



Answer Key

(Step-By-Step Mathematics 5)



Unit 1 Whole Numbers (1)

Drills

Exercise 1

- (a) hundreds (b) 2000
- (a) thousands
(b) 100 000
- (a) 8 ones/8 (b) 500
- (a) ten thousands
(b) 500 000
- (a) millions (b) 9000
- (a) 3 tens/30 (b) 600
- (a) thousands
(b) 0

Exercise 2

- Seven thousand, three hundred and sixty-four
- Seventy-four thousand, two hundred and forty-one
- Eighty-five thousand, two hundred and twenty-five
- Thirty-one thousand, eight hundred and sixty-nine
- Fifty-five thousand, three hundred and thirty-two

- One hundred and seven thousand, four hundred and ninety-six
- Eight hundred and thirty-eight thousand, six hundred and ninety-four
- Two million, four hundred and sixty-three thousand, five hundred and ninety-six
- Six million, twelve thousand and forty
- Three million, five hundred and eight-four thousand, six hundred and ninety-three

Exercise 3

- 1 306 021
- 5 087 002
- 65 500
- 7 009 011
- 34 401
- 12 147

Exercise 4

- $5680 \xrightarrow{+130} 5810 \xrightarrow{+130} 5940 \xrightarrow{+130} 6070 \xrightarrow{+130} 6200$
- $10\ 549 \xrightarrow{-75} 10\ 474 \xrightarrow{-75} 10\ 399 \xrightarrow{-75} 10\ 324 \xrightarrow{-75} 10\ 249$
- $5347 \xrightarrow{-20} 5327 \xrightarrow{-20} 5307 \xrightarrow{-20} 5287 \xrightarrow{-20} 5267$
- $8603 \xrightarrow{+45} 8648 \xrightarrow{+45} 8693 \xrightarrow{+45} 8738 \xrightarrow{+45} 8783$
- $53\ 670 \xrightarrow{+100} 53\ 770 \xrightarrow{-200} 53\ 570 \xrightarrow{+100} 53\ 670 \xrightarrow{-200} 53\ 470$
- $4407 \xrightarrow{-125} 4282 \xrightarrow{-250} 4032 \xrightarrow{-125} 3907 \xrightarrow{-250} 3657$
- $43\ 758 \xrightarrow{+120} 43\ 878 \xrightarrow{+120} 43\ 998 \xrightarrow{+120} 44\ 118 \xrightarrow{+120} 44\ 238$

Exercise 5

- 28 173, 42 646, 62 584, 103 473
- 62 474, 74 235, 732 325, 822 345
- 2784, 29 469, 264 743, 2 535 800
- 9351, 7263, 5852, 2548
- 355 110, 73 245, 10 355, 7474
- 4 464 924, 4 153 756, 495 252, 46 384

Perform

Exercise 1

- (4)
The value of the digit 6 in 46 483 is 6000.
- (3)
900 806 is 20 000 more than 880 806.
- (3)
Two million, four hundred and eight thousand and thirty-five = 2 408 035
- (4)
In 974 062, the digit 7 is in the ten thousands place.
- (3)
 $5\ 000\ 000 \div 100 = 50\ 000$
50 000 hundreds make 5 000 000.
- (2)
1 million = 1 000 000
 $1\ 000\ 000 \div 1000 = 1000$
There are 1000 thousands in one million.
- (1)
 $300\ 000 \div 30 = 10\ 000$
In 385 432, the value of digit in the hundred thousands place 10 000 times the value of the digit in the tens place.
- (1)
 $47\ 135 = 40\ 000 + \boxed{7000} + 100 + 30 + 5$
- (1)
Smallest 6-digit number = 123 469

Exercise 2

1. $\text{Sum} = 60\,000 + 4000 + 300 + 80 + 7$
 $= 64\,387$

2. $6\text{ million} = 6\,000\,000$
 $6\,000\,000 \div 10\,000 = 600$
 There are **600** ten thousands in 6 million.

3. $1 + 2 + \dots + 10 + 11 + \dots + 19 + 20$

$= 10 \times 21$
 $= 210$

4. $805\,349 - 12\,806 = 792\,543$

5. $672\,685 = 67 \times \boxed{10\,000} + 2000$
 $+ 600 + 80 + 5$

6. 135 040, 246 913, 503 114, 716 132, 803 514

7. 715 683 = **Seven hundred and fifteen thousand, six hundred and eighty-three**

8. Greatest 5-digit number = 87 431

9. Smallest 6-digit odd number = 405 689

Achieve

Exercise 1

1. $2 + 4 + \dots + 24 + 26 + \dots + 46 + 48$

$= 12 \times 50$
 $= 600$

The sum is **600**.

2. Use guess and check.

Thousands	Hundreds	Tens	Ones	Sum of digits	Check
9	1	3	4	$9 + 1 + 3 + 4$ $= 17$	\times
9	2	3	8	$9 + 2 + 3 + 8$ $= 22$	\checkmark

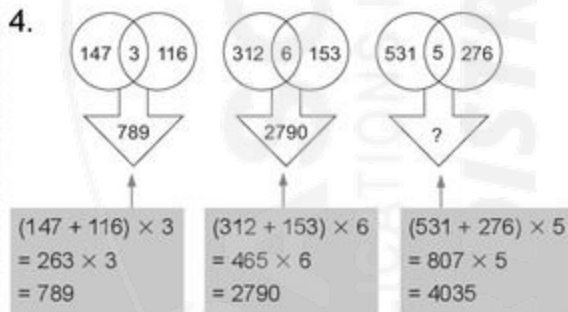
The number is **9238**.

3.

Way	20	40	60
1	6	0	0
2	4	1	0
3	3	0	1
4	2	2	0
5	1	1	1
6	0	3	0
7	0	0	2

There are **7** ways in which 20, 40 and 60 can be added to give a sum of 120.

4.



The missing number is **4035**.

5.

No. of desks	1	2	3	4	5	6	7	8	9	10	11	12
No. of stools	8	12	16	20	24	28	32	36	40	44	48	52
		$+4$	$+4$	$+4$	$+4$	$+4$	$+4$	$+4$	$+4$	$+4$	$+4$	$+4$

There are **52** stools.

Unit 2 Whole Numbers (2)

Drills

Exercise 1

- 7562
- 3633
- 1962
- 2197
- 3142
- 2175
- 3654
- 5957
- 1459
- 6454
- 3641
- 4651
- 1389
- 33 655
- 15 246
- 9640
- 10 864
- 19 719
- 95
- 89
- 1093
- 1051
- 10 103
- 3676

Exercise 2

- | | | | |
|-----------|-----|-----------|-----|
| 3500 | → F | 2600 | → O |
| 38 400 | → I | 49 200 | → P |
| 12 690 | → W | 102 600 | → E |
| 1 692 000 | → D | 41 050 | → L |
| 33 500 | → S | 2 481 000 | → R |

W O L F S P I D E R

Exercise 3

- | | | | |
|--------|-----|------|-----|
| 57 | → E | 70 | → L |
| 400 | → U | 81 | → I |
| 3 | → B | 1132 | → D |
| 45 500 | → R | 414 | → N |
| 296 | → G | | |

B L U E - R I N G E D octopus

Exercise 4

- $(200 - 140) \div 3 \times 5$
 $= 60 \div 3 \times 5$
 $= 20 \times 5$
 $= 100$
- $84 - (18 + 17) \div 7$
 $= 84 - 35 \div 7$
 $= 84 - 5$
 $= 79$
- $45 - 5 \times 4 + 96 \div 8$
 $= 45 - 20 + 12$
 $= 25 + 12$
 $= 37$
- $6 + 27 \div 3 \times 2 - 4$
 $= 6 + 9 \times 2 - 4$
 $= 6 + 18 - 4$
 $= 24 - 4$
 $= 20$
- $36 + 72 \div (3 \times 2) - 15$
 $= 36 + 72 \div 6 - 15$
 $= 36 + 12 - 15$
 $= 48 - 15$
 $= 33$
- $24 \div (11 - 4 \times 2) + 6$
 $= 24 \div (11 - 8) + 6$
 $= 24 \div 3 + 6$
 $= 8 + 6$
 $= 14$

$$\begin{aligned}
 7. \quad & 9 + 4 \times 13 - (12 \times 2) \div 3 \\
 & = 9 + 52 - 24 \div 3 \\
 & = 9 + 52 - 8 \\
 & = 61 - 8 \\
 & = 53
 \end{aligned}$$

$$\begin{aligned}
 8. \quad & 156 + (64 - 48) \div 4 \times 9 \\
 & = 156 + 16 \div 4 \times 9 \\
 & = 156 + 4 \times 9 \\
 & = 156 + 36 \\
 & = 192
 \end{aligned}$$

Exercise 5

B	$45 \div 3 + 36 - 15$	283
E	$13 \times 6 - 32 + 10$	216
N	$646 - 353 + 23 \times 3$	56
R	$325 - 48 + 6$	366
S	$288 \times 6 \div 8$	411
U	$54 \div 6 + 31 - 12 \times 2$	36
M	$500 \div 10 - 4 + 13$	362
E	$45 + (356 - 253)$	285
L	$132 \times 6 - (327 + 54)$	59
W	$28 \times 5 + 545 - (81 \div 9)$	148
O	$652 - 535 + (21 \times 8)$	16
H	$67 \times 15 - 647 + (56 \div 7)$	676

$$\begin{array}{cccccc}
 \underline{W} & \underline{H} & \underline{O} & \underline{L} & \underline{E} & \\
 676 & 366 & 285 & 411 & 148 &
 \end{array}$$

$$\begin{array}{cccccc}
 \underline{N} & \underline{U} & \underline{M} & \underline{B} & \underline{E} & \underline{R} & \underline{S} \\
 362 & 16 & 59 & 36 & 56 & 283 & 216
 \end{array}$$

$$\begin{aligned}
 \text{B} \quad & 45 \div 3 + 36 - 15 \\
 & = 15 + 36 - 15 \\
 & = 51 - 15 \\
 & = 36
 \end{aligned}$$

$$\begin{aligned}
 \text{E} \quad & 13 \times 6 - 32 + 10 \\
 & = 78 - 32 + 10 \\
 & = 46 + 10 \\
 & = 56
 \end{aligned}$$

$$\begin{aligned}
 \text{N} \quad & 646 - 353 + 23 \times 3 \\
 & = 646 - 353 + 69 \\
 & = 293 + 69 \\
 & = 362
 \end{aligned}$$

$$\begin{aligned}
 \text{R} \quad & 325 - 48 + 6 \\
 & = 277 + 6 \\
 & = 283
 \end{aligned}$$

$$\begin{aligned}
 \text{S} \quad & 288 \times 6 \div 8 \\
 & = 1728 \div 8 \\
 & = 216
 \end{aligned}$$

$$\begin{aligned}
 \text{U} \quad & 54 \div 6 + 31 - 12 \times 2 \\
 & = 9 + 31 - 24 \\
 & = 40 - 24 \\
 & = 16
 \end{aligned}$$

$$\begin{aligned}
 \text{M} \quad & 500 \div 10 - 4 + 13 \\
 & = 50 - 4 + 13 \\
 & = 46 + 13 \\
 & = 59
 \end{aligned}$$

$$\begin{aligned}
 \text{E} \quad & 45 + (356 - 253) \\
 & = 45 + 103 \\
 & = 148
 \end{aligned}$$

$$\begin{aligned}
 \text{L} \quad & 132 \times 6 - (327 + 54) \\
 & = 792 - 381 \\
 & = 411
 \end{aligned}$$

$$\begin{aligned}
 \text{W} \quad & 28 \times 5 + 545 - (81 \div 9) \\
 & = 140 + 545 - 9 \\
 & = 685 - 9 \\
 & = 676
 \end{aligned}$$

$$\begin{aligned} \textcircled{O} \quad & 652 - 535 + (21 \times 8) \\ & = 652 - 535 + 168 \\ & = 117 + 168 \\ & = 285 \end{aligned}$$

$$\begin{aligned} \textcircled{H} \quad & 67 \times 15 - 647 + (56 \div 7) \\ & = 1005 - 647 + 8 \\ & = 358 + 8 \\ & = 366 \end{aligned}$$

Perform

Exercise 1

- (3)
Sum
 $= 4136 + 1524$
 $= 5660$
- (1)
 $5374 \div 21 = 255 \text{ R } 19$
The remainder is 19.
- (1)
 9000×500
 $= 9000 \times 5 \times 100$
 $= 45\,000 \times 100$
 $= 4\,500\,000$
- (2)
 $270 \div 18 = 15$
 $15 \times 2 = 30$
- (3)
 $14 \times 45 = 630$
The number is 630.
- (4)
 $22 \times 45 = 990$
 $990 \div 3 = 330$
 $330 + 600 = 930$
- (3)
 $1044 \div 12 = 87$
The number is 87.

- (2)
 $12 + 24 \div (9 - 7) \times 3$
 $= 12 + 24 \div 2 \times 3$
 $= 12 + 12 \times 3$
 $= 12 + 36$
 $= 48$
- (1)
 $5467 \times 32 = 5467 \times 31 + 5467 \times 1$

Exercise 2

- $3675 \div 15 = 245$
The greater number is **245**.
- $136\,900 - 45\,000 = 91\,900$
The greater number is **91 900**.
- $700 \div 20 = 35$

Difference
 $= 35 - 20$
 $= 15$
- $1\,000\,000 - 286\,000 = 714\,000$
- $7200 \div 900$
 $= 7200 \div 100 \div 9$
 $= 72 \div 9$
 $= 8$

 $8 \div 4 = 2$
The third number 2.
- 2080×200
 $= 208 \times \underbrace{10 \times 10}_{100} \times 20$
 $= 208 \times \boxed{100} \times 20$
- $15 \times \$56 = \840
The evening gown cost **\$840**.

8. 7 days \rightarrow 14 packets
 1 day \rightarrow $14 \div 7 = 2$ packets

$$5 \times 12 = 60$$

$$60 \div 2 = 30$$

Five dozen packets of biscuits will last them **30** days.

9. $29 \times 34 = 986$
 $986 - 50 = 936$

He had **936** game cards left.

Achieve

Exercise 1

1.

Tim	15	11
Marc	15	
Jim		

} 149 years

$$3 \text{ units} = 149 - 15 - 11 - 15$$

$$= 108 \text{ years}$$

$$1 \text{ unit} = 108 \div 3$$

$$= 36 \text{ years}$$

$$36 + 15 = 51$$

Marc is **51** years old.

2.

Monica		216
Felix		
Mary		

} ?

$$1 \text{ unit} = 431 - 216$$

$$= 215 \text{ stickers}$$

$$7 \text{ units} = 7 \times 215$$

$$= 1505 \text{ stickers}$$

$$1505 + 216 = 1721$$

They collected **1721** stickers in all.

3. $987 - 15 = 972$
 $972 \div 18 = 54$

He packed **54** boxes of cupcakes.

4. $23 \times \$19 = \437
 $17 \times \$7 = \119
 $\$1000 - \$437 - \$119 - \$25 = \$419$

She would receive **\\$419** in change.

5.

36	Friend	24

$$2 \times 24 + 36$$

$$= 48 + 36$$

$$= 84$$

Grace bought **84** biscuits.

6.

?

$$6 \text{ units} = 82 - 28$$

$$= 54 \text{ erasers}$$

$$1 \text{ unit} = 54 \div 6$$

$$= 9 \text{ erasers}$$

$$9 + 82 = 91$$

Each of them had **91** erasers at first.

7. $\times 4$ $\left\{ \begin{array}{l} 1 \text{ Bag} + 1 \text{ T-shirt} \rightarrow \$19 \\ 4 \text{ Bags} + 4 \text{ T-shirts} \rightarrow 4 \times \$19 = \$76 \\ 4 \text{ Bags} + 2 \text{ T-shirts} \rightarrow \$52 \end{array} \right.$

$$2 \text{ T-shirts} \rightarrow \$76 - \$52 = \$24$$

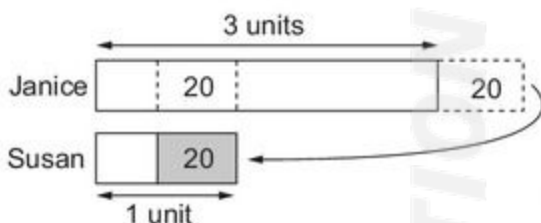
$$1 \text{ T-shirt} \rightarrow \$24 \div 2 = \$12$$

A T-shirt cost **\\$12**.

8. Before:



After:



$$2 \text{ units} = 160 - 20 - 20$$

$$= 120 \text{ stickers}$$

$$1 \text{ unit} = 120 \div 2$$

$$= 60 \text{ stickers}$$

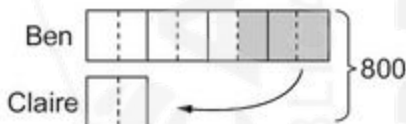
$$3 \text{ units} = 3 \times 60$$

$$= 180 \text{ stickers}$$

$$180 + 20 = 200$$

Janice had **200** stickers at first.

9.



$$10 \text{ units} = 800 \text{ badges}$$

$$1 \text{ unit} = 800 \div 10$$

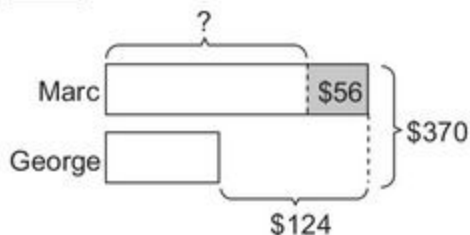
$$= 80 \text{ badges}$$

$$3 \text{ units} = 3 \times 80$$

$$= 240 \text{ badges}$$

Ben must give **240** badges to Claire.

10. After:



$$2 \text{ units} = \$370 + \$124$$

$$= \$494$$

$$1 \text{ unit} = \$494 \div 2$$

$$= \$247$$

$$\$247 - \$56 = \$191$$

Marc had **\$191** at first.

11. Cost of 1 set of 1 file and 1 notebook
 $= \$5 + \3
 $= \$8$

$$\text{Cost of 2 notebooks}$$

$$= 2 \times \$3$$

$$= \$6$$

$$\text{Number of sets}$$

$$= (\$142 - \$6) \div \$8$$

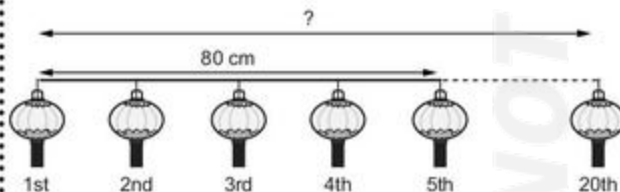
$$= \$136 \div \$8$$

$$= 17$$

$$17 + 2 = 19$$

He bought **19** notebooks.

12.



$$\text{Distance between 2 consecutive lanterns}$$

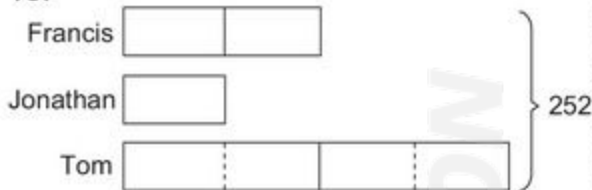
$$= 80 \text{ cm} \div 4$$

$$= 20 \text{ cm}$$

$$\begin{aligned} &\text{Distance between 1st and 20th lantern} \\ &= 19 \times 20 \text{ cm} \\ &= 380 \text{ cm} \end{aligned}$$

The distance between the 1st and the last lantern is **380 cm**.

13.



$$\begin{aligned} 7 \text{ units} &= 252 \text{ stamps} \\ 1 \text{ unit} &= 252 \div 7 \\ &= 36 \text{ stamps (Jonathan)} \\ 4 \text{ units} &= 4 \times 36 \\ &= 144 \text{ stamps (Tom)} \\ 2 \text{ units} &= 2 \times 36 \\ &= 72 \text{ stamps (Francis)} \end{aligned}$$

$$252 \div 3 = 84$$

$$84 - 72 = 12$$

Tom must give **12 stamps** to Francis.

$$84 - 36 = 48$$

Tom must give **48 stamps** to Jonathan.

Challenge

Exercise 1

- $124 - 4 = 120$
 $120 \div 4 = 30$
 $1 + 30 + 1 + 30 + 1 = 63$

Joel arranged **63** toy soldiers along the 2 adjoining sides of the square.

