 25°

∠*a* = 180° − 18° − 25° (∠ sum of △)
= **137°**

26.



1 h 45 min = $1\frac{45}{60}$ h
= $1\frac{3}{4}$ h

Average speed
= 140 km ÷ $1\frac{3}{4}$ h
= 140 km ÷ $\frac{7}{4}$ h
= 140 km × $\frac{4}{7}$ h
= **80 km/h**

27. Volume of water in tank
= $\frac{1}{5} \times 20 \times 18 \times 15$
= $\frac{1}{5} \times 5400$
= 1080 cm³

30 cm³ ⟶ 1 min
1 cm³ ⟶ $\frac{1}{30}$ min
1080 cm³ ⟶ 1080 × $\frac{1}{30}$ = 36 min

It will take **36 min** to empty the tank completely.

28. 2 × 50 cm² = 100 cm²

Radius of circle
= $\sqrt{100}$
= 10 cm

Area of shaded part
= $\frac{3}{4} \times 3.14 \times 10 \times 10$
= **235.5 cm²**

29. 100% – 25% = 75%

Selling price of computer
$= \frac{75}{100} \times \$2800$
$= \mathbf{\$2100}$

30. $\frac{3}{13} \times 2\frac{1}{6}$ kg
$= \frac{\cancel{3}^{1}}{\cancel{13}_{1}} \times \frac{\cancel{13}^{1}}{\cancel{6}_{2}}$ kg
$= \frac{1}{2}$ kg (Given to Jennifer)

Mass of longans she ate
$= 2\frac{1}{6} - \frac{1}{2}$
$= 1\frac{7}{6} - \frac{3}{6}$
$= 1\frac{4}{6}$
$= \mathbf{1\frac{2}{3}}$ **kg**

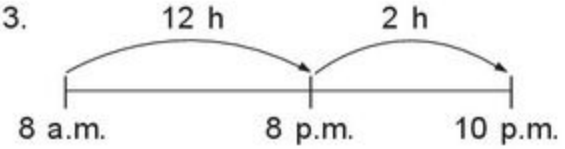
PAPER 2

1. Area of rectangle
$= 248 \text{ cm}^2 \div 2$
$= 124 \text{ cm}^2$

Breadth of rectangle
$= 124 \text{ cm}^2 \div 16 \text{ cm}$
$= \mathbf{7.75}$ **cm**

2. 1346 – 38 = 1308

Total collection
$= 1308 \times \$0.08$
$= \mathbf{\$104.64}$

3. 

12 h + 2 h = 14 h

$1 - \frac{9}{20} - \frac{3}{20} - \frac{3}{10} = \frac{1}{10}$

$\frac{1}{10} \div 2 = \frac{1}{10} \times \frac{1}{2}$
$= \frac{1}{20}$

$\frac{9}{20} + \frac{1}{20} = \frac{10}{20}$
$= \frac{1}{2}$

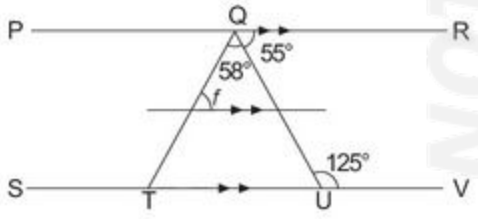
$\frac{1}{2} \times 14 \text{ h} = 7 \text{ h}$

She spent **7 h** doing her homework and playing computer games.

4. Curved part of small semicircle
$= \frac{1}{2} \times 3.14 \times 3$
$= 4.71$ cm

Curved part of big semicircle
$= \frac{1}{2} \times 3.14 \times 4$
$= 6.28$ cm

Length of wire
$= 4.71 + 6.28 + 3 + 4$
$= \mathbf{17.99}$ **cm**

5. 

$\angle RQU = 180° - 125°$ ($\angle$s between // lines)
$= 55°$

$\angle f = 180° - 55° - 58°$ ($\angle$s between // lines)
$= \mathbf{67°}$

6. (a) Sarah's share
$= (150 - h) \div 3$
$= (\frac{150 - h}{3})$ necklaces

Sarah's share was $(\frac{\mathbf{150 - h}}{\mathbf{3}})$ necklaces.

(b) When $h = 36$,
$\frac{150 - h}{3} = \frac{150 - 36}{3}$
$= \frac{114}{3}$
$= 38$

Joan got **38** necklaces.