- Assume Ah Seng did not spill any bowl.
 $64 \times \$0.20 = \12.80

If he spilled a bowl of bean curd, he would lose $20\text{¢} + 5\text{¢} = 25\text{¢}$

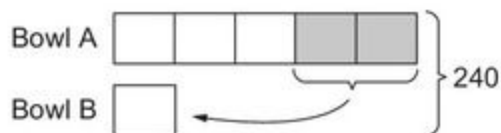
$$\$12.80 - \$11.80 = \$1$$

$$\$1 = 100\text{¢}$$

$$100\text{¢} \div 25\text{¢} = 4$$

Ah Seng spilled **4 bowls** of bean curd.

3.



$$6 \text{ units} = 240 \text{ buttons}$$

$$1 \text{ unit} = 240 \div 6$$

$$= 40 \text{ buttons}$$

$$2 \text{ units} = 2 \times 40$$

$$= 80 \text{ buttons}$$

80 buttons must be transferred from Bowl A to Bowl B.

- Assume there are 39 ants and houseflies.

$$39 \times 6 = 234$$

39 ants and houseflies have 234 legs.

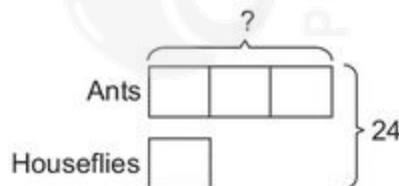
$$264 - 234 = 30$$

Each ant/housefly has 2 less legs than each spider.

$$30 \div 2 = 15$$

The scientist kept **15 spiders**.

$$39 - 15 = 24$$



$$4 \text{ units} = 24 \text{ creatures}$$

$$1 \text{ unit} = 24 \div 4$$

$$= 6 \text{ creatures}$$

$$3 \text{ units} = 3 \times 6$$

$$= 18 \text{ creatures}$$

The scientist kept **18 ants**.

5. (a) Assume Adrian has 52 one-dollar coins.

$$52 \times \$1 = \$52$$

$$\$136 - \$52 = \$84$$

Each \$5-note is \$4 more than a \$1-coin.

$$\$84 \div \$4 = 21$$

Adrian has 21 five-dollar notes.

$$52 - 21 = 31$$

Adrian has 31 one-dollar coins.

$$31 - 21 = 10$$

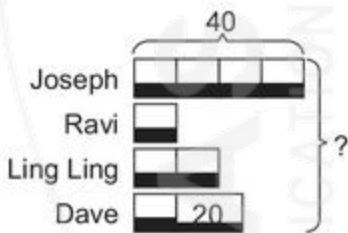
Adrian has **10** more one-dollar coins than five-dollar notes.

- (b) $4 \times \$29 = \116
4 shirts cost \$116.

$$\$136 - \$116 = \$20$$

Adrian will have **\$20** left.

6.



$$4 \text{ units} = 40 \text{ cookies}$$

$$1 \text{ unit} = 40 \div 4$$

$$= 10 \text{ cookies}$$

$$8 \text{ units} = 8 \times 10$$

$$= 80 \text{ cookies}$$

$$80 + 20 = 100$$

There were **100** cookies in the box.

7.



$$3 \text{ units} = 95 - 20$$

$$= 75 \text{ trading cards}$$

$$1 \text{ unit} = 75 \div 3$$

$$= 25 \text{ trading cards}$$

$$25 + 95 = 120$$

There were **120** trading cards in each box at first.

8. $240 - 144 = 96$

$$96 \div 8 \text{ days} = 12$$

Andrea collect 12 stickers each day.

In a day,

$$12 + 5 = 17$$

Helen and Andrea collect 17 stickers each day.

$$170 \div 17 = 10$$

Their total collection would be 170 stickers on the **10th** day.

9. Total number of red marbles

$$= 120 + 180$$

$$= 300$$

$$300 \div 2 = 150$$

$$180 - 150 = 30$$

30 red marbles are transferred from Container B to Container A.

Total number of blue marbles

$$= 80 + 120$$

$$= 200$$

$$200 \div 2 = 100$$

$$120 - 100 = 20$$

20 blue marbles are transferred from Container B to Container A.

$$30 - 20 = 10$$

10 more red than blue marbles are transferred from Container B to Container A.

10. Since the weight is between 30 kg to 35 kg.

Bags of 2 kg 30, 32, 34

Plus 1 kg 31, **33**, 35

Bags of 5 kg 30, 35

Plus 3 kg **33**, 38

Mr Wong has 33 kg of biscuits.

$33 \text{ kg} \times \$6.50 = \214.50

He will collect **\$214.50** from the sale of all his biscuits.

Unit 3 Fractions

Drills

Exercise 1

1. $16 \div 5 = \frac{16}{5} = 3\frac{1}{5}$ → F

2. $24 \div 7 = \frac{24}{7} = 3\frac{3}{7}$ → V

3. $26 \div 3 = \frac{26}{3} = 8\frac{2}{3}$ → I

4. $54 \div 9 = \frac{54}{9} = 6$ → S

5. $73 \div 8 = \frac{73}{8} = 9\frac{1}{8}$ → H

6. $47 \div 5 = \frac{47}{5} = 9\frac{2}{5}$ → U

7. $67 \div 4 = \frac{67}{4} = 16\frac{3}{4}$ → A

8. $48 \div 7 = \frac{48}{7} = 6\frac{6}{7}$ → N

9. $82 \div 9 = \frac{82}{9} = 9\frac{1}{9}$ → E

10. $19 \div 4 = \frac{19}{4} = 4\frac{3}{4}$ → T

11. $22 \div 7 = \frac{22}{7} = 3\frac{1}{7}$ → W

12. $56 \div 3 = \frac{56}{3} = 18\frac{2}{3}$ → M

**H A V E F U N W I T H
M A T H S !**

Exercise 2

$$1. \frac{1}{5} + \frac{7}{10} = \frac{2}{10} + \frac{7}{10} \\ = \frac{9}{10}$$

$$2. \frac{8}{9} - \frac{2}{3} = \frac{8}{9} - \frac{6}{9} \\ = \frac{2}{9}$$

$$3. \frac{1}{2} + \frac{2}{7} = \frac{7}{14} + \frac{4}{14} \\ = \frac{11}{14}$$

$$4. \frac{7}{8} - \frac{1}{4} = \frac{7}{8} - \frac{2}{8} \\ = \frac{5}{8}$$

$$5. \frac{3}{4} + \frac{1}{5} = \frac{15}{20} + \frac{4}{20} \\ = \frac{19}{20}$$

$$6. \frac{11}{12} - \frac{3}{5} = \frac{55}{60} - \frac{36}{60} \\ = \frac{19}{60}$$

$$7. \frac{7}{12} + \frac{1}{3} = \frac{7}{12} + \frac{4}{12} \\ = \frac{11}{12}$$

$$8. \frac{5}{9} - \frac{1}{2} = \frac{10}{18} - \frac{9}{18} \\ = \frac{1}{18}$$

$$9. \frac{6}{7} + \frac{2}{5} = \frac{30}{35} + \frac{14}{35} \\ = \frac{44}{35} \\ = 1\frac{9}{35}$$

Exercise 3

$$1. 1\frac{2}{3} + 1\frac{1}{4} = 1\frac{8}{12} + 1\frac{3}{12} \\ = 2\frac{11}{12}$$

$$2. 4\frac{1}{5} - 1\frac{1}{2} = 4\frac{2}{10} - 1\frac{5}{10} \\ = 3\frac{12}{10} - 1\frac{5}{10} \\ = 2\frac{7}{10}$$

$$3. 2\frac{3}{7} + 1\frac{2}{5} = 2\frac{15}{35} + 1\frac{14}{35} \\ = 3\frac{29}{35}$$

$$4. 3\frac{2}{5} - 1\frac{1}{4} = 3\frac{8}{20} - 1\frac{5}{20} \\ = 2\frac{3}{20}$$

$$5. 2\frac{1}{3} + 2\frac{1}{8} = 2\frac{8}{24} + 2\frac{3}{24} \\ = 4\frac{11}{24}$$

$$6. 7\frac{3}{4} - 2\frac{2}{9} = 7\frac{27}{36} - 2\frac{8}{36} \\ = 5\frac{19}{36}$$

$$7. 3\frac{6}{11} + 1\frac{1}{2} = 3\frac{12}{22} + 1\frac{11}{22} \\ = 4\frac{23}{22} \\ = 5\frac{1}{22}$$

$$8. 3\frac{8}{13} - \frac{7}{26} = 3\frac{16}{26} - \frac{7}{26} \\ = 3\frac{9}{26}$$

$$9. 8\frac{2}{15} + 2\frac{4}{5} = 8\frac{2}{15} + 2\frac{12}{15} \\ = 10\frac{14}{15}$$

Exercise 4

No.	Fraction	Whole Number	Product
1.	$\frac{1}{3}$	12	$\frac{1}{3} \times 12 = 4$
2.	$\frac{2}{5}$	25	$\frac{2}{5} \times 25 = 10$
3.	$\frac{5}{6}$	18	$\frac{5}{6} \times 18 = 15$
4.	$\frac{3}{4}$	16	$\frac{3}{4} \times 16 = 12$
5.	$\frac{13}{16}$	8	$\frac{13}{16} \times 8 = \frac{13}{2} = 6\frac{1}{2}$
6.	$\frac{7}{12}$	20	$\frac{7}{12} \times 20 = \frac{35}{3} = 11\frac{2}{3}$

Exercise 5

	\times	$\frac{2}{5}$	$\frac{1}{3}$	$\frac{3}{7}$	$\frac{3}{4}$	$\frac{5}{9}$	$\frac{1}{2}$	$\frac{2}{7}$	$\frac{7}{9}$	$\frac{2}{3}$	$\frac{1}{5}$
1.	$\frac{1}{4}$	$\frac{1}{10}$	$\frac{1}{12}$	$\frac{3}{28}$	$\frac{3}{16}$	$\frac{5}{36}$	$\frac{1}{8}$	$\frac{1}{14}$	$\frac{7}{36}$	$\frac{1}{6}$	$\frac{1}{20}$
2.	$\frac{4}{5}$	$\frac{8}{25}$	$\frac{4}{15}$	$\frac{12}{35}$	$\frac{3}{5}$	$\frac{4}{9}$	$\frac{2}{5}$	$\frac{8}{35}$	$\frac{28}{45}$	$\frac{8}{15}$	$\frac{4}{25}$
3.	$\frac{4}{13}$	$\frac{8}{65}$	$\frac{4}{39}$	$\frac{12}{91}$	$\frac{3}{13}$	$\frac{20}{117}$	$\frac{2}{13}$	$\frac{8}{91}$	$\frac{28}{117}$	$\frac{8}{39}$	$\frac{4}{65}$
4.	$\frac{5}{12}$	$\frac{1}{6}$	$\frac{5}{36}$	$\frac{5}{28}$	$\frac{5}{16}$	$\frac{25}{108}$	$\frac{5}{24}$	$\frac{5}{42}$	$\frac{35}{108}$	$\frac{5}{18}$	$\frac{1}{12}$
5.	$\frac{1}{11}$	$\frac{2}{55}$	$\frac{1}{33}$	$\frac{3}{77}$	$\frac{3}{44}$	$\frac{5}{99}$	$\frac{1}{22}$	$\frac{2}{77}$	$\frac{7}{99}$	$\frac{2}{33}$	$\frac{1}{55}$

Exercise 6

1. $\frac{3}{2} \times \frac{3}{7} = \frac{9}{14}$

2. $\frac{3^6}{1^5} \times \frac{5^1}{8^4} = \frac{3}{4}$

3. $\frac{1^2}{3} \times \frac{7}{4^2} = \frac{7}{6}$
 $= 1\frac{1}{6}$

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

5. $3\frac{1}{2} \times 4 = \frac{7}{2} \times \frac{2}{1} 4$
 $= 14$

6. $2\frac{1}{5} \times 10 = \frac{11}{5} \times 10^2$
 $= 22$

7. $5 \times 4\frac{3}{10} = \frac{5^1}{1} \times \frac{43}{10^2}$
 $= \frac{43}{2}$
 $= 21\frac{1}{2}$

8. $12 \times 3\frac{3}{4} = \frac{12^3}{1} \times \frac{15}{4^1}$
 $= 45$

Perform

Exercise 1

1. (4)

$$\frac{75}{825} = \frac{1}{11}$$

2. (1)

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

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

3. (1)

$$\begin{aligned}\frac{2}{3} + 6 \times \frac{1}{3} - \frac{5}{7} \\ &= \frac{2}{3} + 2 - \frac{5}{7} \\ &= 2\frac{2}{3} - \frac{5}{7} \\ &= 2\frac{14}{21} - \frac{15}{21} \\ &= 1\frac{35}{21} - \frac{15}{21} \\ &= 1\frac{20}{21}\end{aligned}$$

4. (2)

$$\begin{aligned}\frac{3}{17} \times \frac{14^2}{5} \\ &= \frac{6}{5} \\ &= 1\frac{1}{5}\end{aligned}$$

5. (3)

$$\frac{5}{17} \times 91 = 65$$

6. (4)

$$\begin{aligned}\frac{7}{10} &\rightarrow 560 \\ \frac{1}{10} &\rightarrow 560 \div 7 = 80 \\ \frac{10}{10} &\rightarrow 10 \times 80 = 800\end{aligned}$$

The number is 800.

Exercise 2

$$\begin{aligned}1. \quad 15 \div 4 &= \frac{15}{4} \\ &= 3\frac{3}{4} \text{ cm}\end{aligned}$$

Each piece was $3\frac{3}{4}$ cm long.

$$\begin{aligned}2. \quad \frac{14}{6} &= 2\frac{2}{6} \\ &= 2\frac{1}{3}\end{aligned}$$

Each child received $2\frac{1}{3}$ bars of chocolate.

$$\begin{aligned}3. \quad \frac{50}{12} &= 4\frac{2}{12} \\ &= 4\frac{1}{6} \text{ cm}\end{aligned}$$

Each piece of ribbon was $4\frac{1}{6}$ cm long.

$$4. \quad \frac{4}{3} = 1\frac{1}{3} \text{ l}$$

There was $1\frac{1}{3}$ l of water in each container.

$$5. \quad \frac{22}{5} = 4\frac{2}{5}$$

Each child received $4\frac{2}{5}$ cookies.

$$6. \quad \frac{4}{6} = \frac{2}{3}$$

Each share was $\frac{2}{3}$.

Exercise 3

$$\begin{aligned}1. \quad \frac{3}{10} + \frac{2}{10} &= \frac{5}{10} \\ &= \frac{1}{2}\end{aligned}$$

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

$\frac{1}{2}$ of the rice was left.

$$\begin{aligned}2. \quad \frac{1}{2} + \frac{4}{5} &= \frac{5}{10} + \frac{8}{10} \\ &= \frac{13}{10} \\ &= 1\frac{3}{10} \text{ km}\end{aligned}$$

Ken jogged $1\frac{3}{10}$ km.

$$\begin{aligned}
 3. \quad & 5 - 1\frac{2}{5} - 1\frac{1}{3} \\
 & = 5 - 1\frac{6}{15} - 1\frac{5}{15} \\
 & = 3\frac{9}{15} - 1\frac{5}{15} \\
 & = 2\frac{4}{15} \text{ m}
 \end{aligned}$$

The length of third piece was $2\frac{4}{15}$ m.

$$\begin{aligned}
 4. \quad & 2\frac{1}{2} + \frac{7}{12} + 2\frac{1}{2} \\
 & = 5 + \frac{7}{12} \\
 & = 5\frac{7}{12} \text{ h}
 \end{aligned}$$

He took $5\frac{7}{12}$ h to travel to and fro.

$$\begin{aligned}
 5. \quad & 1 - \frac{3}{8} - \frac{1}{4} = 1 - \frac{3}{8} - \frac{2}{8} \\
 & = \frac{5}{8} - \frac{2}{8} \\
 & = \frac{3}{8}
 \end{aligned}$$

$\frac{3}{8}$ of the storybook was not read.

Exercise 4

$$\begin{aligned}
 1. \quad & 1 - \frac{2}{5} = \frac{3}{5} \\
 & \frac{3}{5} \times 200 = 120
 \end{aligned}$$

120 apples were green.

2. Perimeter of square

$$\begin{aligned}
 & = 4 \times 2\frac{3}{8} \text{ m} \\
 & = 4 \times \frac{19}{8} \text{ m} \\
 & = \frac{19}{2} \text{ m} \\
 & = 9\frac{1}{2} \text{ m}
 \end{aligned}$$

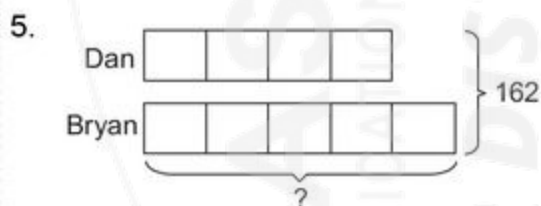
$$\begin{aligned}
 3. \quad & 1 - \frac{1}{3} = \frac{2}{3} \\
 & \frac{2}{3} \rightarrow 84 \text{ stamps} \\
 & \frac{1}{3} \rightarrow 84 \div 2 = 42 \text{ stamps} \\
 & \frac{3}{3} \rightarrow 3 \times 42 = 126 \text{ stamps}
 \end{aligned}$$

He had 126 stamps at first.

$$\begin{aligned}
 4. \quad & 1\frac{5}{10} \times \frac{7}{10} \text{ kg} = \frac{7}{2} \text{ kg} \\
 & = 3\frac{1}{2} \text{ kg} \\
 & 1\frac{2}{4} \times \frac{3}{4} \text{ kg} = \frac{3}{2} \text{ kg} \\
 & = 1\frac{1}{2} \text{ kg}
 \end{aligned}$$

$$3\frac{1}{2} \text{ kg} + 1\frac{1}{2} \text{ kg} = 5 \text{ kg}$$

The total weight of the items she bought was 5 kg.



9 units = 162 game cards

$$\begin{aligned}
 1 \text{ unit} & = 162 \div 9 \\
 & = 18 \text{ game cards}
 \end{aligned}$$

$$\begin{aligned}
 5 \text{ units} & = 5 \times 18 \\
 & = 90 \text{ game cards}
 \end{aligned}$$

Bryan collected 90 game cards.

$$\begin{aligned}
 6. \quad & 1 - \frac{1}{4} = \frac{3}{4} \\
 & \frac{1}{8} \times \frac{3}{4} = \frac{1}{8}
 \end{aligned}$$

Jim ate $\frac{1}{8}$ of the whole pizza.

7. Mass of sugar packed

$$= \frac{4}{19} \times 45^5$$

$$= 20 \text{ kg}$$

Mass of sugar in each bag

$$= 20 \text{ kg} \div 3$$

$$= \frac{20}{3} \text{ kg}$$

$$= 6\frac{2}{3} \text{ kg}$$

The mass of sugar in each bag is

$$6\frac{2}{3} \text{ kg.}$$

Achieve

Exercise 1

1. Fraction of flour left

$$= 1 - \frac{5}{8} - \frac{1}{5}$$

$$= \frac{40}{40} - \frac{25}{40} - \frac{8}{40}$$

$$= \frac{7}{40}$$

Amount of flour left

$$= \frac{7}{40} \times 60^3 \text{ kg}$$

$$= \frac{21}{2} \text{ kg}$$

$$= 10\frac{1}{2} \text{ kg}$$

$$10\frac{1}{2} \text{ kg of flour was left.}$$

2. $\frac{7}{8} \times 288 = 252$

$$252 \times \$3 = \$756$$

$$288 - 252 = 36$$

$$36 \times \$2 = \$72$$

$$\$756 + \$72 = \$828$$

She received **\$828** altogether.

3. $5 \times 18 = 90$

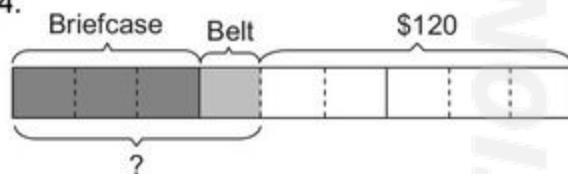
$$\frac{3}{7} \rightarrow 90 \text{ pens}$$

$$\frac{1}{7} \rightarrow 90 \div 3 = 30 \text{ pens}$$

$$\frac{7}{7} \rightarrow 7 \times 30 = 210 \text{ pens}$$

The shopkeeper had **210 pens** at first.

- 4.



$$5 \text{ units} = \$120$$

$$1 \text{ unit} = \$120 \div 5$$

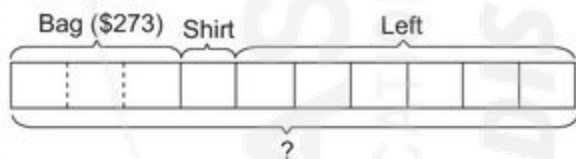
$$= \$24$$

$$4 \text{ units} = 4 \times \$24$$

$$= \$96$$

He spent **\$96** in all.

- 5.



$$\frac{3}{5} = \frac{6}{10}$$

$$3 \text{ units} = \$273$$

$$1 \text{ unit} = \$273 \div 3$$

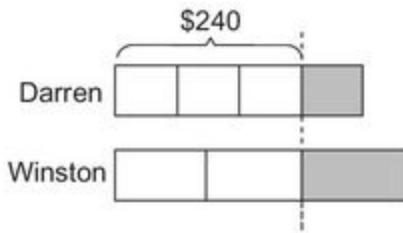
$$= \$91$$

$$10 \text{ units} = 10 \times \$91$$

$$= \$910$$

He had **\$910** at first.

6.



$$\begin{aligned} 3 \text{ units} &= \$240 \\ 1 \text{ unit} &= \$240 \div 3 \\ &= \$80 \\ 4 \text{ units} &= 4 \times \$80 \\ &= \$320 \end{aligned}$$

Darren had **\$320** at first.

$$\begin{aligned} 2 \text{ parts} &= \$240 \\ 1 \text{ part} &= \$240 \div 2 \\ &= \$120 \\ 3 \text{ parts} &= 3 \times \$120 \\ &= \$360 \end{aligned}$$

Winston had **\$360** at first.

7. $\frac{4}{7} \rightarrow 12 \text{ T-shirts} + 4 \text{ pairs of socks}$
 $= (12 \times 4) + 4 \leftarrow 1 \text{ T-shirt} \rightarrow$
 $= 48 + 4 \quad \leftarrow 4 \text{ pairs of socks}$
 $= 52 \text{ pairs of socks}$

$$\frac{1}{7} \rightarrow 52 \div 4 = 13 \text{ pairs of socks}$$

$$\frac{3}{7} \rightarrow 3 \times 13 = 39 \text{ pairs of socks}$$

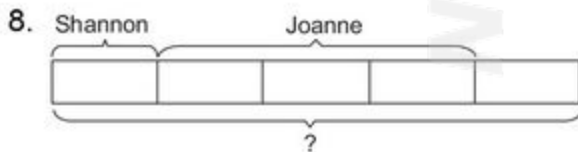
$$39 - 3 = 36$$

$$36 \div 4 = 9$$

She bought **9** more T-shirts.

$$12 + 9 = 21$$

She bought **21** T-shirts altogether.

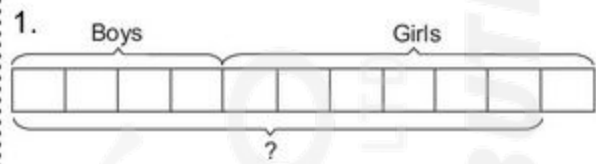


$$\begin{aligned} 3 \text{ units} - 1 \text{ unit} &= 2 \text{ units} \\ 2 \text{ units} &= 24 \text{ bracelets} \\ 1 \text{ unit} &= 24 \div 2 \\ &= 12 \text{ bracelets} \\ 5 \text{ units} &= 5 \times 12 \\ &= 60 \text{ bracelets} \end{aligned}$$

Anna made **60** bracelets.

Challenge

Exercise 1



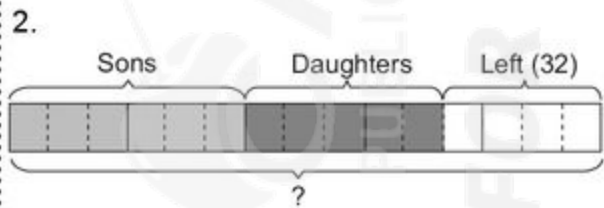
$$7 \text{ units} - 4 \text{ units} = 3 \text{ units}$$

$$3 \text{ units} = 84 \text{ children}$$

$$\begin{aligned} 1 \text{ unit} &= 84 \div 3 \\ &= 28 \text{ children} \end{aligned}$$

$$\begin{aligned} 11 \text{ units} &= 11 \times 28 \\ &= 308 \text{ children} \end{aligned}$$

There are **308** children altogether.



$$4 \text{ units} = 32 \text{ biscuits}$$

$$\begin{aligned} 1 \text{ unit} &= 32 \div 4 \\ &= 8 \text{ biscuits} \end{aligned}$$

$$\begin{aligned} 15 \text{ units} &= 15 \times 8 \\ &= 120 \text{ biscuits} \end{aligned}$$

She bought **120** biscuits.

3.



$$5 \text{ units} = 15 \text{ animals}$$

$$1 \text{ unit} = 15 \div 5 \\ = 3 \text{ animals}$$

$$8 \text{ units} = 8 \times 3 \\ = 24 \text{ animals}$$

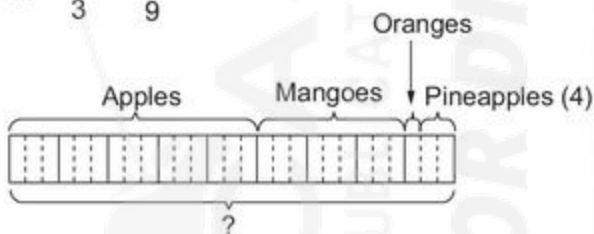
There are **24** hamsters.

$$4. \quad 12 \times \frac{3}{5} \text{ m} = \frac{36}{5} \text{ m} \\ = 7\frac{1}{5} \text{ m}$$

$$7\frac{1}{5} \text{ m} + 6 \text{ m} = 13\frac{1}{5} \text{ m}$$

The length of the roll of ribbon was $13\frac{1}{5}$ m.

$$5. \quad \frac{1}{3} = \frac{3}{9}$$



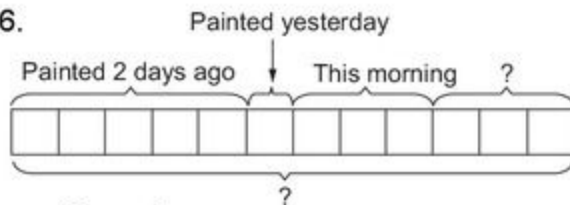
$$2 \text{ units} = 4 \text{ fruits}$$

$$1 \text{ unit} = 4 \div 2 \\ = 2 \text{ fruits}$$

$$27 \text{ units} = 27 \times 2 \\ = 54 \text{ fruits}$$

Mr Tan bought **54** fruits altogether.

6.



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

$\frac{1}{4}$ of the wall remains unpainted.

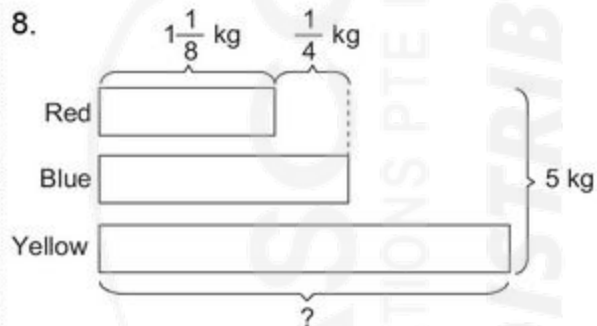
$$7. \quad 320 - 180 - 56 = 84$$

$$1 - \frac{2}{7} = \frac{5}{7}$$

$$\frac{5}{7} \times 84 = 60$$

He had **60** trading cards left.

8.



$$1\frac{1}{8} \text{ kg} + \frac{1}{4} \text{ kg}$$

$$= 1\frac{1}{8} \text{ kg} + \frac{2}{8} \text{ kg}$$

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

The mass of the blue marbles was $1\frac{3}{8}$ kg.

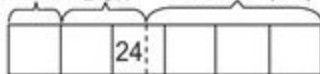
$$1\frac{1}{8} \text{ kg} + 1\frac{3}{8} \text{ kg} = 2\frac{4}{8} \text{ kg}$$

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

$$5 \text{ kg} - 2\frac{1}{2} \text{ kg} = 2\frac{1}{2} \text{ kg}$$

The mass of the yellow marbles in the container is $2\frac{1}{2}$ kg.

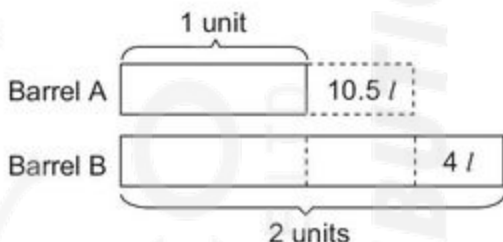
9. Anna Ben Charlie (80)



$$\begin{aligned} 4 \text{ units} &= 24 + 80 \\ &= 104 \text{ sweets} \\ 1 \text{ unit} &= 104 \div 4 \\ &= 26 \text{ sweets} \\ 6 \text{ units} &= 6 \times 26 \\ &= 156 \text{ sweets} \end{aligned}$$

There were **156** sweets in the bag at first.

- 10.

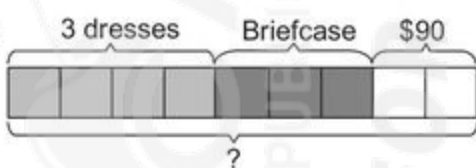


$$\begin{aligned} 1 \text{ unit} &= 10.5 \text{ l} + 4 \text{ l} \\ &= 14.5 \text{ l} \end{aligned}$$

$$14.5 \text{ l} + 10.5 \text{ l} = 25 \text{ l}$$

There were **25 l** of wine in each barrel at first.

- 11.



$$\begin{aligned} \text{(a)} \quad 2 \text{ units} &= \$90 \\ 1 \text{ unit} &= \$90 \div 2 \\ &= \$45 \\ 9 \text{ units} &= 9 \times \$45 \\ &= \$405 \end{aligned}$$

She had **\$405** at first.

$$\begin{aligned} \text{(b)} \quad 4 \text{ units} &= 4 \times \$45 \\ &= \$180 \\ \$180 \div 3 &= \$60 \end{aligned}$$

Each dress was **\$60**.

Unit 4 Area of a Triangle

Drills

Exercise 1

- | | |
|-------|-------|
| 1. AC | 2. AC |
| 3. AD | 4. AB |
| 5. BE | 6. AD |

Exercise 2

- | | |
|-------|-------|
| 1. BC | 2. AC |
| 3. CD | 4. BC |
| 5. AD | 6. CE |

Exercise 3

- $\frac{1}{2} \times 10 \times 8 = 40 \text{ cm}^2$
- $\frac{1}{2} \times 12 \times 7 = 42 \text{ cm}^2$
- $\frac{1}{2} \times 14 \times 6 = 42 \text{ cm}^2$
- $\frac{1}{2} \times 8 \times 9 = 36 \text{ cm}^2$

Exercise 4

- Area of rectangle ABCD
 $= 17 \times 11$
 $= 187 \text{ m}^2$

Area of $\triangle AED$

$$\begin{aligned} &= \frac{1}{2} \times 17 \times 11 \\ &= 93.5 \text{ m}^2 \end{aligned}$$

Total shaded area

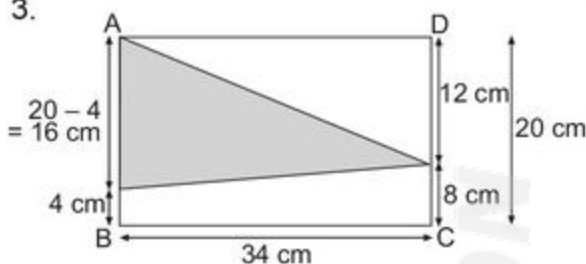
$$\begin{aligned} &= 187 \text{ m}^2 - 93.5 \text{ m}^2 \\ &= 93.5 \text{ m}^2 \end{aligned}$$

2. Area of $\triangle ACD$

$$= \frac{1}{2} \times 8 \times 9$$

$$= 36 \text{ cm}^2$$

3.

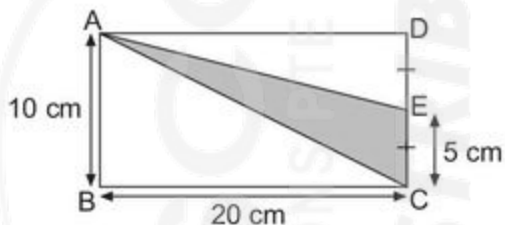


Shaded area

$$= \frac{1}{2} \times 16 \times 34$$

$$= 272 \text{ cm}^2$$

4.



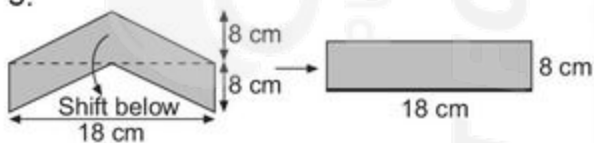
$$CE = 10 \text{ cm} \div 2 = 5 \text{ cm}$$

Shaded area

$$= \frac{1}{2} \times 5 \times 20$$

$$= 50 \text{ cm}^2$$

5.



Shaded area

$$= 18 \times 8$$

$$= 144 \text{ cm}^2$$

6. $AB = \frac{1}{4} \times 20 \text{ cm}$

$$= 5 \text{ cm}$$

Shaded area

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

$$= 30 \text{ cm}^2$$

7. $BC = 10 - 4 - 4 = 2 \text{ m}$

Shaded area

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

$$= 14 \text{ m}^2$$

8. $AB = 12 \text{ cm} \div 2 = 6 \text{ cm}$

Area of $\triangle ABH$

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

$$= 18 \text{ cm}^2$$

Total area of shaded parts

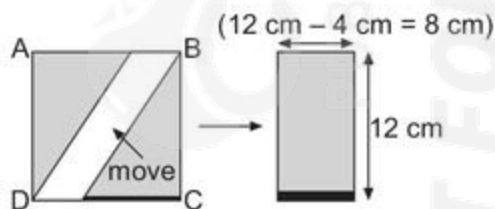
$$= 2 \times 18 \text{ cm}^2$$

$$= 36 \text{ cm}^2$$

Perform

Exercise 1

1.



Total area of shaded parts

$$= 12 \times 8$$

$$= 96 \text{ cm}^2$$

2. Area of rectangular cardboard
 $= 48 \times 32$
 $= 1536 \text{ cm}^2$

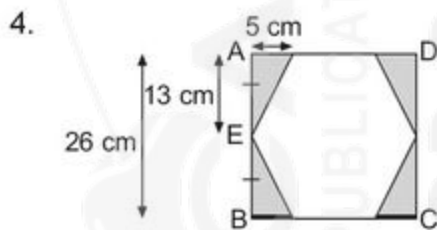
Area of sticker
 $= \frac{1}{2} \times 30 \times 24$
 $= 360 \text{ cm}^2$

Area of cardboard not covered by the sticker
 $= 1536 \text{ cm}^2 - 360 \text{ cm}^2$
 $= 1176 \text{ cm}^2$

3. Area of $\triangle ABC$
 $= \frac{1}{2} \times 12 \times 16$
 $= 96 \text{ cm}^2$

Area of $\triangle BDC$
 $= \frac{1}{2} \times 12 \times 6$
 $= 36 \text{ cm}^2$

Area of shaded part
 $= 96 \text{ cm}^2 - 36 \text{ cm}^2$
 $= 60 \text{ cm}^2$



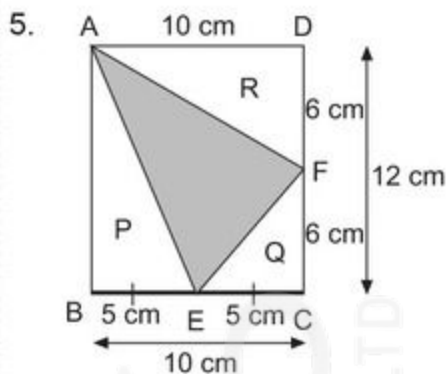
$AB = 104 \text{ cm} \div 4$
 $= 26 \text{ cm}$
 $AE = 26 \text{ cm} \div 2$
 $= 13 \text{ cm}$

Area of each shaded triangle
 $= \frac{1}{2} \times 5 \times 13$
 $= 32.5 \text{ cm}^2$

Area of 4 shaded triangles
 $= 4 \times 32.5 \text{ cm}^2$
 $= 130 \text{ cm}^2$

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

Area of unshaded part of square
 $= 676 \text{ cm}^2 - 130 \text{ cm}^2$
 $= 546 \text{ cm}^2$



$BE = 10 \text{ cm} \div 2 = 5 \text{ cm}$
 $CF = 12 \text{ cm} \div 2 = 6 \text{ cm}$

Area of $\triangle P$
 $= \frac{1}{2} \times 5 \times 12$
 $= 30 \text{ cm}^2$

Area of $\triangle Q$
 $= \frac{1}{2} \times 5 \times 6$
 $= 15 \text{ cm}^2$

Area of $\triangle R$
 $= \frac{1}{2} \times 10 \times 6$
 $= 30 \text{ cm}^2$

Area of rectangle ABCD
 $= 12 \times 10$
 $= 120 \text{ cm}^2$

Area of $\triangle AEF$
 $= 120 \text{ cm}^2 - (30 \text{ cm}^2 + 15 \text{ cm}^2 + 30 \text{ cm}^2)$
 $= 120 \text{ cm}^2 - 75 \text{ cm}^2$
 $= 45 \text{ cm}^2$

$$\begin{aligned} 6. \text{ Length of square} &= 72 \text{ cm} \div 4 \\ &= 18 \text{ cm} \end{aligned}$$

$$\begin{aligned} \text{Area of square} &= 18 \times 18 \\ &= 324 \text{ cm}^2 \end{aligned}$$

$$\begin{aligned} \text{Area of } \triangle ABC &= \frac{1}{2} \times 80 \times 60 \\ &= 2400 \text{ cm}^2 \end{aligned}$$

$$\begin{aligned} \text{Area of shaded part of figure} &= 2400 \text{ cm}^2 - 324 \text{ cm}^2 \\ &= 2076 \text{ cm}^2 \end{aligned}$$

$$\begin{aligned} 7. \text{ Length of square} &= 16 \text{ cm} \div 2 \\ &= 8 \text{ cm} \end{aligned}$$

$$\begin{aligned} \text{Area of square} &= 8 \times 8 \\ &= 64 \text{ cm}^2 \end{aligned}$$

$$\begin{aligned} \text{Area of triangle} &= \frac{1}{2} \times 15 \times 16 \\ &= 120 \text{ cm}^2 \end{aligned}$$

$$\begin{aligned} \text{Total area of shaded parts} &= 64 \text{ cm}^2 + 120 \text{ cm}^2 \\ &= 184 \text{ cm}^2 \end{aligned}$$

$$8. \text{ AD} = 8 \text{ cm} \div 2 = 4 \text{ cm}$$

$$\begin{aligned} \text{Area of rectangle ABCD} &= 8 \times 4 \\ &= 32 \text{ cm}^2 \end{aligned}$$

$$\begin{aligned} \text{Area of } \triangle EFG &= \frac{1}{2} \times 16 \times 8 \\ &= 64 \text{ cm}^2 \end{aligned}$$

$$\begin{aligned} \text{Total area of shaded parts} &= 64 \text{ cm}^2 - 32 \text{ cm}^2 \\ &= 32 \text{ cm}^2 \end{aligned}$$

$$\begin{aligned} 9. \text{ Length of square} &= 56 \text{ m} \div 4 \\ &= 14 \text{ m} \end{aligned}$$

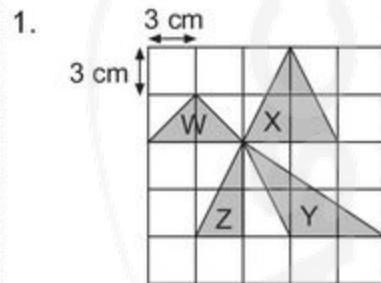
$$\begin{aligned} \text{Area of square ABCD} &= 14 \times 14 \\ &= 196 \text{ m}^2 \end{aligned}$$

$$\begin{aligned} \text{Area of two triangles} &= \text{Area of square of side 7 m} \\ &= 7 \times 7 \\ &= 49 \text{ m}^2 \end{aligned}$$

$$\begin{aligned} \text{Area of square left} &= 196 \text{ m}^2 - 49 \text{ m}^2 \\ &= 147 \text{ m}^2 \end{aligned}$$

Achieve

Exercise 1



$$\begin{aligned} \text{Area of } \triangle W &= \frac{1}{2} \times 6 \times 3 \\ &= 9 \text{ cm}^2 \end{aligned}$$

$$\begin{aligned} \text{Area of } \triangle X &= \frac{1}{2} \times 6 \times 6 \\ &= 18 \text{ cm}^2 \end{aligned}$$

$$\begin{aligned} \text{Area of } \triangle Y &= \frac{1}{2} \times 6 \times 6 \\ &= 18 \text{ cm}^2 \end{aligned}$$

Area of $\triangle Z$

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

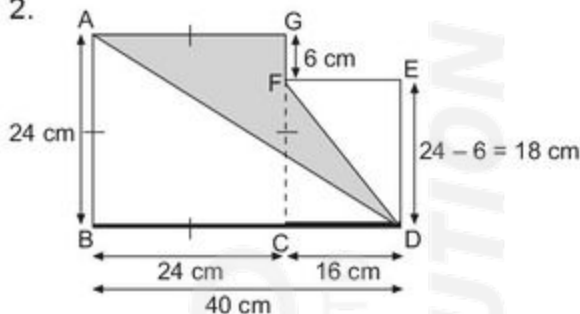
$$= 9 \text{ cm}^2$$

Total area of shaded figure

$$= 9 \text{ cm}^2 + 18 \text{ cm}^2 + 18 \text{ cm}^2 + 9 \text{ cm}^2$$

$$= 54 \text{ cm}^2$$

2.