7. 2 dresses + 3 bags ⟶ \$367
$\times 2$ (1 dress + 2 bags ⟶ \$212
2 dresses + 4 bags ⟶ $2 \times \$212 = \$424$

1 bag ⟶ \$424 − \$367 = \$57
1 dress ⟶ \$212 − (2 × \$57)
= \$212 − \$114
= \$98

1 dress + 1 bag ⟶ \$98 + \$57 = \$155
6 dresses + 6 bags ⟶ $6 \times \$155 = \$930$

The total cost of 6 such dresses and 6 such bags is **\$930**.

8. (a) Number of different triangles
$= 1 + 2 + 3 + 4$
$= 10$

She would get **10** different triangles.

(b) Number of different triangles
$= 1 + 2 + 3 + 4 + 5 + 6 + 7 + 8 + 9 + 10 + 11$
$= 66$ ← Alternative method: $\frac{11}{2} \times (1 + 11) = 66$

She would get **66** different triangles.

9. $80\% = \frac{80}{100} = \frac{4}{5}$, $60\% = \frac{60}{100} = \frac{3}{5}$

Leslie	:	Jonathan	:	Jane
4 $\times 3$	:	5 $\times 3$		
= 12	:	15		
		3 $\times 5$	:	5 $\times 5$
		= 15	:	25
= 12	:	15	:	25

15 units + 25 units = 40 units

Jonathan □
Jane □□□ } 40 units

4 parts = 40 units
1 part = 40 units ÷ 4 = 10 units
3 parts = 3 × 10 units = 30 units

After:

Leslie	:	Jonathan	:	Jane
12	:	10	:	30

15 units − 10 units = 5 units

5 units = 505 stamps
1 unit = 505 ÷ 5
= 101 stamps
40 units = 40 × 101
= 4040 stamps

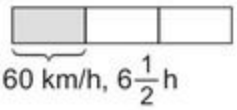
Jane and Jonathan had **4040** stamps at first.

10. Area of △ABC
$= \frac{1}{2} \times 15 \times 15$
$= 112.5 \text{ cm}^2$

Area of quadrant
$= \frac{1}{4} \times \pi \times 7 \times 7$
$= 38.485 \text{ cm}^2$

Area of shaded part
= 112.5 – 38.485
= 74.02 cm^2 (correct to 2 d.p.)

The area of the shaded part of the triangle is **74.02 cm^2**.

11. (a) 

Distance (1st part of journey)
= 60 km/h × $6\frac{1}{2}$ h
= 390 km

$\frac{1}{3}$ ⟶ 390 km
$\frac{3}{3}$ ⟶ 3 × 390 km = 1170 km

The distance of the journey was **1170 km**.

(b) Average speed (Return journey)
= 1170 km ÷ 15 h
= 78 km/h

His average speed on his return journey was **78 km/h**.

12. Number of men
= 1350 – 810
= 540

Number of men who wore glasses
= $\frac{8}{9}$ × 540
= 480

Number of women who wore glasses
= $\frac{5}{6}$ × 810
= 675

480 + 675 = 1155

1155 men and women wore glasses at the funfair altogether.

13. (a) $\frac{1}{2} - \frac{2}{5} = \frac{1}{10}$

$\frac{1}{10}$ ⟶ 8.5 *l*

$\frac{10}{10}$ ⟶ 10 × 8.5 *l*
= 85 *l*
= 85 000 cm^3

Height of tank
= 85 000 cm^3 ÷ 1250 cm^2
= 68 cm

The height of the tank is **68 cm**.

(b) $\frac{2}{5}$ × 85 *l* = 34 *l*

The volume of water in the tank when its was $\frac{2}{5}$ filled was **34 *l***.

14. 500 – 325 = 175
$\frac{60}{100}$ × 175 = 105
325 × \$2 = \$650
105 × \$1.50 = \$157.50

\$849.50 – \$650 – \$157.50 = \$42

500 – 105 – 325 = 70 balloons
\$42 ÷ 70 = \$0.60

She sold each of the rest of the balloons for **\$0.60**.

15. 