Total area of square ABCD and rectangle CDEF

$$= (24 \times 24) + (18 \times 16)$$

$$= 576 + 288$$

$$= 864 \text{ cm}^2$$

Area of $\triangle ABD$

$$= \frac{1}{2} \times 40 \times 24$$

$$= 480 \text{ cm}^2$$

Area of $\triangle DEF$

$$= \frac{1}{2} \times 16 \times 18$$

$$= 144 \text{ cm}^2$$

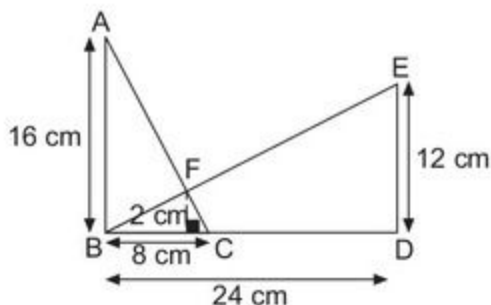
Area of shaded part

$$= 864 - (480 + 144)$$

$$= 864 - 624$$

$$= 240 \text{ cm}^2$$

3.



$$AB = 2 \times 8 \text{ cm} = 16 \text{ cm}$$

$$BD = 3 \times 8 \text{ cm} = 24 \text{ cm}$$

Area of $\triangle ABC$

$$= \frac{1}{2} \times 8 \times 16$$

$$= 64 \text{ cm}^2$$

Area of $\triangle BDE$

$$= \frac{1}{2} \times 24 \times 12$$

$$= 144 \text{ cm}^2$$

Area of $\triangle BCF$

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

$$= 8 \text{ cm}^2$$

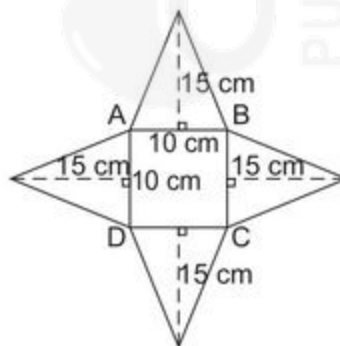
Area of figure ABCDEF

$$= (64 \text{ cm}^2 + 144 \text{ cm}^2) - 8 \text{ cm}^2$$

$$= 208 \text{ cm}^2 - 8 \text{ cm}^2$$

$$= 200 \text{ cm}^2$$

4.



$$\text{Length of square} = 40 \text{ cm} \div 4$$

$$= 10 \text{ cm}$$

Area of square

$$= 10 \times 10$$

$$= 100 \text{ cm}^2$$

Area of each triangle

$$= \frac{1}{2} \times 10 \times 15$$

$$= 75 \text{ cm}^2$$

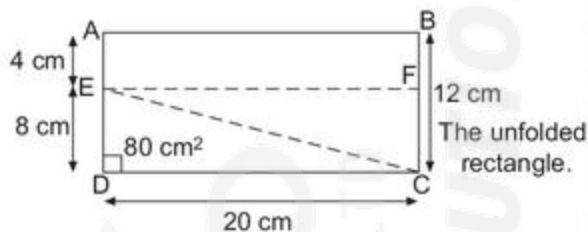
Area of figure

$$= 4 \times \text{Area of triangle} + \text{Area of square}$$

$$= (4 \times 75 \text{ cm}^2) + 100 \text{ cm}^2$$

$$= 400 \text{ cm}^2$$

5.



$$AE = \frac{1}{3} \times 12 \text{ cm} = 4 \text{ cm}$$

Area of rectangle CDEF

$$= 2 \times 80 \text{ cm}^2$$

$$= 160 \text{ cm}^2$$

$$CD = 160 \text{ cm}^2 \div 8 \text{ cm}$$

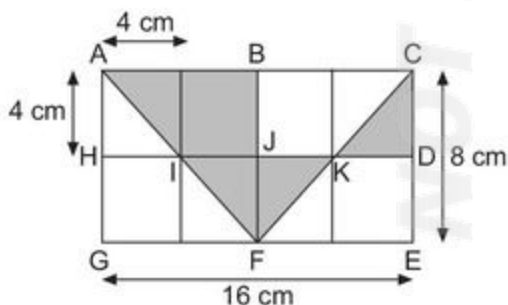
$$= 20 \text{ cm}$$

Area of ABCD before it was folded

$$= 20 \times 12$$

$$= 240 \text{ cm}^2$$

6. Divide 4 rectangles into 8 identical squares.



Length of each small square

$$= 16 \text{ cm} \div 4$$

$$= 4 \text{ cm}$$

Area of each small square

$$= 4 \times 4$$

$$= 16 \text{ cm}^2$$

Total area of shaded parts

$$= 3 \times \text{Area of small square}$$

$$= 3 \times 16 \text{ cm}^2$$

$$= 48 \text{ cm}^2$$

Challenge

Exercise 1

1. Perimeter of each square = 32 cm
Length of each square = $32 \text{ cm} \div 4$
 $= 8 \text{ cm}$

Area of each square

$$= 8 \times 8$$

$$= 64 \text{ cm}^2$$

Area of figure

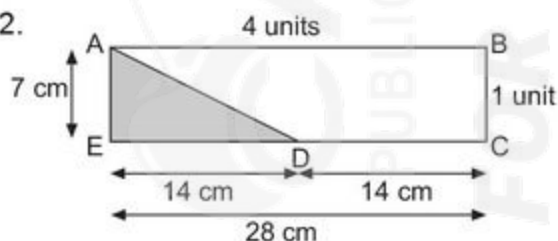
$$= 7 \times \text{Area of square}$$

$$= 7 \times 64 \text{ cm}^2$$

$$= 448 \text{ cm}^2$$

The area of the figure is **448 cm²**.

2.



Perimeter = 70 cm

10 units = 70 cm

$$1 \text{ unit} = 70 \text{ cm} \div 10$$

$$= 7 \text{ cm (Breadth)}$$

$$4 \text{ units} = 4 \times 7 \text{ cm}$$

$$= 28 \text{ cm (Length)}$$

$$DE = 28 \text{ cm} \div 2$$

$$= 14 \text{ cm}$$

Area of $\triangle ADE$

$$= \frac{1}{2} \times 14 \times 7$$
$$= 49 \text{ cm}^2$$

The area of triangle ADE is 49 cm^2 .

3. Length of square = 28 cm
Base of triangle = $28 \text{ cm} \div 4 = 7 \text{ cm}$
Height of triangle = $\frac{1}{2} \times 28 \text{ cm}$
 $= 14 \text{ cm}$

Area of square
 $= 28 \times 28$
 $= 784 \text{ cm}^2$

Area of triangle
 $= \frac{1}{2} \times 7 \times 14$
 $= 49 \text{ cm}^2$

Required fraction = $\frac{49}{784}$
 $= \frac{1}{16}$

The required fraction is $\frac{1}{16}$.

4. 2 right-angled triangles equals 1 square of side 6 cm.

Area of square cardboard = 225 cm^2
 $15 \times 15 = 225$

The length of each side of the square cardboard is 15 cm.

$$15 \div 6 = 2 \text{ R } 3$$

$$2 \times 2 = 4$$

4 squares of side 6 cm can be cut.

$$4 \times 2 = 8$$

8 triangles can be cut from the square cardboard.

Unit 5 Ratio

Drills

Exercise 1

No.	Ratio	Simplest form
1.	14 : 20	7 : 10
2.	8 : 24	1 : 3
3.	12 : 60	1 : 5
4.	9 : 18	1 : 2
5.	6 : 30	1 : 5
6.	5 : 15	1 : 3
7.	16 : 48	1 : 3
8.	21 : 49	3 : 7
9.	36 : 54	2 : 3
10.	12 : 144	1 : 12
11.	24 : 28	6 : 7
12.	32 : 64	1 : 2
13.	27 : 45	3 : 5
14.	28 : 63	4 : 9
15.	50 : 250	1 : 5

Exercise 2

1. Total number of stickers
 $= 21 + 30$
 $= 51$

$$\frac{\text{Leslie}}{\text{Total}} = \frac{21}{51}$$
$$= \frac{7}{17}$$

2. $\frac{\text{Charmaine}}{\text{Mother}} = \frac{21}{35}$
 $= \frac{3}{5}$

$$\begin{aligned}
 3. \quad & \text{Orange syrup} : \text{Water} \\
 & = 50 \text{ ml} : 2000 \text{ ml} \leftarrow 1 \text{ l} = 1000 \text{ ml} \\
 & = 1 : 40
 \end{aligned}$$

$$\begin{aligned}
 4. \quad & \text{Red} : \text{Blue} : \text{Green} \\
 & = 36 : 15 : 9 \\
 & = 12 : 5 : 3
 \end{aligned}$$

$$\begin{aligned}
 5. \quad & \text{Total number of necklaces and bracelets} \\
 & = 27 + 63 \\
 & = 90
 \end{aligned}$$

<u>Bracelets</u>	:	<u>Necklaces</u>	:	<u>Total</u>
= 63	:	27	:	90
= 21	:	9	:	30
= 7	:	3	:	10

$$\begin{aligned}
 6. \quad & 45 - 9 = 36 \\
 & \text{Derrick collected 36 stamps.}
 \end{aligned}$$

$$\begin{aligned}
 & \text{Total number of stamps} \\
 & = 45 + 36 \\
 & = 81
 \end{aligned}$$

<u>Derrick</u>	:	<u>Total</u>
= 36	:	81
= 4	:	9

$$\begin{aligned}
 7. \quad & \text{Total number of children} \\
 & = 28 + 22 \\
 & = 50
 \end{aligned}$$

<u>Girls</u>	:	<u>Boys</u>	:	<u>Total</u>
= 22	:	28	:	50
= 11	:	14	:	25

$$\begin{aligned}
 8. \quad & 48 + 12 = 60 \\
 & \text{There were 60 women.}
 \end{aligned}$$

<u>Women</u>	:	<u>Men</u>
= 60	:	48
= 10	:	8
= 5	:	4

Exercise 3

$$\begin{aligned}
 1. \quad & 5 \text{ units} + 7 \text{ units} = 12 \text{ units} \\
 & 12 \text{ units} = 36 \text{ pupils} \\
 & 1 \text{ unit} = 36 \div 12 \\
 & \quad = 3 \text{ pupils} \\
 & 5 \text{ units} = 5 \times 3 \\
 & \quad = 15 \text{ pupils}
 \end{aligned}$$

There are **15** boys.

$$\begin{aligned}
 2. \quad & 5 \text{ units} + 10 \text{ units} + 9 \text{ units} = 24 \text{ units} \\
 & 24 \text{ units} = 72 \text{ marbles} \\
 & 1 \text{ unit} = 72 \div 24 \\
 & \quad = 3 \text{ marbles} \\
 & 10 \text{ units} = 10 \times 3 \\
 & \quad = 30 \text{ marbles}
 \end{aligned}$$

Terry receives **30** marbles.

$$\begin{aligned}
 3. \quad & 4 \text{ units} = 36 \text{ kg} \\
 & 1 \text{ unit} = 36 \text{ kg} \div 4 \\
 & \quad = 9 \text{ kg} \\
 & 7 \text{ units} = 7 \times 9 \text{ kg} \\
 & \quad = 63 \text{ kg}
 \end{aligned}$$

Francis' mass is **63** kg.

$$\begin{aligned}
 4. \quad & 11 \text{ units} = 407 \text{ children} \\
 & 1 \text{ unit} = 407 \div 11 \\
 & \quad = 37 \text{ children} \\
 & 20 \text{ units} = 20 \times 37 \\
 & 11 \text{ units} + 9 \text{ units} = 740 \text{ children} \\
 & = 20 \text{ units}
 \end{aligned}$$

There are **740** children in the hall.

$$\begin{aligned}
 5. \quad & 2 \text{ units} = 6 \text{ cm} \\
 & 1 \text{ unit} = 6 \text{ cm} \div 2 \\
 & \quad = 3 \text{ cm} \\
 & 9 \text{ units} = 9 \times 3 \text{ cm} \\
 & \quad = 27 \text{ cm}
 \end{aligned}$$

The length of the longest piece of ribbon is **27** cm.

$$\begin{aligned}
 6. \quad 2 \text{ units} &= 1.4 \text{ l} \\
 1 \text{ unit} &= 1.4 \text{ l} \div 2 \\
 &= 0.7 \text{ l} \\
 7 \text{ units} &= 7 \times 0.7 \text{ l} \\
 &= 4.9 \text{ l}
 \end{aligned}$$

She used **4.9 l** of water.

$$\begin{aligned}
 7. \quad 5 \text{ units} + 9 \text{ units} &= 14 \text{ units} \\
 14 \text{ units} &= 350 \text{ stickers} \\
 1 \text{ unit} &= 350 \div 14 \\
 &= 25 \text{ stickers} \\
 9 \text{ units} &= 9 \times 25 \\
 &= 225 \text{ stickers}
 \end{aligned}$$

Sue received **225** stickers.

$$\begin{aligned}
 8. \quad 7 \text{ units} &= 308 \text{ beads} \\
 1 \text{ unit} &= 308 \div 7 \\
 &= 44 \text{ beads} \\
 \rightarrow 11 \text{ units} &= 11 \times 44 \\
 \left. \begin{array}{l} 4 \text{ units} + 7 \text{ units} \\ = 11 \text{ units} \end{array} \right\} &= 484 \text{ beads}
 \end{aligned}$$

There are **484** beads in the bottle altogether.

Perform

Exercise 1

$$\begin{array}{l}
 1. \quad (2) \\
 \times 8 \left(\begin{array}{c} 2 : X : 7 \\ \downarrow \quad \downarrow \\ \times 8 \quad \times 8 \end{array} \right) \times 8 \\
 = Y : 72 : 56
 \end{array}$$

$$X = 72 \div 8 = 9$$

$$Y = 2 \times 8 = 16$$

$$X = 9 \text{ and } Y = 16$$

$$\begin{array}{l}
 2. \quad (2) \\
 \div 7 \left(\begin{array}{c} 14 : 91 \\ \downarrow \quad \downarrow \\ \div 7 \quad \div 7 \end{array} \right) \div 7 \\
 = 2 : 13
 \end{array}$$

The missing number is **13**.

$$\begin{aligned}
 3. \quad (3) \\
 8 \text{ units} &= 88 \text{ stamps} \\
 1 \text{ unit} &= 88 \div 8 \\
 &= 11 \text{ stamps} \\
 \rightarrow 11 \text{ units} &= 11 \times 11 \\
 \left. \begin{array}{l} 8 \text{ units} + 3 \text{ units} \\ = 11 \text{ units} \end{array} \right\} &= 121 \text{ stamps}
 \end{aligned}$$

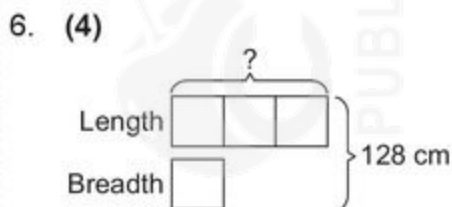
Maisy had **121** stamps in all.

$$\begin{aligned}
 4. \quad (2) \\
 20 \text{ units} - 13 \text{ units} &= 7 \text{ units} \\
 7 \text{ units} &= 42 \text{ people} \\
 1 \text{ unit} &= 42 \div 7 \\
 &= 6 \text{ people} \\
 20 \text{ units} &= 20 \times 6 \\
 &= 120 \text{ people}
 \end{aligned}$$

There are **120** women in the hall.

$$\begin{aligned}
 5. \quad (1) \\
 4 \text{ units} + 7 \text{ units} + 5 \text{ units} &= 16 \text{ units} \\
 16 \text{ units} &= 240 \text{ cm} \\
 1 \text{ unit} &= 240 \text{ cm} \div 16 \\
 &= 15 \text{ cm} \\
 4 \text{ units} &= 4 \times 15 \\
 &= 60 \text{ cm}
 \end{aligned}$$

The length of the shortest piece of rope is **60 cm**.



$$\text{Length} + \text{Breadth} = 256 \text{ cm} \div 2 = 128 \text{ cm}$$

$$4 \text{ units} = 128 \text{ cm}$$

$$1 \text{ unit} = 128 \text{ cm} \div 4 = 32 \text{ cm}$$

$$3 \text{ units} = 3 \times 32 \text{ cm} = 96 \text{ cm}$$

Its length is **96 cm**.

7. (1)

$$9 \text{ units} - 4 \text{ units} = 5 \text{ units}$$

$$5 \text{ units} = 65 \text{ cupcakes}$$

$$1 \text{ unit} = 65 \div 5$$

$$= 13 \text{ cupcakes}$$

$$\rightarrow 13 \text{ units} = 13 \times 13$$

$$\begin{array}{l} 9 \text{ units} + 4 \text{ units} \\ = 13 \text{ units} \end{array} = 169 \text{ cupcakes}$$

Fanny distributed 169 cupcakes.

8. (4)

$$11 \text{ units} - 9 \text{ units} = 2 \text{ units}$$

$$2 \text{ units} = 24 \text{ cookies}$$

$$1 \text{ unit} = 24 \div 2$$

$$= 12 \text{ cookies}$$

$$15 \text{ units} = 15 \times 12$$

$$= 180 \text{ cookies}$$

Samuel received 180 cookies.

Exercise 2

1. $4 \text{ units} + 7 \text{ units} = 11 \text{ units}$

$$11 \text{ units} = 55 \text{ cm}$$

$$1 \text{ unit} = 55 \text{ cm} \div 11$$

$$= 5 \text{ cm}$$

$$\rightarrow 3 \text{ units} = 3 \times 5$$

$$\begin{array}{l} 7 \text{ units} - 4 \text{ units} \\ = 3 \text{ units} \end{array} = 15 \text{ cm}$$

The difference in length between the 2 pieces of string is 15 cm.

2. $12 \text{ units} + 9 \text{ units} = 21 \text{ units}$

$$21 \text{ units} = 315 \text{ children}$$

$$1 \text{ unit} = 315 \div 21$$

$$= 15 \text{ children}$$

$$\rightarrow 3 \text{ units} = 3 \times 15$$

$$\begin{array}{l} 12 \text{ units} - 9 \text{ units} \\ = 3 \text{ units} \end{array} = 45 \text{ children}$$

There are 45 fewer girls than boys.

3. $8 \text{ units} - 3 \text{ units} = 5 \text{ units}$

$$5 \text{ units} = \$235$$

$$1 \text{ unit} = \$235 \div 5$$

$$= \$47$$

$$8 \text{ units} = 8 \times \$47$$

$$= \$376$$

Janet received \$376.

4. $7 \text{ units} - 3 \text{ units} = 4 \text{ units}$

$$4 \text{ units} = 48 \text{ years}$$

$$1 \text{ unit} = 48 \div 4$$

$$= 12 \text{ years}$$

$$\rightarrow 10 \text{ units} = 10 \times 12$$

$$\begin{array}{l} 7 \text{ units} + 3 \text{ units} \\ = 10 \text{ units} \end{array} = 120 \text{ years}$$

Their total age is 120 years.

5. $6 \text{ units} + 3 \text{ units} + 9 \text{ units} = 18 \text{ units}$

$$18 \text{ units} = 90 \text{ mangoes}$$

$$1 \text{ unit} = 90 \div 18$$

$$= 5 \text{ mangoes}$$

$$\rightarrow 6 \text{ units} = 6 \times 5$$

$$\begin{array}{l} 9 \text{ units} - 3 \text{ units} \\ = 6 \text{ units} \end{array} = 30 \text{ mangoes}$$

Maggie receives 30 more mangoes than Jonathan.

6. $2 \text{ units} = 24 \text{ apples}$

$$1 \text{ unit} = 24 \div 2$$

$$= 12 \text{ apples}$$

$$\rightarrow 5 \text{ units} = 5 \times 12$$

$$\begin{array}{l} 12 \text{ units} - 7 \text{ units} \\ = 5 \text{ units} \end{array} = 60 \text{ apples}$$

There are 60 fewer green than red apples.