Time taken by Jimmy
= 45 km ÷ 50 km/h
= $\frac{9}{10}$ h

Time taken by Tony

$= \frac{9}{10}\ h - \frac{2}{5}\ h$ ← $\frac{24}{60}\ h = \frac{2}{5}\ h$

$= \frac{1}{2}\ h$

Tony's average speed

$= 45\ km \div \frac{1}{2}\ h$

$= 90\ km/h$

Tony's average speed was **90 km/h**.

16. Area of larger semicircle

$= \frac{1}{2} \times 3.14 \times 14 \times 14$

$= 307.72\ cm^2$

Area of smaller semicircle

$= 307.72 - 207.24$

$= 100.48\ cm^2$

$\frac{1}{2} \times 3.14 \times Radius \times Radius = 100.48$

$Radius \times Radius = \frac{100.48 \times 2}{3.14}$

$= 64$

$= 8 \times 8$

$Radius = 8\ cm$

Breadth of rectangle = 8 cm

Length of rectangle $= 2 \times 8\ cm$

$= 16\ cm$

Area of rectangle

$= 16 \times 8$

$= 128\ cm^2$

Area of shaded part

$= 128 - 100.48$

$= 27.52\ cm^2$

The area of the shaded part is **27.52 cm²**.

17. $1135 \times \$0.40 = \$454$

$\$552 - \$454 = \$98$

$1135 \div 40 = 28$ R 15 (28 sets)

$\$98 \div 28 = \$3.50$

The bonus she got for every 40 bags she sold was **$3.50**.

Trial Examination 2

PAPER 1

Booklet A:

1. **(4)**
Area of square
$= 3 \times 3$
$= 9 \text{ cm}^2$

Area of square	:	Area of triangle
9	:	36
1	:	4

2. **(3)**
$\frac{24}{96} \times 100\% = \frac{1}{4} \times 100\%$
$= 25\%$

The number in the box is 25.

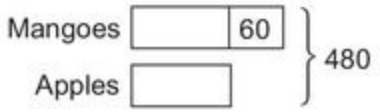
3. **(1)**
Average speed
$= 160 \text{ km} \div 2\frac{1}{2} \text{ h}$
$= 160 \text{ km} \div \frac{5}{2} \text{ h}$
$= 160 \text{ km} \times \frac{2}{5} \text{ h}$
$= 64 \text{ km/h}$

4. **(3)**
Area of 1 quarter circle
$= \frac{1}{4} \times 3.14 \times 4 \times 4$
$= 12.56 \text{ cm}^2$

Area of figure
$= 5 \times 12.56 \text{ cm}^2$
$= 62.8 \text{ cm}^2$

5. **(2)**
When $k = 12$,
$\frac{5k}{2} + 2k = \frac{5(12)}{2} + 2(12)$
$= 30 + 24$
$= 54$

6. **(3)**



2 units = 480 – 60
= 420 fruits
1 unit = 420 ÷ 2
= 210 fruits (Apples)

210 + 60 = 270 (Mangoes)

Apples	:	Mangoes
210	:	270
= 21	:	27
= 7	:	9

7. **(1)**
Breadth
$= \frac{2}{3} \times 90 \text{ cm}$
$= 60 \text{ cm}$

Base area
$= 90 \times 60$
$= 5400 \text{ cm}^2$

Height of box
$= 70\,200 \text{ cm}^3 \div 5400 \text{ cm}^2$
$= 13 \text{ cm}$

8. **(1)**
Diameter of smaller semicircle
$= \frac{2}{3} \times 12$
$= 8 \text{ cm}$

Area of smaller semicircle
$= \frac{1}{2} \times 3.14 \times 4 \times 4$
$= 25.12 \text{ cm}^2$

9. **(1)**
It has 5 faces.

10. **(2)**
$\angle k = 180° - 85° - 26°$ ($\angle$s on a straight line)
$= 69°$

11. **(3)**

$$\frac{1}{2} - \frac{1}{6} - \frac{1}{6} = \frac{3}{6} - \frac{1}{6} - \frac{1}{6}$$
$$= \frac{1}{6}$$

$$\frac{1}{2} - \frac{1}{6} = \frac{3}{6} - \frac{1}{6}$$
$$= \frac{2}{6}$$
$$= \frac{1}{3}$$

$\frac{1}{3} \times \$1830 = \$610$

She spends $610 more on her car instalment than clothing in a month.