7. Area of square

$$= 8 \times 8$$

$$= 64 \text{ cm}^2$$

$$4 \text{ units} = 64 \text{ cm}^2$$

$$1 \text{ unit} = 64 \text{ cm}^2 \div 4$$

$$= 16 \text{ cm}^2$$

$$7 \text{ units} = 7 \times 16 \text{ cm}^2$$

$$= 112 \text{ cm}^2$$

The area of the rectangle is 112 cm².

$$\begin{aligned} \text{Length of rectangle} &= 112 \text{ cm}^2 \div 7 \text{ cm} \\ &= 16 \text{ cm} \end{aligned}$$

8. $2 \text{ units} + 3 \text{ units} = 5 \text{ units}$
 $5 \text{ units} = \$15$
 $1 \text{ unit} = \$15 \div 5$
 $= \$3$
 $2 \text{ units} = 2 \times \3
 $= \$6$
 $7 \times \$6 = \42

Raymond saves **\$42** in a week.

9. $2 \text{ units} = 64 \text{ stickers}$
 $1 \text{ unit} = 64 \div 2$
 $= 32 \text{ stickers}$
 $9 \text{ units} = 9 \times 32$
 $= 288 \text{ stickers}$
 $288 - 50 = 238 \text{ stickers}$

Rodney has **238** stickers left.

10. Adults : Children
 15 : 7
Adults : Boys : Girls
 $= 15$: 2 : 5

$$\begin{aligned} 15 \text{ units} + 2 \text{ units} + 5 \text{ units} &= 22 \text{ units} \\ 22 \text{ units} &= 1100 \text{ people} \\ 1 \text{ unit} &= 1100 \div 22 \\ &= 50 \text{ people} \\ 5 \text{ units} &= 5 \times 50 \\ &= 250 \text{ people} \end{aligned}$$

There are **250** girls.

11. $30 + 12 = 42$
 Marc had 42 sweets at first.

$$\begin{aligned} 3 \text{ units} &= 42 \text{ sweets} \\ 1 \text{ unit} &= 42 \div 3 \\ &= 14 \text{ sweets} \end{aligned}$$

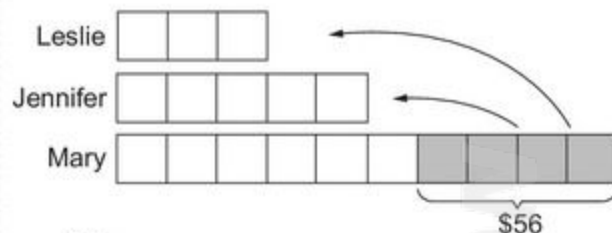
$$\begin{aligned} \rightarrow 7 \text{ units} &= 7 \times 14 \\ 3 \text{ units} + 4 \text{ units} &= 98 \text{ sweets} \\ &= 7 \text{ units} \end{aligned}$$

There were **98** sweets in the bag at first.

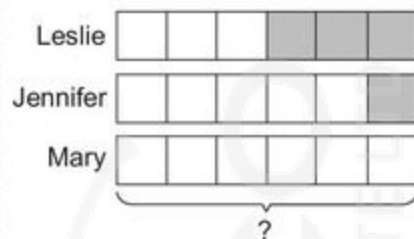
Achieve

Exercise 1

1. Before:



After:



$$\begin{aligned} 3 \text{ units} + 5 \text{ units} + 10 \text{ units} &= 18 \text{ units} \\ 18 \text{ units} \div 3 &= 6 \text{ units} \end{aligned}$$

Each of them had **6** units in the end.

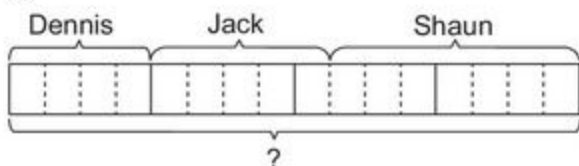
$$\begin{aligned} 4 \text{ units} &= \$56 \\ 1 \text{ unit} &= \$56 \div 4 \\ &= \$14 \\ 6 \text{ units} &= 6 \times \$14 \\ &= \$84 \end{aligned}$$

Mary had **\$84** left.

2. $5 \text{ units} = 15.5 \text{ m}$
 $1 \text{ unit} = 15.5 \text{ m} \div 5$
 $= 3.1 \text{ m}$
 $\rightarrow 15 \text{ units} = 15 \times 3.1 \text{ m}$
 $7 \text{ units} + 8 \text{ units} = 46.5 \text{ m}$
 $= 15 \text{ units}$

The length of the original piece of rope was **46.5** m.

3.



$$7 \text{ units} - 4 \text{ units} = 3 \text{ units}$$

$$3 \text{ units} = 21 \text{ tickets}$$

$$1 \text{ unit} = 21 \div 3$$

$$= 7 \text{ tickets}$$

$$16 \text{ units} = 16 \times 7$$

$$= 112 \text{ tickets}$$

The three boys sold **112** tickets altogether.

4. Susan : Kelvin : Terence

$$3 : 7 : 4$$

$$\frac{1}{4} \times 4 \text{ units} = 1 \text{ unit}$$

New ratio:

Susan : Kelvin : Terence

$$3 : 7 : 3 \leftarrow \begin{array}{l} 4 \text{ units} - 1 \text{ unit} \\ = 3 \text{ units} \end{array}$$

$$7 \text{ units} - 3 \text{ units} = 4 \text{ units}$$

$$4 \text{ units} = \$180$$

$$1 \text{ unit} = \$180 \div 4$$

$$= \$45$$

$$\rightarrow 14 \text{ units} = 14 \times \$45$$

$$= \$630$$

$$\begin{array}{l} 3 \text{ units} + 7 \text{ units} \\ + 4 \text{ units} \\ = 14 \text{ units} \end{array}$$

The original sum of money shared by them was **\$630**.

5. John : Leslie : Jessica

$$2 : 5$$

$$3 : 8$$

$$6 : 15 : 40$$

$$46 \text{ units} = \$322$$

$$1 \text{ unit} = \$322 \div 46$$

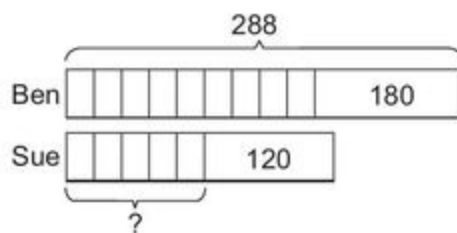
$$= \$7$$

$$15 \text{ units} = 15 \times \$7$$

$$= \$105$$

Leslie had **\$105**.

6.



$$9 \text{ units} = 288 - 180$$

$$= 108 \text{ beads}$$

$$1 \text{ unit} = 108 \div 9$$

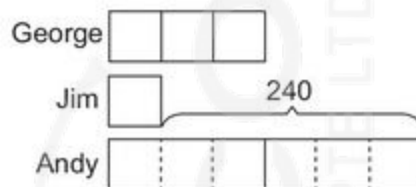
$$= 12 \text{ beads}$$

$$5 \text{ units} = 5 \times 12$$

$$= 60 \text{ beads}$$

Sue had **60** beads left.

7.

(a) Andy's stamps : Jim's stamps

$$6 : 1$$

The required ratio is **6 : 1**.

(b) 5 units = 240 stamps

$$1 \text{ unit} = 240 \div 5$$

$$= 48 \text{ stamps}$$

$$6 \text{ units} = 6 \times 48$$

$$= 288 \text{ stamps}$$

Andy has **288** stamps.

$$288 \div 4 = 72$$

There are **72** stamps in each album.

Challenge

Exercise 1

1. 5 units + 8 units = 13 units

$$\begin{aligned}13 \text{ units} &= 312 \text{ items} \\1 \text{ unit} &= 312 \div 13 \\&= 24 \text{ items} \\12 \text{ units} &= 12 \times 24 \\&= 288 \text{ items}\end{aligned}$$

There are 288 pens.

$$288 \times \$1.80 = \$518.40.$$

\$518.40 can be collected from the sale of all the pens.

2. 6 units = 90 sweets
1 unit = $90 \div 6$
= 15 sweets (Melvin)
5 units = 5×15
= 75 sweets (Jessica)
9 units = 9×15
= 135 sweets (Bryan)

$$75 - 12 = 63$$

Jessica had 63 sweets left.

$$15 - 10 = 5$$

Melvin had 5 sweets left.

$$135 - 22 = 113$$

Bryan had 113 sweets left.

3. 12 units - 7 units = 5 units
5 units = 15 cm
1 unit = $15 \text{ cm} \div 5$
= 3 cm
12 units = $12 \times 3 \text{ cm}$
= 36 cm (Length)
7 units = $7 \times 3 \text{ cm}$
= 21 cm (Breadth)

$$\begin{aligned}\text{Perimeter of Rectangle A} \\&= 36 + 21 + 36 + 21 \\&= 114 \text{ cm}\end{aligned}$$

$$\begin{aligned}6 \text{ parts} &= 114 \text{ cm} \\1 \text{ part} &= 114 \text{ cm} \div 6 \\&= 19 \text{ cm} \\5 \text{ parts} &= 5 \times 19 \text{ cm} \\&= 95 \text{ cm}\end{aligned}$$

The perimeter of Rectangle B is 95 cm.

4. Before:

$$\begin{array}{l} \text{Wei Jun} : \text{Jing Kai} \\ \times 2 \left(\begin{array}{l} 7 : 11 \\ \downarrow \quad \uparrow \\ 14 : 22 \end{array} \right) \times 2 \\ = 14 : 22 \end{array}$$

After:

$$\begin{array}{l} \text{Wei Jun} : \text{Jing Kai} \\ \times 11 \left(\begin{array}{l} 1 : 2 \\ \downarrow \quad \uparrow \\ 11 : 22 \end{array} \right) \times 11 \\ = 11 : 22 \end{array}$$

$$\begin{aligned}14 \text{ units} - 11 \text{ units} &= 3 \text{ units} \\3 \text{ units} &= 12 \text{ marbles} \\1 \text{ unit} &= 12 \div 3 \\&= 4 \text{ marbles} \\22 \text{ units} &= 22 \times 4 \\&= 88 \text{ marbles}\end{aligned}$$

Jing Kai had 88 marbles.

5. Sheep : Goats : Horses
7 : 5 : 4

$$\begin{aligned}5 \text{ units} - 4 \text{ units} &= 1 \text{ unit} \\1 \text{ unit} &= 6 \text{ animals} \\16 \text{ units} &= 16 \times 6 \leftarrow \begin{array}{l} 7 + 5 + 4 \\ = 16 \text{ units} \end{array} \\&= 96 \text{ animals}\end{aligned}$$

$$1 - \frac{3}{7} = \frac{4}{7}$$

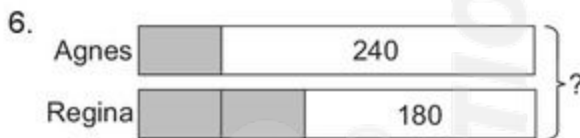
$$\frac{4}{7} \rightarrow 96 \text{ animals}$$

$$\frac{1}{7} \rightarrow 96 \div 4 = 24 \text{ animals}$$

$$\frac{7}{7} \rightarrow 7 \times 24 = 168 \text{ animals}$$

$$168 - 12 - 15 = 141$$

141 animals were left in the farm.



$$1 \text{ unit} = 240 - 180$$

$$= 60 \text{ cookies}$$

$$3 \text{ units} = 3 \times 60$$

$$= 180 \text{ cookies}$$

$$180 + 240 + 180 = 600$$

Both of them baked **600** cookies altogether.

7. $5 \text{ units} - 3 \text{ units} = 2 \text{ units}$

$$2 \text{ units} = 20 \text{ children}$$

$$1 \text{ unit} = 20 \div 2$$

$$= 10 \text{ children}$$

$$8 \text{ units} = 8 \times 10$$

$$= 80 \text{ children}$$

$$1 - \frac{4}{9} = \frac{5}{9}$$

$$\frac{5}{9} \rightarrow 80 \text{ children}$$

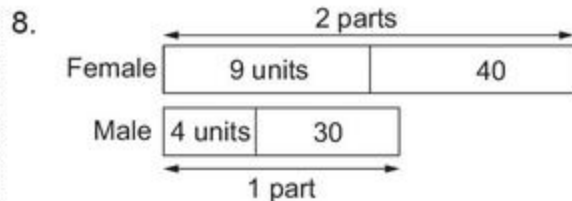
$$\frac{1}{9} \rightarrow 80 \div 5 = 16 \text{ children}$$

$$\frac{4}{9} \rightarrow 4 \times 16 = 64 \text{ children}$$

There are 64 Chinese children.

$$64 - 9 = 55$$

55 Chinese children are left in the childcare centre.



$$9 \text{ units} + 40 = 8 \text{ units} + 60$$

$$1 \text{ unit} = 60 - 40$$

$$= 20 \text{ guests}$$

$$4 \text{ units} = 4 \times 20$$

$$= 80 \text{ guests}$$

$$80 + 30 = 110$$

110 more female than male guests attended the wedding.

9. $\text{Red} : \text{Blue} : \text{Green}$

$$\times 2 \left(\begin{array}{ccc} 6 & : & 7 \\ \hline 12 & : & 14 \end{array} \right) \times 2$$

$$= 12 : 14 : 17$$

$$17 \text{ units} - 12 \text{ units} = 5 \text{ units}$$

$$5 \text{ units} = 30 \text{ buttons}$$

$$1 \text{ unit} = 30 \div 5$$

$$= 6 \text{ buttons}$$

$$\rightarrow 43 \text{ units} = 43 \times 6$$

$$12 \text{ units} + 14 \text{ units} = 258 \text{ buttons}$$

$$+ 17 \text{ units}$$

$$= 43 \text{ units}$$

There are 258 buttons in the container altogether.

10. $\text{Before: } \frac{50\text{¢ coins}}{5} : \frac{\$1 \text{ coins}}{2}$

$$\text{After: } \frac{50\text{¢ coins}}{5} : \frac{\$1 \text{ coins}}{4} \quad \left. \vphantom{\frac{50\text{¢ coins}}{5}} \right\} + 2$$

$$2 \text{ units} = 10 \text{ coins}$$

$$1 \text{ unit} = 10 \div 2$$

$$= 5 \text{ coins}$$

$$5 \text{ units} = 5 \times 5$$

$$= 25 \text{ coins}$$

There were 25 fifty-cent coins.

$$25 \times 50\text{¢} = \$12.50.$$

The total value of the fifty-cent coins Jack had was **\$12.50**.

Unit 6 Decimals

Drills

Exercise 1

Value	Rounded off to 1 decimal place
45.87	45.9
63.02	63.0
87.99	88.0
154.73	154.7
238.98	239.0

Exercise 2

Value	Rounded off to 2 decimal places
32.867	32.87
76.046	76.05
148.807	146.81
326.675	326.68
860.998	861.00

Exercise 3

Value	Rounded off to 1 decimal place
$\frac{1}{4}$	$0.25 \approx 0.3$
$\frac{7}{8}$	$0.875 \approx 0.9$
$\frac{9}{12}$	$0.75 \approx 0.8$
$\frac{18}{25}$	$0.72 \approx 0.7$
$\frac{39}{50}$	$0.78 \approx 0.8$

Exercise 4

Value	Rounded off to 2 decimal places
$\frac{4}{7}$	0.57
$\frac{9}{11}$	0.82
$\frac{12}{17}$	0.71
$\frac{13}{20}$	0.65
$\frac{19}{30}$	0.63

Exercise 5

- $5.34 \times 10 = 53.4$
- $67.5 \times 10 = 675$
- $0.43 \times 100 = 43$
- $45.8 \times 100 = 4580$
- $34.83 \times 1000 = 34\ 830$
- $789.6 \times 1000 = 789\ 600$
- $0.07 \times 10 = 0.7$
- $0.95 \times 1000 = 950$
- 30.5×20
 $= 30.5 \times 2 \times 10$
 $= 61 \times 10$
 $= 610$
- 0.6×300
 $= 0.6 \times 3 \times 100$
 $= 1.8 \times 100$
 $= 180$

$$\begin{aligned} 11. \quad & 0.85 \times 4000 \\ & = 0.85 \times 4 \times 1000 \\ & = 3.4 \times 1000 \\ & = \mathbf{3400} \end{aligned}$$

$$\begin{aligned} 12. \quad & 5.7 \times 40 \\ & = 5.7 \times 4 \times 10 \\ & = 22.8 \times 10 \\ & = \mathbf{228} \end{aligned}$$

$$\begin{aligned} 13. \quad & 7.14 \times 800 \\ & = 7.14 \times 8 \times 100 \\ & = 57.12 \times 100 \\ & = \mathbf{5712} \end{aligned}$$

$$\begin{aligned} 14. \quad & 8.41 \times 4000 \\ & = 8.41 \times 4 \times 1000 \\ & = 33.64 \times 1000 \\ & = \mathbf{33\ 640} \end{aligned}$$

$$\begin{aligned} 15. \quad & 10.4 \times 6000 \\ & = 10.4 \times 6 \times 1000 \\ & = 62.4 \times 1000 \\ & = \mathbf{62\ 400} \end{aligned}$$

Exercise 6

$$1. \quad 12.9 \div 10 = \mathbf{1.29}$$

$$2. \quad 9.45 \div 100 = \mathbf{0.0945}$$

$$3. \quad 92.3 \div 1000 = \mathbf{0.0923}$$

$$4. \quad 65.5 \div 100 = \mathbf{0.655}$$

$$5. \quad 387 \div 1000 = \mathbf{0.387}$$

$$6. \quad 40 \div 100 = \mathbf{0.4}$$

$$7. \quad 5 \div 1000 = \mathbf{0.005}$$

$$\begin{aligned} 8. \quad & 0.08 \div 20 \\ & = 0.08 \div 2 \div 10 \\ & = 0.04 \div 10 \\ & = \mathbf{0.004} \end{aligned}$$

$$\begin{aligned} 9. \quad & 10.2 \div 600 \\ & = 10.2 \div 6 \div 100 \\ & = 1.7 \div 100 \\ & = \mathbf{0.017} \end{aligned}$$

$$\begin{aligned} 10. \quad & 6.5 \div 50 \\ & = 6.5 \div 5 \div 10 \\ & = 1.3 \div 10 \\ & = \mathbf{0.13} \end{aligned}$$

$$\begin{aligned} 11. \quad & 81.9 \div 900 \\ & = 81.9 \div 9 \div 100 \\ & = 9.1 \div 100 \\ & = \mathbf{0.091} \end{aligned}$$

$$\begin{aligned} 12. \quad & 306 \div 2000 \\ & = 306 \div 2 \div 1000 \\ & = 153 \div 1000 \\ & = \mathbf{0.153} \end{aligned}$$

$$\begin{aligned} 13. \quad & 360.6 \div 6000 \\ & = 360.6 \div 6 \div 1000 \\ & = 60.1 \div 1000 \\ & = \mathbf{0.0601} \end{aligned}$$

$$\begin{aligned} 14. \quad & 99.2 \div 400 \\ & = 99.2 \div 4 \div 100 \\ & = 24.8 \div 100 \\ & = \mathbf{0.248} \end{aligned}$$

$$\begin{aligned} 15. \quad & 296 \div 8000 \\ & = 296 \div 8 \div 1000 \\ & = 37 \div 1000 \\ & = \mathbf{0.037} \end{aligned}$$

3. $0.185 \text{ l} = 185 \text{ ml}$

$$6 \times 220 \text{ ml} = 1320 \text{ ml}$$

$$10 \times 185 \text{ ml} = 1850 \text{ ml}$$

$$1320 \text{ ml} + 1850 \text{ ml} = 3170 \text{ ml}$$

6 such mugs and 10 such cups can hold **3170 ml** of coffee.

4. Breadth = $102 \text{ cm}^2 \div 12 \text{ cm}$
 $= 8.5 \text{ cm}$
 Perimeter = $12 + 8.5 + 12 + 8.5$
 $= 41 \text{ cm}$

5. $1 - 0.54 = 0.46$
 $0.54 - 0.46 = 0.08$
 $0.08 \times 850 = 68$

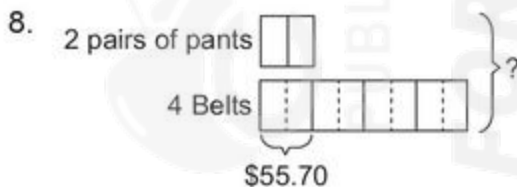
There are **68** fewer boys than girls.

6. $25 \div 5 = 5$
 $5 \times \$2.80 = \14

Sean paid **\$14** for 25 apples.

7. $0.4 \times 240 = 96$
 $240 - 96 - 46 = 98$

She had **98** seashells left.



$$2 \text{ units} = \$55.70$$

$$1 \text{ unit} = \$55.70 \div 2$$

$$= \$27.85$$

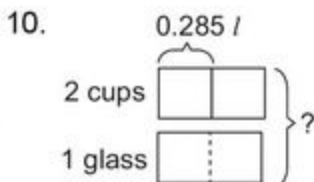
$$10 \text{ units} = 10 \times \$27.85$$

$$= \$278.50$$

James spent **\$278.50** altogether.

9. $7 \times 0.38 = 2.66 \text{ kg}$
 $5 - 2.66 - 0.25 = 2.09 \text{ kg}$

Jack had **2.09 kg** of flour left.



$$1 \text{ unit} = 0.285 \text{ l}$$

$$4 \text{ units} = 4 \times 0.285 \text{ l}$$

$$= 1.14 \text{ l}$$

$$1.14 \text{ l} \div 5 = 0.228 \text{ l}$$

The amount of mixture in each container was **0.228 l**.

Achieve

Exercise 1

1. $5 \times 55\text{¢} = \$2.75$
 $\$74.75 - \$2.75 = \$72$
 $\$72 \div 12 = \6
 Each watermelon costs \$6.

$$\$6 + 55\text{¢} = \$6.55$$

Each rock melon costs \$6.55.

$$10 \times \$6 = \$60$$

$$8 \times \$6.55 = \$52.40$$

$$\$60 + \$52.40 = \$112.40$$

The total cost of 8 rock melons and 10 watermelons is **\$112.40**.

2. $15 \times 2.48 \text{ kg} = 37.2 \text{ kg}$
 $20 \times 3.56 \text{ kg} = 71.2 \text{ kg}$

$$37.2 \text{ kg} + 71.2 \text{ kg} + 0.875 \text{ kg}$$

$$= 109.275 \text{ kg}$$

He had **109.275 kg** of flour at first.

3. $\$198.60 + \$95.40 = \$294$
Each briefcase cost \$294.
- Cost of 1 set of 1 briefcase and 1 jacket
= $\$294 + \198.60
= $\$492.60$

$$\$1447.80 = \$492.60 + \$492.60 + \$492.60$$

He bought **3** briefcases.

4. $\$54 \div 40 = \1.35
Each ruler cost \$1.35.

$$\$1.35 - \$0.45 = \$0.90$$

Each eraser cost \$0.90.

$$\$54 \div \$0.90 = 5400 \div 90$$

$$= 60$$

He would be able to buy **60** erasers.

5. Xavier \rightarrow 55 units
Charles \rightarrow 100 units

Xavier : Charles : Alicia

$$55 : 100$$

$$70 : 100$$

$$385 : 700 : 1000$$

$$1000 \text{ units} - 385 \text{ units} = 615 \text{ units}$$

$$700 \text{ units} = 70 \text{ marks}$$

$$1 \text{ unit} = 70 \div 700$$

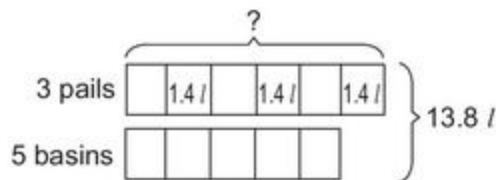
$$= 0.1 \text{ marks}$$

$$615 \text{ units} = 615 \times 0.1$$

$$= 61.5 \text{ marks}$$

Alicia scored **61.5** marks more than Xavier.

6.



$$8 \text{ units} = 13.8 \text{ l} - (3 \times 1.4 \text{ l})$$

$$= 13.8 \text{ l} - 4.2 \text{ l}$$

$$= 9.6 \text{ l}$$

$$1 \text{ unit} = 9.6 \text{ l} \div 8$$

$$= 1.2 \text{ l}$$

$$3 \text{ units} = 3 \times 1.2 \text{ l}$$

$$= 3.6 \text{ l}$$

$$3.6 \text{ l} + (3 \times 1.4 \text{ l})$$

$$= 3.6 \text{ l} + 4.2 \text{ l}$$

$$= 7.8 \text{ l}$$

The total capacity of 3 such pails is **7.8 l**.

Challenge

Exercise 1

1. Pail A

1 unit	4 l
--------	-----

 } 32 l
Pail B

--

$$2 \text{ units} = 32 \text{ l} - 4 \text{ l}$$

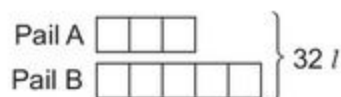
$$= 28 \text{ l}$$

$$1 \text{ unit} = 28 \text{ l} \div 2$$

$$= 14 \text{ l (Pail B)}$$

$$14 \text{ l} + 4 \text{ l} = 18 \text{ l (Pail A)}$$

Pail A contains 18 l of water and Pail B contains 14 l of water.

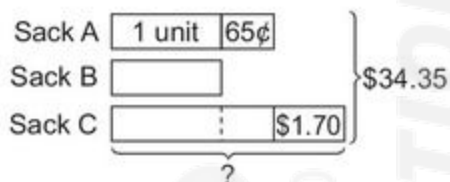


$$\begin{aligned}
 8 \text{ parts} &= 32 \text{ l} \\
 1 \text{ part} &= 32 \text{ l} \div 8 \\
 &= 4 \text{ l} \\
 3 \text{ parts} &= 3 \times 4 \text{ l} \\
 &= 12 \text{ l}
 \end{aligned}$$

$$18 \text{ l} - 12 \text{ l} = 6 \text{ l}$$

Xiao Ling should transfer **6 l** of water from Pail A to Pail B.

2.

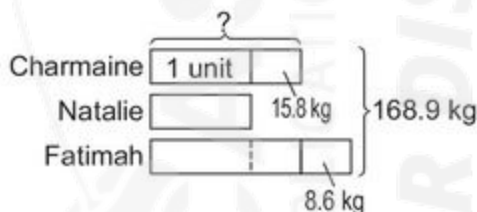


$$\begin{aligned}
 3 \text{ units} &= \$34.35 - 65¢ - 65¢ - \$1.70 \\
 &= \$31.35 \\
 1 \text{ unit} &= \$31.35 \div 3 \\
 &= \$10.45
 \end{aligned}$$

$$\$10.45 + 65¢ + \$1.70 = \$12.80$$

Sack C cost **\$12.80**.

3.



$$\begin{aligned}
 3 \text{ units} &= 168.9 \text{ kg} - 15.8 \text{ kg} - 15.8 \text{ kg} - 8.6 \text{ kg} \\
 &= 128.7 \text{ kg}
 \end{aligned}$$

$$\begin{aligned}
 1 \text{ unit} &= 128.7 \text{ kg} \div 3 \\
 &= 42.9 \text{ kg}
 \end{aligned}$$

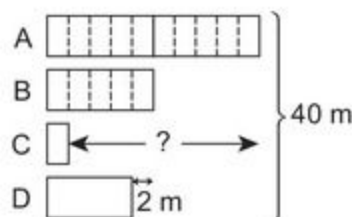
$$42.9 \text{ kg} + 15.8 \text{ kg} = 58.7 \text{ kg}$$

Charmaine's mass is **58.7 kg**.

4. $850 \text{ m} = 0.85 \text{ km}$
 Total distance walked
 $= 0.85 + (9 \times 0.25)$
 $= 0.85 + 2.25$
 $= 3.1 \text{ km}$

He walked **3.1 km** during the 10th training session.

5.



$$\begin{aligned}
 21 \text{ units} &= 40 \text{ m} + 2 \text{ m} \\
 &= 42 \text{ m} \\
 1 \text{ unit} &= 42 \text{ m} \div 21 \\
 &= 2 \text{ m} \\
 9 \text{ units} &= 9 \times 2 \text{ m} \\
 &= 18 \text{ m}
 \end{aligned}$$

The difference in length between the longest and the shortest pieces of rope is **18 m**.

6.

$$\begin{aligned}
 \frac{1}{5} \times 400 \text{ ml} &= 80 \text{ ml} \\
 120 \text{ ml} + 80 \text{ ml} &= 200 \text{ ml} \\
 \frac{3}{5} \times 200 \text{ ml} &= 120 \text{ ml} \\
 880 \text{ ml} + 120 \text{ ml} &= 1000 \text{ ml} \\
 &= 1 \text{ l}
 \end{aligned}$$

There was **1 l** of water in Basin C in the end.

7.

$$\begin{aligned}
 \$260 \div 2 &= \$130 \\
 \$130 \div 5 &= 26 \\
 &\text{He had 26 five-dollar notes left.} \\
 \\
 \$130 \div \$10 &= 13 \\
 &\text{He had 13 ten-dollar notes left.} \\
 \\
 65 - 26 - 13 - 18 &= 8 \\
 &\text{He used 8 five-dollar notes.}
 \end{aligned}$$

Unit 7 Rate

Drills

Exercise 1

1. $4 \text{ h} \rightarrow \50
 $1 \text{ h} \rightarrow \$50 \div 4 = \$12.50$

He is paid **\$12.50** per hour.

2. $5 \text{ min} \rightarrow 220 \text{ postcards}$
 $1 \text{ min} \rightarrow 220 \div 5 = 44 \text{ postcards}$

It can print **44** postcards per minute.

3. $9 \text{ min} \rightarrow 720 \text{ words}$
 $1 \text{ min} \rightarrow 720 \div 9 = 80 \text{ words}$

She can type **80** words per minute.

4. $5 \text{ l} \rightarrow 76 \text{ km}$
 $1 \text{ l} \rightarrow 76 \text{ km} \div 5 = 15.2 \text{ km}$

The car can travel **15.2 km** per litre of petrol.

5. $7 \text{ days} \rightarrow 889 \text{ toys}$
 $1 \text{ day} \rightarrow 889 \div 7 = 127 \text{ toys}$

It can make **127** toys per day.

Exercise 2

1. $1 \text{ min} \rightarrow 200 \text{ badges}$
 $60 \text{ min} \rightarrow 60 \times 200 = 12\,000 \text{ badges}$

It can make **12 000** badges in 1 hour.

2. $1 \text{ min} \rightarrow 24 \text{ l}$
 $8 \text{ min} \rightarrow 8 \times 24 \text{ l} = 192 \text{ l}$

192 l of water flows from the tap in 8 minutes.

8. R = Packet of rice and F = Packet of flour

$$\begin{aligned} \times 2 \left(\begin{aligned} 4 \text{ R} + 2 \text{ F} &\rightarrow 36.1 \text{ kg} \\ 8 \text{ R} + 4 \text{ F} &\rightarrow 2 \times 36.1 \text{ kg} \\ &= 72.2 \text{ kg} \\ 8 \text{ R} + 5 \text{ F} &\rightarrow 75.85 \text{ kg} \end{aligned} \right. \end{aligned}$$

$$\begin{aligned} 1 \text{ F} &\rightarrow 75.85 \text{ kg} - 72.2 \text{ kg} \\ &= 3.65 \text{ kg} \\ 3 \text{ F} &\rightarrow 3 \times 3.65 \text{ kg} \\ &= 10.95 \text{ kg} \end{aligned}$$

The mass of 3 packets of flour is **10.95 kg**.

9. (a) $32 \times \$16.80 = \537.60
 $18 \times \$8.90 = \160.20

$$\$537.60 + \$160.20 = \$697.80$$

Their total bill was **\$697.80**.

- (b) $15 \times \$13.50 = \202.50
 $\$264.60 - \$202.50 = \$62.10$
 $\$62.10 \div 9 = \6.90

He paid **\$6.90** for each child.



$$\begin{aligned} 5 \text{ units} \\ &= 3 \text{ l} - 750 \text{ ml} \\ &= 3000 \text{ ml} - 750 \text{ ml} \\ &= 2250 \text{ ml} \end{aligned}$$

$$\begin{aligned} 1 \text{ unit} &= 2250 \text{ ml} \div 5 \\ &= 450 \text{ ml} \end{aligned}$$

450 ml of water was in the pail at first.

3. 8 seconds \rightarrow 14 pages
 1 second \rightarrow $(\frac{14}{8})$ pages
 1 min = 60 seconds \rightarrow $60 \times \frac{14}{8}$
 $= 105$ pages

It can print **105 pages** in 1 minute.

4. 25 min \rightarrow 90 bookmarks
 1 min \rightarrow $(\frac{90}{25})$ bookmarks
 3 h = 180 min \rightarrow $180 \times \frac{90}{25}$
 $= 648$ bookmarks

It can make **648 bookmarks** in 3 hours.

Exercise 3

1. 75 pages \rightarrow 1 min
 1 page \rightarrow $(\frac{1}{75})$ min
 1800 pages \rightarrow $1800 \times \frac{1}{75}$
 $= 24$ min

It will take **24 min** to print 1800 pages.

2. 6 buttons \rightarrow 5 min
 1 button \rightarrow $(\frac{5}{6})$ min
 48 buttons \rightarrow $48 \times \frac{5}{6}$
 $= 40$ min

She took **40 min** to paint 48 buttons.

3. \$120 \rightarrow 8 h
 \$1 \rightarrow $(\frac{8}{120})$ h
 \$285 \rightarrow $285 \times \frac{8}{120} = 19$ h

He needs to work **19 h** to earn \$285.

4. 1800 bells \rightarrow 30 min
 1 bell \rightarrow $(\frac{30}{1800})$ min
 4320 bells \rightarrow $4320 \times \frac{30}{1800}$
 $= 72$ min
 $= 1$ h 12 min

It will take **1 h 12 min** to produce 4320 bells.

Perform

Exercise 1

1. (2)
 1 min \rightarrow 4.26 l = 4260 ml
 60 s \rightarrow 4260 ml
 1 s \rightarrow $4260 \text{ ml} \div 60 = 71$ ml

71 ml of water flows from the tap in 1 second.

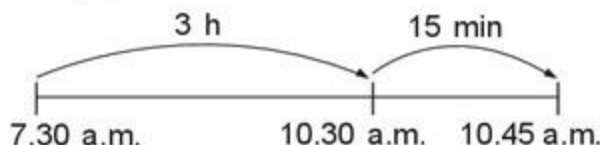
2. (2)
 1 h \rightarrow 2.4 km = 2400 m
 60 min \rightarrow 2400 m
 1 min \rightarrow $2400 \text{ m} \div 60 = 40$ m

He walks 40 m in a minute.

3. (2)
 1 h \rightarrow 348 key chains
 60 min \rightarrow 348 key chains
 1 min \rightarrow $\frac{348}{60}$ key chains
 45 min \rightarrow $45 \times \frac{348}{60}$
 $= 261$ key chains

It can produce 261 key chains in 45 minutes.

4. (4)



$$\begin{aligned} 3 \text{ h } 15 \text{ min} - 1 \text{ h} \\ = 2 \text{ h } 15 \text{ min} \\ = 5 \text{ half hours or part thereof} \end{aligned}$$

$$\begin{aligned} \text{Charges} \\ = \$6 + (5 \times \$2.50) \\ = \$6 + \$12.50 \\ = \$18.50 \end{aligned}$$

Exercise 2

- 7 days \rightarrow 26.6 l
1 day \rightarrow $26.6 \text{ l} \div 7 = 3.8 \text{ l}$
3 days \rightarrow $3 \times 3.8 \text{ l} = 11.4 \text{ l}$

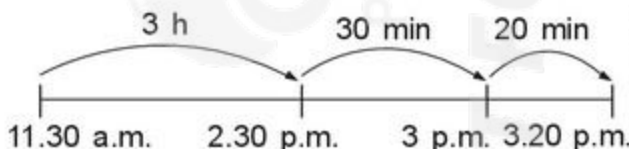
11.4 l of water are used in 3 such days.

- 8 days \rightarrow 640 packets
1 day \rightarrow $640 \div 8 = 80$ packets

$$80 \times 24 = 1920$$

It can produce 1920 whistles in 1 day.

3.



$$\begin{aligned} 3 \text{ h } 50 \text{ min} - 1 \text{ h} \\ = 2 \text{ h } 50 \text{ min} \\ = 6 \text{ half hours or part thereof} \end{aligned}$$

$$\begin{aligned} \text{Parking charges} \\ = \$2.50 + (6 \times \$1.60) \\ = \$2.50 + \$9.60 \\ = \$12.10 \end{aligned}$$

Peter must pay **\$12.10**.

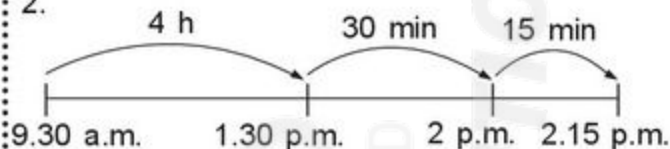
Achieve

Exercise 1

- $3 \times \$0.20 = \0.60
 $\$3.10 - \$0.60 = \$2.50$
 $\$2.50 \div \$0.50 = 5$
 $3 + 5 = 8$

The book was 8 days overdue.

2.



$$4 \text{ h} + 30 \text{ min} + 15 \text{ min} = 4 \text{ h } 45 \text{ min}$$

$$\begin{aligned} 4 \text{ h } 45 \text{ min} - 1 \text{ h} \\ = 3 \text{ h } 45 \text{ min} \\ = 8 \text{ half hours or part thereof} \end{aligned}$$

$$\begin{aligned} \text{Cost of car park for first hour} \\ = \$17.20 - (8 \times \$1.80) \\ = \$17.20 - \$14.40 \\ = \$2.80 \end{aligned}$$

The car park charge for the first hour was **\$2.80**.

- Postage charge
 $= \$5.20 + (4 \times \$1.10)$
 $= \$5.20 + \4.40
 $= \$9.60$

The postage charge was **\$9.60**.

- $\$11.80 - \$5.20 = \$6.60$
 $\$6.60 \div \$1.10 = 6$

$$\begin{aligned} \text{Maximum possible mass} \\ = 500 \text{ g} + (6 \times 100 \text{ g}) \\ = 500 \text{ g} + 600 \text{ g} \\ = 1100 \text{ g} \end{aligned}$$

The maximum possible mass of the parcel was **1100 g**.

4. $360 \text{ km} \rightarrow 25 \text{ l}$
 $1 \text{ km} \rightarrow \left(\frac{25}{360}\right) \text{ l}$
 $216 \text{ km} \rightarrow 216 \times \left(\frac{25}{360}\right) \text{ l} = 15 \text{ l}$
 $1 \text{ l} \rightarrow \2.25
 $15 \text{ l} \rightarrow 15 \times \$2.25 = \$33.75$

Mr Tan must pay **\$33.75** for petrol to travel a distance of 216 km.

5. Amount earned (Mon, Wed, Thu and Fri)
 $= 4 \times (8 \times \$8.40)$
 $= 4 \times \$67.20$
 $= \$268.80$

Amount earned (Tues)
 $= 8 \times (2 \times \$8.40)$
 $= 8 \times \$16.80$
 $= \$134.40$

Amount earned (Sat and Sun)
 $= 2 \times (8 \times \$11.10) \leftarrow \begin{matrix} \$8.40 + \$2.70 \\ = \$11.10 \end{matrix}$
 $= 2 \times \$88.80$
 $= \$177.60$

$\$268.80 + \$134.40 + \$177.60$
 $= \$580.80$

She was paid **\$580.80** that week.