12. **(2)**
Distance travelled
$= 72 \text{ km/h} \times \frac{55}{60} \text{ h}$
$= 72 \text{ km/h} \times \frac{11}{12} \text{ h}$
$= 66 \text{ km}$

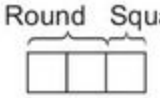
1 km ⟶ 1.5 *l*
66 km ⟶ 66 × 1.5 *l* = 99 *l*

His car used up 99 *l* of petrol.

13. **(3)**
$12 \times \$6 = \$72$
$\frac{72}{1200} \times 100\% = 6\%$
$6\% - 3\% = 3\%$

The annual rate of interest rose by 3%.

14. **(3)**



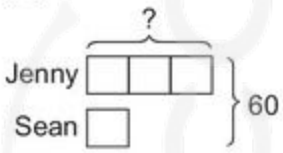
2 units − 1 unit = 1 unit

1 unit = 35 stickers (Square)
3 units = 3 × 35
= 105 stickers (Total)

35 + 2 = 37
105 + 2 = 107

Required fraction = $\frac{37}{107}$

15. **(4)**



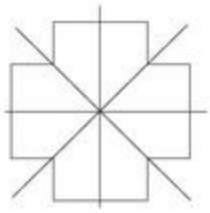
4 units = 60 phonecards
1 unit = 60 ÷ 4
= 15 phonecards
3 units = 3 × 15
= 45 phonecards

Jenny had 45 phonecards.

Booklet B:

16. Area of base
$= 18 \times 15$
$= 270 \text{ cm}^2$

Height
$= 3240 \text{ cm}^3 \div 270 \text{ cm}^2$
= 12 cm

17. 

There are **4** lines of symmetry in the figure.

18.  = 36 ÷ 3
= 12 stamps

 = 48 ÷ 2
= 24 stamps

 +  = 24 + 12
= **36** stamps

19. 27 ÷ 3 = 9
$9 \times 4y = 36y$

The mass of 27 packets of sugar is **36*y* kg**.

20. 2 min = 2 × 60 = 120 s

1 s ⟶ $4\frac{1}{2}$ revolutions

120 s ⟶ $120 \times 4\frac{1}{2}$

$= 120 \times \frac{9}{2}$

= 540 revolutions

The fan will make **540** revolutions in 2 minutes.

21. Area of garden
= 40 × 10
= 400 m²

$1 - \frac{3}{8} = \frac{5}{8}$

Area of garden not planted with carrots

$= \frac{5}{8} \times 400$

= **250 m²**

22. 100% – 10% = 90%

90% ⟶ $252

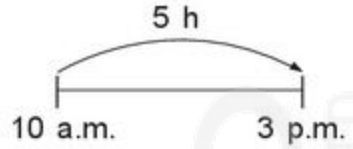
1% ⟶ $\$(\frac{252}{90})$

100% ⟶ $100 \times \$(\frac{252}{90}) = \$280$

Price of fan after final discount

$= \frac{65}{100} \times \$280$

= **$182**

23. 

Average speed
= 160 km ÷ 5 h
= **32 km/h**

24. (a) Smallest even number = **2796**
(b) Number closest to 7000 = **6972**

25. ∠BCD = 62° (opp. ∠s of a parallelogram)
∠ACB = (180° – 126°) ÷ 2 (isos. △)
= 54° ÷ 2
= 27°

∠ACD = 62° + 27°
= **89°**

26. (a) 32 – 18 = 14
He sold **14** more cameras in August than in June.

(b) May : September
24 : 36
= **2** : **3**

27. 425 km | 300 km
$3\frac{2}{5}$ h | $1\frac{3}{5}$ h

Total distance
= 425 + 300
= 725 km

Total time
$= 3\frac{2}{5}$ h + $1\frac{3}{5}$ h
= 5 h

Average speed
= 725 km ÷ 5 h
= **145 km/h**

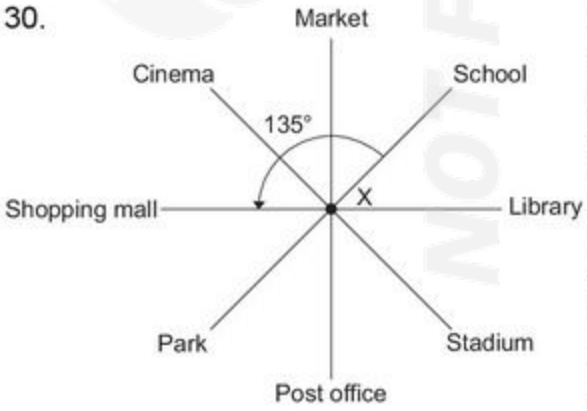
28. $\angle ACB = 180° \div 3$ (equi. $\triangle$)
$= 60°$

$\angle g = 60° - 48°$
$= \mathbf{12°}$

29. 100% – 20% = 80%
80% ⟶ \$50
1% ⟶ $\$(\frac{50}{80})$
100% ⟶ $100 \times \$(\frac{50}{80})$
= \$62.50

Original price of 1 wallet
= \$62.50 ÷ 5
= **\$12.50**

30.



He will be facing the **shopping mall** now.

PAPER 2

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

$\frac{1}{4} = \frac{2}{8}$
$\frac{2}{8}$ ⟶ 712 items
$\frac{1}{8}$ ⟶ 712 ÷ 2 = 356 items
$\frac{3}{8}$ ⟶ 3 × 356 = 1068 items

He sold **1068** more pens and rulers than pencils.

2. 6 m = 600 cm
3 m = 300 cm

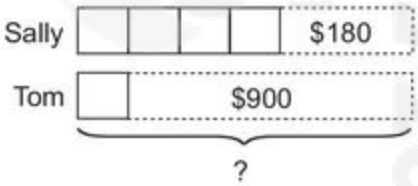
600 cm ÷ 30 cm = 20
300 cm ÷ 30 cm = 10

Number of tiles
= 20 × 10
= 200

Cost of tiles
= 200 × \$5.90
= **\$1180**

3. 7 × 4 × 3 = 84 m^3
84 m^3 ÷ 3 m^3 = **28 people**

4.



3 units = \$900 – \$180
= \$720
1 unit = \$720 ÷ 3
= \$240

\$240 + \$900 = \$1140
2 × \$1140 = \$2280

Both of them had **\$2280** at first.

5. Radius = 18 cm ÷ 3 = 6 cm

Area of circle
= 3.14 × 6 × 6
= 113.04 cm^2

Area of each unshaded part
= 113.04 – 50.24
= 62.8 cm^2

Total area of unshaded parts
= 2 × 62.8 cm^2
= **125.6 cm^2**

6. Length + Breadth = 70 cm ÷ 2
= 35 cm

$4a + 4 + a + 3.4 = 35$
$5a + 7.4 = 35$
$5a = 35 - 7.4$
$= 27.6$
$a = 27.6 \div 5$
$= 5.52$

Length = 4(5.52) + 4
= 26.08 cm

Breadth = 5.52 + 3.4
= 8.92 cm

Area of rectangle
= 26.08 × 8.92
= 232.6336 cm^2

The area of the rectangle is **232.6336 cm^2**.

7. (a) 15 cm ÷ 3 = 5 cm
The length of one side of the square base is **5 cm**.

(b) Height
= (26 – 5 – 5) ÷ 2
= 16 ÷ 2
= 8 cm

Volume cuboid
= 5 × 5 × 8
= 200 cm^3

The volume of the cuboid is **200 cm^3**.

8. Green : Red : Blue
$3^{\times 2}$: $7^{\times 2}$
$3^{\times 3}$: $2^{\times 3}$

9 : 6 : 14

9 units + 6 units + 14 units = 29 units

29 units = 87 beads
1 unit = 87 ÷ 29
= 3 beads

9 units + 14 units = 23 units

23 units = 23 × 3
= 69 beads

The total number of blue and green beads is **69**.

9. Area of square flower bed
= 5 × 5
= 25 m^2

Area of rectangular garden
= 4 × 25 m^2
= 100 m^2

Breadth of rectangular garden
= 100 m^2 ÷ 20 m
= 5 m

Perimeter of rectangular garden
= 20 + 5 + 20 + 5
= 50 m

Cost of fencing
= 50 × $21.50
= $1075

The cost of fencing the rectangular garden is **$1075**.

10. Area of shaded part
= Area of big semicircle
$= \frac{1}{2} \times \pi \times 14 \times 14$
= 307.88 cm^2 (correct to 2 d.p.)

The area of the shaded part is **307.88 cm^2**.