Unit 8 Average

Drills

Exercise 1

No.	Items	No. of items	Total	Average
1.	6, 16 and 20	3	42	14
2.	16, 19 and 25	3	60	20
3.	21, 26 and 37	3	84	28
4.	22, 25 and 46	3	93	31
5.	37, 38 and 51	3	126	42
6.	28, 37, 39 and 52	4	156	39
7.	18, 32, 58 and 92	4	200	50
8.	27, 34, 71 and 80	4	212	53
9.	32, 45, 58 and 69	4	204	51
10.	65, 68, 93 and 102	4	328	82
11.	34, 51, 69 and 94	4	248	62
12.	21, 39, 53, 61 and 76	5	250	50
13.	28, 32, 53, 58 and 89	5	260	52
14.	42, 43, 57, 63 and 95	5	300	60
15.	42, 79, 81, 93 and 105	5	400	80

Exercise 2

1. Total = $32 \text{ kg} + 45 \text{ kg} + 67 \text{ kg}$
 $= 144 \text{ kg}$

$$\text{Average} = 144 \text{ kg} \div 3$$

$$= 48 \text{ kg}$$

2. Total = $120 \text{ cm} + 154 \text{ cm} + 179 \text{ cm}$
 $= 453 \text{ cm}$

$$\text{Average} = 453 \text{ cm} \div 3$$

$$= 151 \text{ cm}$$

$$\begin{aligned} 3. \text{ Total} &= 25 + 45 + 86 \\ &= 165 \end{aligned}$$

$$\begin{aligned} \text{Average} &= 165 \div 3 \\ &= 55 \end{aligned}$$

$$\begin{aligned} 4. \text{ Total} &= 2.5 \text{ l} + 2.8 \text{ l} + 3 \text{ l} + 4.5 \text{ l} \\ &= 12.8 \text{ l} \end{aligned}$$

$$\begin{aligned} \text{Average} &= 12.8 \text{ l} \div 4 \\ &= 3.2 \text{ l} \end{aligned}$$

$$\begin{aligned} 5. \text{ Total} &= \$27 + \$32 + \$56 + \$81 \\ &= \$196 \end{aligned}$$

$$\begin{aligned} \text{Average} &= \$196 \div 4 \\ &= \$49 \end{aligned}$$

$$\begin{aligned} 6. \text{ Total} &= 104 + 186 + 192 + 214 \\ &= 696 \end{aligned}$$

$$\begin{aligned} \text{Average} &= 696 \div 4 \\ &= 174 \end{aligned}$$

$$\begin{aligned} 7. \text{ Total} &= 430 \text{ g} + 547 \text{ g} + 700 \text{ g} \\ &\quad + 831 \text{ g} + 1032 \text{ g} \\ &= 3540 \text{ g} \end{aligned}$$

$$\begin{aligned} \text{Average} &= 3540 \text{ g} \div 5 \\ &= 708 \text{ g} \end{aligned}$$

$$\begin{aligned} 8. \text{ Total} &= 3.1 \text{ km} + 4.6 \text{ km} + 5.3 \text{ km} \\ &\quad + 6.7 \text{ km} + 9 \text{ km} \\ &= 28.7 \text{ km} \end{aligned}$$

$$\begin{aligned} \text{Average} &= 28.7 \text{ km} \div 5 \\ &= 5.74 \text{ km} \end{aligned}$$

$$\begin{aligned} 9. \text{ Total} &= \$214 + \$345 + \$457 + \$597 \\ &\quad + \$657 + \$820 \\ &= \$3090 \end{aligned}$$

$$\begin{aligned} \text{Average} &= \$3090 \div 6 \\ &= \$515 \end{aligned}$$

Exercise 3

$$\begin{aligned} 1. \text{ Total weight of the rice} \\ &= 5 \times 135 \text{ g} \\ &= 675 \text{ g} \end{aligned}$$

$$\begin{aligned} 2. \text{ Total number of candies} \\ &= 8 \times 864 \\ &= 6912 \end{aligned}$$

$$\begin{aligned} 3. \text{ Their total height} \\ &= 4 \times 1.24 \text{ m} \\ &= 4.96 \text{ m} \end{aligned}$$

$$\begin{aligned} 4. \text{ Total capacity} \\ &= 8 \times 9.4 \text{ l} \\ &= 75.2 \text{ l} \end{aligned}$$

$$\begin{aligned} 5. \text{ Total amount of money} \\ &= 7 \times \$636 \\ &= \$4452 \end{aligned}$$

$$\begin{aligned} 6. \text{ Total score} \\ &= 4 \times 79.5 \\ &= 318 \end{aligned}$$

$$\begin{aligned} 7. \text{ Total number of stamps} \\ &= 6 \times 486 \\ &= 2916 \end{aligned}$$

$$\begin{aligned} 8. \text{ Total number of stickers} \\ &= 5 \times 375 \\ &= 1875 \end{aligned}$$

Perform

Exercise 1

$$\begin{aligned} 1. \text{ (1)} \\ \text{Total weight} \\ &= 3.4 \text{ kg} + 5.2 \text{ kg} + 8.8 \text{ kg} \\ &= 17.4 \text{ kg} \end{aligned}$$

$$\begin{aligned} \text{Average weight} \\ &= 17.4 \text{ kg} \div 3 \\ &= 5.8 \text{ kg} \end{aligned}$$

2. (4)
Total score
= 4×76.5
= 306
3. (1)
 $3 \times 121 = 363$
 $363 - 142 - 173 = 48$
4. (2)
Total height of 3 boys
= $3 \times 1.76 \text{ m}$
= 5.28 m
- Total height of other 2 boys
= $5.28 \text{ m} - 1.56 \text{ m}$
= 3.72 m
5. (1)
 $36 - 16 = 20$
Helen made 20 necklaces.
- Total number of necklaces
= $36 + 20$
= 56
- Average
= $56 \div 2$
= 28 necklaces
6. (1)
Total
= $\$27 + (5 \times \$9)$
= $\$27 + \45
= $\$72$
- Average
= $\$72 \div 8$
= $\$9$
7. (1)
Total cost of 3 pencils
= $\frac{1}{3} \times \$9$
= $\$3$
- Average cost of 3 pencils
= $\$3 \div 3$
= $\$1$

Exercise 2

1. Total score of 7 children
= 7×80
= 560
- Total score of 3 girls
= 3×90
= 270
- Total score of 4 boys
= $560 - 270$
= 290
- Average score of 4 boys
= $290 \div 4$
= **72.5**
2. $14 \times 36.9 \text{ l} = 516.6 \text{ l}$
- The amount of petrol he used in a fortnight is **516.6 l**.
3. Total mass of 7 ladies
= $7 \times 60.8 \text{ kg}$
= 425.6 kg
- Total mass of other 5 ladies
= $425.6 \text{ kg} - 60.8 \text{ kg} - 70 \text{ kg}$
= 294.8 kg
- Average mass of other 5 ladies
= $294.8 \text{ kg} \div 5$
= **58.96 kg**
4. Total cost of 3 items
= $3 \times \$256$
= $\$768$
- Cost of camera
= $\$768 - \$204 - \$286$
= **\\$278**
5. Total cost
= $(10 \times \$4) + (20 \times \$1)$
= $\$40 + \20
= $\$60$

$$\begin{aligned} \text{Average cost} \\ &= \$60 \div 30 \\ &= \$2 \end{aligned}$$

$$\begin{aligned} 6. \text{ Total height} \\ &= 8 \times 96 \text{ cm} \\ &= 768 \text{ cm} \end{aligned}$$

$$\begin{aligned} 7. \text{ Perimeter of rectangle} \\ &= 35 + 21 + 35 + 21 \\ &= 112 \text{ cm} \end{aligned}$$

$$\begin{aligned} \text{Total perimeter} \\ &= 2 \times 104 \\ &= 208 \text{ cm} \end{aligned}$$

$$\begin{aligned} \text{Perimeter of square} \\ &= 208 \text{ cm} - 112 \text{ cm} \\ &= 96 \text{ cm} \end{aligned}$$

$$\begin{aligned} \text{Length of one side of square} \\ &= 96 \text{ cm} \div 4 \\ &= 24 \text{ cm} \end{aligned}$$

$$\begin{aligned} 8. \text{ Father's age} \\ &= 8 \times 6 \\ &= 48 \text{ years} \end{aligned}$$

$$\begin{aligned} \text{Total age} \\ &= 6 + 48 \\ &= 54 \text{ years} \end{aligned}$$

$$\begin{aligned} \text{Average age} \\ &= 54 \div 2 \\ &= 27 \text{ years} \end{aligned}$$

$$\begin{aligned} 9. \text{ Total cost of 7 dresses} \\ &= \$1088 - \$150 \\ &= \$938 \end{aligned}$$

$$\begin{aligned} \text{Average cost of other 7 dresses} \\ &= \$938 \div 7 \\ &= \$134 \end{aligned}$$

$$\begin{aligned} 10. \text{ Sum of 3 numbers} \\ &= 3 \times 17 \\ &= 51 \end{aligned}$$

$$\begin{aligned} \text{Sum of 4 other numbers} \\ &= 4 \times 45 \\ &= 180 \end{aligned}$$

$$\begin{aligned} \text{Total of 7 numbers} \\ &= 51 + 180 \\ &= 231 \end{aligned}$$

$$\begin{aligned} \text{Average of 7 numbers} \\ &= 231 \div 7 \\ &= 33 \end{aligned}$$

$$\begin{aligned} 11. \text{ Total mass of 5 girls} \\ &= 5 \times 45.4 \text{ kg} \\ &= 227 \text{ kg} \end{aligned}$$

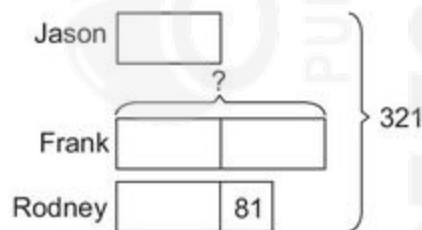
$$\begin{aligned} \text{Total mass of 6 girls} \\ &= 227 \text{ kg} + 52.6 \text{ kg} \\ &= 279.6 \text{ kg} \end{aligned}$$

$$\begin{aligned} \text{Average mass of 6 girls} \\ &= 279.6 \text{ kg} \div 6 \\ &= 46.6 \text{ kg} \end{aligned}$$

Achieve

Exercise 1

$$\begin{aligned} 1. \text{ Total number of stamps} \\ &= 3 \times 107 \\ &= 321 \end{aligned}$$



$$\begin{aligned} 4 \text{ units} &= 321 - 81 \\ &= 240 \text{ stamps} \\ 1 \text{ unit} &= 240 \div 4 \\ &= 60 \text{ stamps} \\ 2 \text{ units} &= 2 \times 60 \\ &= 120 \text{ stamps} \end{aligned}$$

Frank had **120** stamps.

2. Length of one side of square
 $= 144 \text{ cm} \div 4$
 $= 36 \text{ m}$

Area of square
 $= 36 \times 36$
 $= 1296 \text{ m}^2$

Total area of rectangle and square
 $= 2 \times 1032 \text{ m}^2$
 $= 2064 \text{ m}^2$

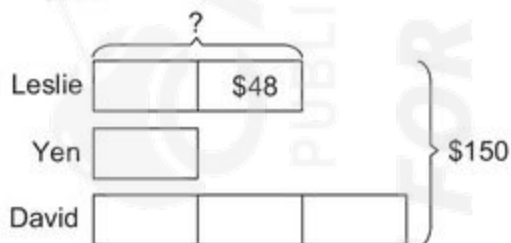
Area of rectangle
 $= 2064 \text{ m}^2 - 1296 \text{ m}^2$
 $= 768 \text{ m}^2$

Length of rectangle
 $= 768 \text{ m}^2 \div 16 \text{ m}$
 $= 48 \text{ m}$

Perimeter of rectangle
 $= 48 + 16 + 48 + 16$
 $= 128 \text{ m}$

The perimeter of the rectangle is **128 m**.

3. Total amount
 $= 3 \times \$50$
 $= \$150$



5 units $= \$150 - \48
 $= \$102$

1 unit $= \$102 \div 5$
 $= \$20.40$

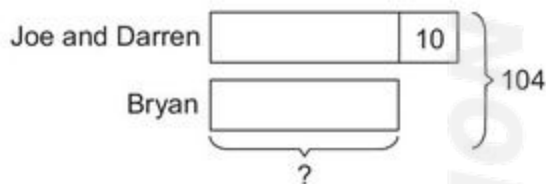
$\$20.40 + \$48 = \$68.40$

Leslie had **\$68.40**.

4. Total number of stickers
 $= 4 \times 36$
 $= 144$

$144 - 40 = 104$

Joe, Darren and Bryan had 104 stickers altogether.

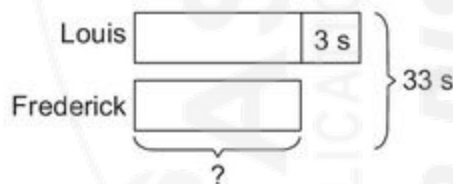


2 units $= 104 - 10$
 $= 94 \text{ stickers}$

1 unit $= 94 \div 2$
 $= 47 \text{ stickers}$

Bryan had **47 stickers**.

5. Total time taken
 $= 2 \times 16.5 \text{ s}$
 $= 33 \text{ s}$

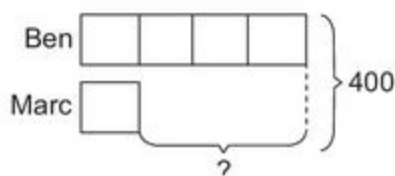


2 units $= 33 \text{ s} - 3 \text{ s}$
 $= 30 \text{ s}$

1 unit $= 30 \text{ s} \div 2$
 $= 15 \text{ s}$

Frederick's timing for the race is **15 seconds**.

6. Total number of marbles
 $= 2 \times 200$
 $= 400$



$$\begin{aligned} 5 \text{ units} &= 400 \text{ marbles} \\ 1 \text{ unit} &= 400 \div 5 \\ &= 80 \text{ marbles} \\ 3 \text{ units} &= 3 \times 80 \\ &= 240 \text{ marbles} \end{aligned}$$

Ben has **240** more marbles than Marc.

Challenge

Exercise 1

1. Cost of each book
 $= \$18 \div 3$
 $= \$6$

Cost of each file
 $= \$6 + \3
 $= \$9$

Total cost of 2 books and 18 files
 $= (2 \times \$6) + (18 \times \$9)$
 $= \$12 + \162
 $= \$174$

Average cost of each item
 $= \$174 \div 20$
 $= \$8.70$

The average amount he pays for each of the items is **\$8.70**.

2. Total savings
 $= 4 \times \$80$
 $= \$320$



$$\begin{aligned} 2 \text{ units} &= \$320 - \$40 \\ &= \$280 \\ 1 \text{ unit} &= \$280 \div 2 \\ &= \$140 \end{aligned}$$

$$\begin{aligned} \text{Amount Raymond saves} &= \$140 - \$80 \\ &= \$60 \end{aligned}$$

$$\begin{aligned} \text{Amount Jessica saves} &= \frac{2}{5} \times \$60 \\ &= \$24 \end{aligned}$$

$$\begin{aligned} \text{Amount Mandy saves} &= (\$140 + \$40) - \$24 \\ &= \$180 - \$24 \\ &= \$156 \end{aligned}$$

Mandy saves **\$156**.

3. $\frac{1}{4} \times 320 = 80$

Mei Fang had 80 cookies left.

$$320 - 80 = 240$$

She gave 240 cookies to Mary, Alicia and Jean altogether.

$$240 \div 3 = 80$$

Each of her friends received an average of 80 cookies.

4. From 10th October to 21st October
 \rightarrow 12 days

$$12 \times 20 = 240$$

Jennifer read 240 pages by 21st October.

$$300 - 240 = 60$$

Required fraction

$$\begin{aligned} &= \frac{60}{300} \\ &= \frac{6}{30} \\ &= \frac{1}{5} \end{aligned}$$

$\frac{1}{5}$ of the storybook was left unread.

$$5. \quad \frac{1}{2} \times 60 = 30$$

Regina has 30 beads.

$$\frac{4}{5} \rightarrow 60$$

$$\frac{1}{5} \rightarrow 60 \div 4 = 15$$

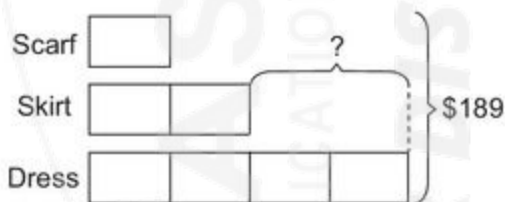
$$\frac{5}{5} \rightarrow 5 \times 15 = 75$$

Isabel has 75 beads.

$$\begin{aligned} \text{Average number of beads} \\ &= (60 + 30 + 75) \div 3 \\ &= 165 \div 3 \\ &= 55 \end{aligned}$$

The average number of beads the three girls have is **55**.

$$\begin{aligned} 6. \quad \text{Total cost of 3 items} \\ &= 3 \times \$63 \\ &= \$189 \end{aligned}$$



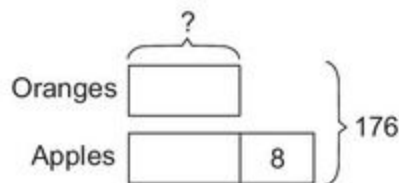
$$\begin{aligned} 7 \text{ units} &= \$189 \\ 1 \text{ unit} &= \$189 \div 7 \\ &= \$27 \\ 2 \text{ units} &= 2 \times \$27 \\ &= \$54 \end{aligned}$$

The difference in cost is **\$54**.

$$\begin{aligned} 7. \quad \text{Total number of fruits} \\ &= 3 \times 99 \\ &= 297 \end{aligned}$$

$$\begin{aligned} \text{Number of pears} \\ &= 99 + 22 \\ &= 121 \end{aligned}$$

$$\begin{aligned} \text{Total number of apples and oranges} \\ &= 297 - 121 \\ &= 176 \end{aligned}$$



$$\begin{aligned} 2 \text{ units} &= 176 - 8 \\ &= 168 \text{ fruits} \\ 1 \text{ unit} &= 168 \div 2 \\ &= 84 \text{ fruits} \end{aligned}$$

There are **84** oranges at the fruit stall.

$$\begin{aligned} 8. \quad \text{Total height} \\ &= 4 \times 140.5 \text{ cm} \\ &= 562 \text{ cm} \end{aligned}$$

$$\begin{aligned} \text{Total height of Sally, Joe and their dad} \\ &= 3 \times 134 \text{ cm} \\ &= 402 \text{ cm} \end{aligned}$$

$$\begin{aligned} \text{Mum's height} \\ &= 562 \text{ cm} - 402 \text{ cm} \\ &= 160 \text{ cm} \end{aligned}$$

$$\begin{aligned} \text{Dad's height} \\ &= 160 \text{ cm} + 28 \text{ cm} \\ &= 188 \text{ cm} \end{aligned}$$

$$\begin{aligned} \text{Joe's height} \\ &= \frac{3}{4} \times 160 \text{ cm} \\ &= 120 \text{ cm} \end{aligned}$$

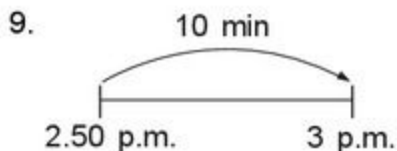
$$\begin{aligned} \text{Sally's height} \\ &= 402 \text{ cm} - 120 \text{ cm} - 188 \text{ cm} \\ &= 94 \text{ cm} \end{aligned}$$

Sally's height is **94 cm**.