11. (a) Area of Rectangle ABCD
= 24 × 14
= 336 cm^2

Area of 4 shaded squares
= 4 × (3 × 3)
= 36 cm^2

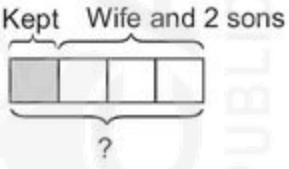
336 – 36 = 300 cm^2

The area of the cardboard left is **300 cm^2**.

(b) Volume of box
= 18 × 8 × 3
= 432 cm^3

The volume of the box is **432 cm^3**.

12.



Wife : Elder son : Younger son
7 : 5 : 3

5 units – 3 units = 2 units

2 units = \$765
1 unit = \$765 ÷ 2
= \$382.50

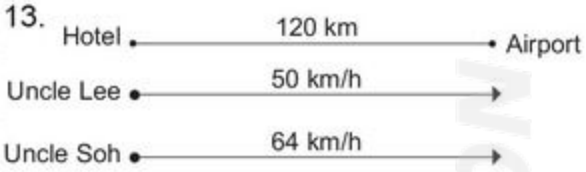
7 units + 5 units + 3 units = 15 units

15 units = 15 × \$382.50
= \$5737.50

3 parts = \$5737.50
1 part = \$5737.50 ÷ 3
= \$1912.50
4 parts = 4 × \$1912.50
= \$7650

Uncle Sam had **\$7650** in savings.

13.



Time taken by Uncle Lee
= 120 km ÷ 50 km/h
$= 2\frac{2}{5}$ h

Time taken by Uncle Soh
= 120 km ÷ 64 km/h
$= 1\frac{7}{8}$ h

$2\frac{2}{5}$ h – $1\frac{7}{8}$ h = $\frac{21}{40}$ h

Uncle Soh will reach the airport **$\frac{21}{40}$ h** earlier.

14. Amount given to wife
$= \frac{15}{100} \times$ \$2400
= \$360

\$2400 – \$360 – \$1290 = \$750

Amount he spends on food
$= \frac{40}{100} \times$ \$750
= \$300

\$750 – \$300 = \$450

He saves **\$450** each month.

15. Total number of notebooks
= 8 × 20
= 160

$\frac{60}{100}$ × 160 = 96 books (Sold at $1.20)
96 × $1.20 = $115.20

160 – 96 = 64

$\frac{75}{100}$ × 64 = 48 books
(Sold at 20% discount)

$\frac{80}{100}$ × $1.20 = $0.96

48 × $0.96 = $46.08

$115.20 + $46.08 = $161.28
$161.28 – $64.80 = $96.48

He spent **$96.48** on buying the notebooks.

16. Area of rectangle
= 16 × 14
= 224 cm^2

Area of big circle
= 3.14 × 3.5 × 3.5
= 38.465 cm^2

Area of small circle
= 3.14 × 2 × 2
= 12.56 cm^2

224 + 38.465 + 12.56
= 275.025 cm^2
= 275.03 cm^2 (correct to 2 d.p.)

The area of the figure is **275.03 cm^2**.

Circumference of big circle
= 3.14 × 7
= 21.98 cm

Circumference of small circle
= 3.14 × 4
= 12.56 cm

Perimeter of figure
= 21.98 + 12.56 + 16 + 16 + 3 + 3
= 72.54 cm

The perimeter of the figure is **72.54 cm**.

17. Selling price of a game software
= $16 ÷ 2
= $8

6 × $8 = $48
$240 – $48 = $192

Total cost of 1 set
= $16 + $8
= $24

Number of sets
= $192 ÷ $24
= 8

8 + 8 + 6 = 22

He bought **22** computer software.

27. 425 km | 300 km
$3\frac{2}{5}$ h | $1\frac{3}{5}$ h

Total distance
= 425 + 300
= 725 km

Total time
$= 3\frac{2}{5}$ h + $1\frac{3}{5}$ h
= 5 h

Average speed
= 725 km ÷ 5 h
= **145 km/h**

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80% ⟶ \$50
1% ⟶ $\$(\frac{50}{80})$
100% ⟶ $100 \times \$(\frac{50}{80})$
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Original price of 1 wallet
= \$62.50 ÷ 5
= **\$12.50**

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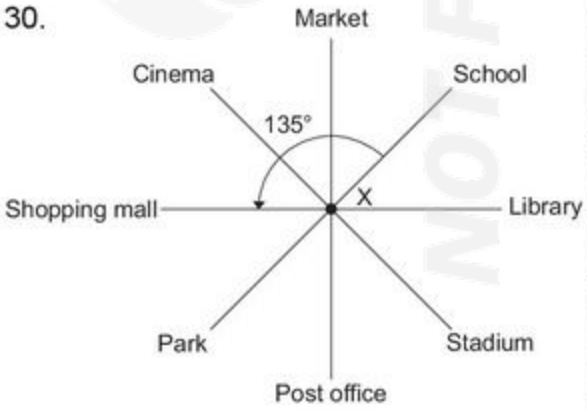

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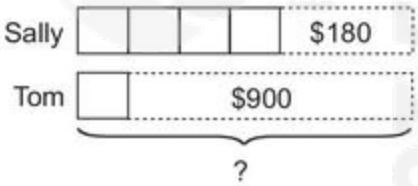

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Area of rectangle
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= 232.6336 cm^2

The area of the rectangle is **232.6336 cm^2**.

7. (a) 15 cm ÷ 3 = 5 cm
The length of one side of the square base is **5 cm**.

(b) Height
= (26 – 5 – 5) ÷ 2
= 16 ÷ 2
= 8 cm

Volume cuboid
= 5 × 5 × 8
= 200 cm^3

The volume of the cuboid is **200 cm^3**.

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Area of rectangular garden
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= 100 m^2

Breadth of rectangular garden
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Perimeter of rectangular garden
= 20 + 5 + 20 + 5
= 50 m

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= 50 × $21.50
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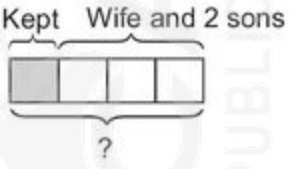

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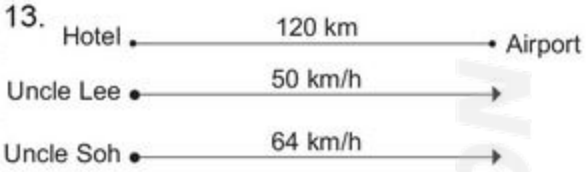
Uncle Sam had **\$7650** in savings.

13.



Time taken by Uncle Lee
= 120 km ÷ 50 km/h
$= 2\frac{2}{5}$ h

Time taken by Uncle Soh
= 120 km ÷ 64 km/h
$= 1\frac{7}{8}$ h

$2\frac{2}{5}$ h – $1\frac{7}{8}$ h = $\frac{21}{40}$ h

Uncle Soh will reach the airport **$\frac{21}{40}$ h** earlier.

14. Amount given to wife
$= \frac{15}{100} \times$ \$2400
= \$360

\$2400 – \$360 – \$1290 = \$750

Amount he spends on food
$= \frac{40}{100} \times$ \$750
= \$300

\$750 – \$300 = \$450

He saves **\$450** each month.

15. Total number of notebooks
= 8 × 20
= 160

$\frac{60}{100}$ × 160 = 96 books (Sold at $1.20)
96 × $1.20 = $115.20

160 – 96 = 64

$\frac{75}{100}$ × 64 = 48 books
(Sold at 20% discount)

$\frac{80}{100}$ × $1.20 = $0.96

48 × $0.96 = $46.08

$115.20 + $46.08 = $161.28
$161.28 – $64.80 = $96.48

He spent **$96.48** on buying the notebooks.

16. Area of rectangle
= 16 × 14
= 224 cm^2

Area of big circle
= 3.14 × 3.5 × 3.5
= 38.465 cm^2

Area of small circle
= 3.14 × 2 × 2
= 12.56 cm^2

224 + 38.465 + 12.56
= 275.025 cm^2
= 275.03 cm^2 (correct to 2 d.p.)

The area of the figure is **275.03 cm^2**.

Circumference of big circle
= 3.14 × 7
= 21.98 cm

Circumference of small circle
= 3.14 × 4
= 12.56 cm

Perimeter of figure
= 21.98 + 12.56 + 16 + 16 + 3 + 3
= 72.54 cm

The perimeter of the figure is **72.54 cm**.

17. Selling price of a game software
= $16 ÷ 2
= $8

6 × $8 = $48
$240 – $48 = $192

Total cost of 1 set
= $16 + $8
= $24

Number of sets
= $192 ÷ $24
= 8

8 + 8 + 6 = 22

He bought **22** computer software.