Drills

Exercise 1

1. $\frac{53}{100} \times 100\% = 53\%$
2. $\frac{95}{100} \times 100\% = 95\%$
3. $\frac{76}{100} \times 100\% = 76\%$
4. $\frac{29}{100} \times 100\% = 29\%$
5. $\frac{7}{100} \times 100\% = 7\%$
6. $\frac{83}{100} \times 100\% = 83\%$
7. $\frac{46}{100} \times 100\% = 46\%$
8. $\frac{15}{100} \times 100\% = 15\%$



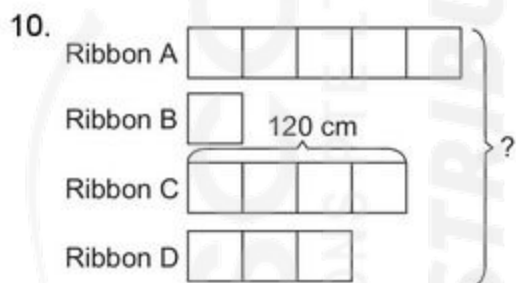
$$\begin{aligned} 1 \text{ min} &\longrightarrow 76 \text{ words} \\ 10 \text{ min} &\longrightarrow 10 \times 76 = 760 \text{ words} \end{aligned}$$

She typed 760 words in 10 minutes.

$$\begin{aligned} 4560 - 760 &= 3800 \\ \text{She has to type } &3800 \text{ more words.} \end{aligned}$$

$$3800 \div 76 = 50 \text{ min}$$

Mrs Lim needs **50** minutes more to finish typing the report.



$$\begin{aligned} 4 \text{ units} &= 120 \text{ cm} \\ 1 \text{ unit} &= 120 \text{ cm} \div 4 \\ &= 30 \text{ cm} \\ 13 \text{ units} &= 13 \times 30 \\ &= 390 \text{ cm} \end{aligned}$$

$$\begin{aligned} \text{Average length} &= 390 \text{ cm} \div 4 \\ &= 97.5 \text{ cm} \end{aligned}$$

The average length of the four ribbons is **97.5 cm**.

$$9. \frac{99}{100} \times 100\% = 99\%$$

$$10. \frac{2}{100} \times 100\% = 2\%$$

Exercise 2

Fraction	Equivalent Fraction	As Percentage
$\frac{1}{2}$	$\frac{50}{100}$	$\frac{50}{100} \times 100\% = 50\%$
$\frac{13}{20}$	$\frac{65}{100}$	$\frac{65}{100} \times 100\% = 65\%$
$\frac{18}{20}$	$\frac{90}{100}$	$\frac{90}{100} \times 100\% = 90\%$
$\frac{4}{5}$	$\frac{80}{100}$	$\frac{80}{100} \times 100\% = 80\%$
$\frac{16}{25}$	$\frac{64}{100}$	$\frac{64}{100} \times 100\% = 64\%$
$\frac{9}{10}$	$\frac{90}{100}$	$\frac{90}{100} \times 100\% = 90\%$
$\frac{46}{50}$	$\frac{92}{100}$	$\frac{92}{100} \times 100\% = 92\%$
$\frac{18}{25}$	$\frac{72}{100}$	$\frac{72}{100} \times 100\% = 72\%$
$\frac{2}{5}$	$\frac{40}{100}$	$\frac{40}{100} \times 100\% = 40\%$
$\frac{3}{4}$	$\frac{75}{100}$	$\frac{75}{100} \times 100\% = 75\%$

Exercise 3

Decimal	Fraction	As Percentage
0.4	$\frac{4}{10}$	$\frac{4}{10} \times 100\% = 40\%$
0.25	$\frac{25}{100}$	$\frac{25}{100} \times 100\% = 25\%$
0.2	$\frac{2}{10}$	$\frac{2}{10} \times 100\% = 20\%$
0.75	$\frac{75}{100}$	$\frac{75}{100} \times 100\% = 75\%$
0.02	$\frac{2}{100}$	$\frac{2}{100} \times 100\% = 2\%$
0.08	$\frac{8}{100}$	$\frac{8}{100} \times 100\% = 8\%$
0.34	$\frac{34}{100}$	$\frac{34}{100} \times 100\% = 34\%$
0.17	$\frac{17}{100}$	$\frac{17}{100} \times 100\% = 17\%$

Exercise 4

Percentage	Fraction	Simplest Form
20%	$\frac{20}{100}$	$\frac{1}{5}$
40%	$\frac{40}{100}$	$\frac{2}{5}$
50%	$\frac{50}{100}$	$\frac{1}{2}$
9%	$\frac{9}{100}$	$\frac{9}{100}$
30%	$\frac{30}{100}$	$\frac{3}{10}$
23%	$\frac{23}{100}$	$\frac{23}{100}$
15%	$\frac{15}{100}$	$\frac{3}{20}$

Exercise 5

Percentage	Fraction	Decimal
44%	$\frac{44}{100}$	0.44
25%	$\frac{25}{100}$	0.25
96%	$\frac{96}{100}$	0.96
12%	$\frac{12}{100}$	0.12
50%	$\frac{50}{100}$	0.5
56%	$\frac{56}{100}$	0.56
90%	$\frac{90}{100}$	0.9
35%	$\frac{35}{100}$	0.35

Exercise 6

Percentage	Quantity	Part of quantity
15%	40	$\frac{15}{100} \times 40 = 6$
25%	180	$\frac{25}{100} \times 180 = 45$
35%	\$800	$\frac{35}{100} \times \$800 = \280
40%	6500 ml	$\frac{40}{100} \times 6500 \text{ ml} = 2600 \text{ ml}$
70%	540 g	$\frac{70}{100} \times 540 \text{ g} = 378 \text{ g}$

Perform

Exercise 1

- (3)
 $80 - 16 = 64$
 $\frac{64}{80} \times 100\% = 80\%$
80% of the apples are red.
- (1)
 $1 - \frac{18}{20} = \frac{2}{20}$
 $\frac{2}{20} \times 100\% = 10\%$
10% of the pencils are blunt.
- (3)
 $40 - 38 = 2$
 $\frac{2}{40} \times 100\% = 5\%$
5% of the questions are wrongly answered.
- (4)
 $100\% - 35\% = 65\%$
 $\frac{65}{100} = \frac{13}{20}$
 $\frac{13}{20}$ of the container is filled with apple juice.
- (1)
 $100\% - 78\% = 22\%$
 $\frac{22}{100} = \frac{11}{50}$
 $\frac{11}{50}$ of the children prefer walking to cycling.
- (2)
 $1 - \frac{3}{5} = \frac{2}{5}$
 $\frac{2}{5} \times 100\% = 40\%$
40% of the books are in Chinese.

7. (4)
 $100\% - 25\% = 75\%$
 $\frac{75}{100} \times 1200 = 900$
 There are 900 men in the hall.

8. (3)
 $100\% + 7\% = 107\%$
 $\frac{107}{100} \times \$85 = \90.95
 The dress cost her \$90.95.

9. (2)
 Area of rectangle
 $= 40 \times 32$
 $= 1280 \text{ cm}^2$

$$100\% - 70\% = 30\%$$

Area left

$$= \frac{30}{100} \times 1280 \text{ cm}^2$$

$$= 384 \text{ cm}^2$$

10. (4)
 $\frac{20}{100} \times \$5 = \1
 $\$10 \div \$1 = 10$
 He will take 10 days.

11. (2)
 $100\% - 15\% = 85\%$
 $\frac{85}{100} \times \$200 = \170
 The sale price of the toaster was \$170.

12. (1)
 Percentage of figure shaded
 $= \frac{6}{24} \times 100\%$
 $= 25\%$

13. (4)
 $\frac{30}{100} \times \$2200 = \660
 $3 \times \$660 = \1980
 She gave \$1980 to her mother in 3 months.

14. (2)
 $\frac{40}{100} \times 135 = 54 \text{ m}^2$
 The area of the swimming pool is 54 m^2 .

15. (3)
 $100\% - 20\% = 80\%$
 $80\% \rightarrow \$153$
 $1\% \rightarrow \$\left(\frac{153}{80}\right)$
 $100\% \rightarrow 100 \times \$\left(\frac{153}{80}\right) = \191.25

The original selling price of the vacuum cleaner was \$191.25.

16. (2)
 $140\% \rightarrow \$980$
 $1\% \rightarrow \$980 \div 140 = \7
 $100\% \rightarrow 100 \times \$7 = \$700$

His original monthly savings was \$700.

Exercise 2

1. $120 - 45 = 75$
 $\frac{75}{120} \times 100\% = 62.5\%$
 62.5% of the visitors at the zoo were adults.

2. $4 \text{ units} + 3 \text{ units} + 5 \text{ units} = 12 \text{ units}$
 $4 \text{ units} + 5 \text{ units} = 9 \text{ units}$
 $\frac{9}{12} \times 100\% = 75\%$
 Raymond and Michael received 75% of the game cards altogether.

3. $100\% - 42\% = 58\%$

$$\frac{58}{100} = \frac{29}{50}$$

$\frac{29}{50}$ of the people at the museum are children.

4. $108\% \rightarrow \$432$

$$1\% \rightarrow \$432 \div 108 = \$4$$

$$100\% \rightarrow 100 \times \$4 = \$400$$

The original price of the washing machine was **\$400**.

5. $\frac{20}{60} \times 100\% = 33.33\%$ (2 d.p.)

Her daily naptime was **33.33%** of an hour.

6. $25\% + 15\% = 40\%$

$$\frac{40}{100} \times \$240 = \$96$$

Sally spent **\$96** on both items.

7. $100\% - 15\% - 20\% - 8\% = 57\%$

$$\frac{57}{100} \times \$20 = \$11.40$$

He had **\$11.40** left.

8. $40 - 18 = 22$

$$\frac{22}{40} \times 100\% = 55\%$$

55% of the pupils are girls.

9. $\frac{12}{100} \times 1800 = 216$

216 of the pupils are in the Drama Club.

10. $100\% - 40\% = 60\%$

$$60\% \rightarrow 45 \text{ bars}$$

$$1\% \rightarrow \left(\frac{45}{60}\right) \text{ bars}$$

$$40\% \rightarrow 40 \times \frac{45}{60} = 30 \text{ bars}$$

She gave **30** bars of chocolate to Alicia.

11. $100\% - 80\% = 20\%$

$$\frac{20}{100} = \frac{1}{5}$$

$\frac{1}{5}$ of the beads are yellow.

12. $\frac{7}{100} \times \$40 = \2.80

The GST is **\$2.80**.

13. $100\% + 7\% = 107\%$

$$\frac{107}{100} \times \$225 = \$240.75$$

He paid **\$240.75** for the camera.

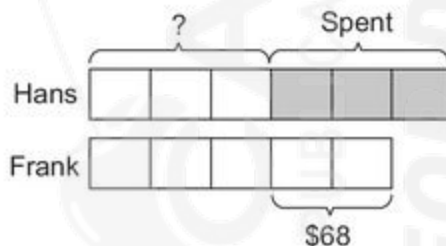
14. $\frac{1.5}{100} \times \$16\,500 = \247.50

Sheila paid **\$247.50** interest in the first year.

Achieve

Exercise 1

1.



$$2 \text{ units} = \$68$$

$$1 \text{ unit} = \$68 \div 2$$

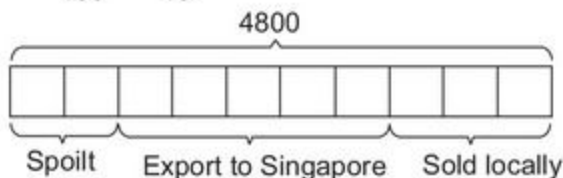
$$= \$34$$

$$3 \text{ units} = 3 \times \$34$$

$$= \$102$$

He had **\$102** left.

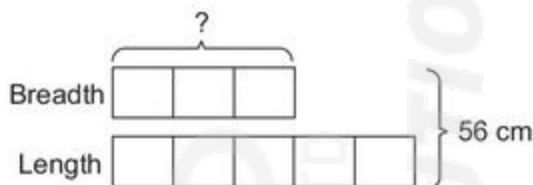
$$2. \frac{20}{100} = \frac{2}{10}$$



$$\frac{3}{10} \times 100\% = 30\%$$

30% of the dolls were sold locally.

3.



$$\text{Length} + \text{Breadth} = 112 \text{ cm} \div 2 = 56 \text{ cm}$$

$$8 \text{ units} = 56 \text{ cm}$$

$$1 \text{ unit} = 56 \text{ cm} \div 8 = 7 \text{ cm}$$

$$3 \text{ units} = 3 \times 7 \text{ cm} = 21 \text{ cm}$$

Required percentage

$$= \frac{21}{112} \times 100\%$$

$$= 18\frac{3}{4}\%$$

The required percentage is $18\frac{3}{4}\%$.

$$4. 100\% - 75\% = 25\%$$

$$25\% \rightarrow \$200$$

$$1\% \rightarrow \$200 \div 25 = \$8$$

$$100\% \rightarrow 100 \times \$8 = \$800$$

Rebecca withdrew \$800 of her savings.

$$5\% \text{ of savings} \rightarrow \$800$$

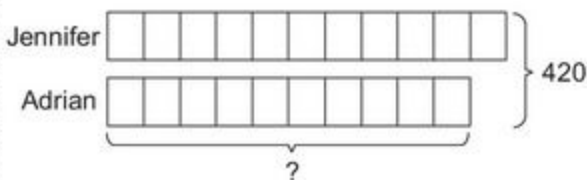
$$1\% \text{ of savings} \rightarrow \$800 \div 5 = \$160$$

$$100\% \text{ of savings} \rightarrow 100 \times \$160 = \$16\,000$$

She had \$16 000 savings in the bank at first.

$$5. 470 - 50 = 420$$

Jennifer and Adrian had 420 stickers altogether.



$$21 \text{ units} = 420 \text{ stickers}$$

$$1 \text{ unit} = 420 \div 21$$

$$= 20 \text{ stickers}$$

$$10 \text{ units} = 10 \times 20$$

$$= 200 \text{ stickers}$$

Adrian had 200 stickers.

Required percentage

$$= \frac{50}{200} \times 100\%$$

$$= 25\%$$

The required percentage is 25%.

$$6. 100\% - 36\% = 64\%$$

$$64\% - 36\% = 28\%$$

$$28\% \rightarrow 56 \text{ children}$$

$$1\% \rightarrow 56 \div 28 = 2 \text{ children}$$

$$100\% \rightarrow 100 \times 2 = 200 \text{ children}$$

There are 200 children at the party.

Challenge

Exercise 1

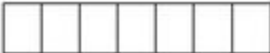

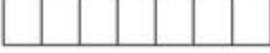
$$1. 100\% - 25\% - 30\% - 10\% = 35\%$$

$$35\% \rightarrow 105 \text{ fruits}$$

$$1\% \rightarrow 105 \div 35 = 3 \text{ fruits}$$

$$100\% \rightarrow 100 \times 3 = 300 \text{ fruits}$$

There are 300 fruits at the fruit stall.

2. Ahmad 
 Ah Heng 
 James 

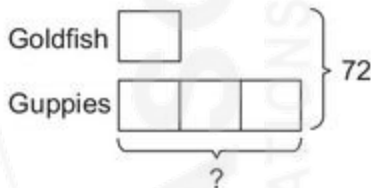
Required percentage

$$= \frac{10}{24} \times 100\%$$

$$= 41\frac{2}{3}\%$$

The required percentage is $41\frac{2}{3}\%$.

3. $100\% - 60\% = 40\%$
 $40\% \rightarrow 96$ fish
 $1\% \rightarrow \frac{96}{40}$ fish
 $30\% \rightarrow 30 \times \frac{96}{40} = 72$ fish
- There were 72 fish left.



$$4 \text{ units} = 72 \text{ fish}$$

$$1 \text{ unit} = 72 \div 4$$

$$= 18 \text{ fish}$$

$$3 \text{ units} = 3 \times 18$$

$$= 54 \text{ fish}$$

54 guppies were left.

4. $\frac{90}{100} \times \$300 = \270
 Alex gives his mother \$270.
- $$\$1000 - \$300 - \$270 = \$430$$
- Melvin gives his mother \$430.
- $$20\% \rightarrow \$430$$
- $$1\% \rightarrow \$430 \div 20 = \$21.50$$
- $$100\% \rightarrow 100 \times \$21.50 = \$2150$$

Melvin's monthly salary is \$2150.

5. $\$2000 - \$500 = \$1500$
 $100\% + 7\% = 107\%$
 $\frac{107}{100} \times \$1500 = \1605
 $\$1605 + \$500 = \$2105$

Jean would have paid \$2105 for the dining table altogether.

6. $\frac{60}{100} \times 280 = 168$
 There were 168 red buttons.

$280 - 168 = 112$
 There were 112 blue buttons.

- $100\% - 44\% = 56\%$
 $56\% \rightarrow 112$ buttons
 $1\% \rightarrow 112 \div 56 = 2$ buttons
 $44\% \rightarrow 44 \times 2 = 88$ buttons
 There are 88 red buttons left.

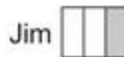
$$168 - 88 = 80$$

Xiao Ying took out 80 red buttons.

7. Before:



After:



- $15 \text{ units} = 30 \text{ cards}$
 $1 \text{ unit} = 30 \div 15$
 $= 2 \text{ cards}$
 $23 \text{ units} = 23 \times 2$
 $= 46 \text{ cards}$

They had 46 cards altogether in the end.

Unit 10 Angles, Triangles and Quadrilaterals

Drills

Exercise 1

8. $\frac{20}{100} \times \$5400 = \1080

He spends \$1080.

$$\frac{30}{100} \times \$5400 = \$1620$$

He gives \$1620 to his wife.

$$\$5400 - \$1080 - \$1620 = \$2700$$

He saves \$2700.

$$100\% \longrightarrow \$2700$$

$$1\% \longrightarrow \$2700 \div 100 = \$27$$

$$110\% \longrightarrow 110 \times \$27 = \$2970$$

$$\$5400 - \$2970 - \$1620 = \$810$$

He should spend **\$810** that month.

9. $100\% - 30\% = 70\%$

$$\frac{70}{100} \times \$6500 = \$4550$$

$$\frac{107}{100} \times \$4550 = \$4868.50$$

He had to pay \$4868.50 including GST.

Down payment

$$= \frac{10}{100} \times \$4868.50$$

$$= \$486.85$$

He had to pay **\$486.85** for the down payment.

10. $\frac{25}{100} \times \$180 = \45

$$\begin{aligned} \text{Total discount} &= \$45 + \$9 \\ &= \$54 \end{aligned}$$

Total percentage discount

$$= \frac{\$54}{\$180} \times 100\%$$

$$= 30\%$$

The total percentage discount given to members for the rice cooker is **30%**.

1. $\angle a = 180^\circ - 40^\circ$ (\angle s on a straight line)
 $= 140^\circ$

2. $\angle b = 180^\circ - 115^\circ$ (\angle s on a straight line)
 $= 65^\circ$

3. $\angle c = 180^\circ - 32^\circ - 41^\circ$ (\angle s on a straight line)
 $= 107^\circ$

4. $\angle d = 180^\circ - 17^\circ - 90^\circ$ (\angle s on a straight line)
 $= 73^\circ$

5. $\angle e = 360^\circ - 85^\circ - 146^\circ$ (\angle s at a point)
 $= 129^\circ$

6. $\angle f = 360^\circ - 87^\circ - 28^\circ$ (\angle s at a point)
 $= 245^\circ$

7. $\angle g = 100^\circ$ (vert. opp. \angle s)

8. $\angle h = 140^\circ - 90^\circ$ (vert. opp. \angle s)
 $= 50^\circ$

9. $\angle i = 55^\circ$ (vert. opp. \angle s)
 $\angle j = 23^\circ$ (vert. opp. \angle s)

10. $\angle k = 180^\circ - 90^\circ - 35^\circ$ (sum of Δ)
 $= 55^\circ$

11. $\angle l = (180^\circ - 48^\circ) \div 2$ (isos. Δ)
 $= 132^\circ \div 2$
 $= 66^\circ$

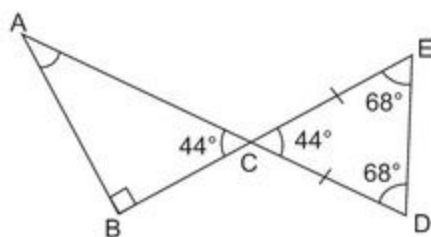
12. $\angle m = 180^\circ - 46^\circ - 46^\circ$ (isos. Δ)
 $= 88^\circ$

13. $\angle n = 70^\circ$ (opp. \angle s of a parallelogram)
 $\angle p = 180^\circ - 70^\circ$ (\angle s between \parallel lines)
 $= 110^\circ$

14. $\angle q = 180^\circ - 60^\circ - 55^\circ$ (\angle s between // lines)
 $= 65^\circ$
15. $\angle r = 75^\circ$ (opp. \angle s of a rhombus)
 $\angle s = 180^\circ - 75^\circ$ (\angle s between // lines)
 $= 105^\circ$
16. $\angle t = 180^\circ - 72^\circ$ (\angle s between // lines)
 $= 108^\circ$
 $\angle u = 180^\circ - 118^\circ$ (\angle s between // lines)
 $= 62^\circ$
17. $\angle v = 180^\circ - 90^\circ$ (\angle s between // lines)
 $= 90^\circ$
 $\angle w = 180^\circ - 120^\circ$ (\angle s between // lines)
 $= 60^\circ$
18. $\angle x = 180^\circ - 35^\circ - 65^\circ$ (\angle s between // lines)
 $= 80^\circ$

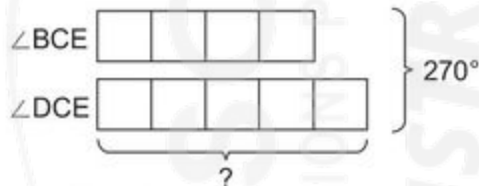
Exercise 2

1. $\angle CBD = 180^\circ - 52^\circ - 70^\circ$ (\angle s on a straight line)
 $= 58^\circ$
2. $\angle x = 180^\circ - 125^\circ$ (\angle s between // lines)
 $= 55^\circ$
3. $\angle BAC = 180^\circ - 90^\circ - 33^\circ$ (\angle sum of Δ)
 $= 57^\circ$
 $\angle ABD = 180^\circ - 57^\circ - 76^\circ$ (\angle sum of Δ)
 $= 47^\circ$
4. $\angle ACB = 180^\circ \div 3$ (equi. Δ)
 $= 60^\circ$
 $\angle BCD = 134^\circ - 60^\circ$
 $= 74^\circ$
5. $\angle ADC = 180^\circ - 50^\circ$ (\angle s between // lines)
 $= 130^\circ$



6. $\angle CED = \angle CDE$ (isos. Δ)
 $= 68^\circ$
 $\angle DCE = 180^\circ - 68^\circ - 68^\circ$ (\angle sum of Δ)
 $= 44^\circ$
 $\angle ACB = 44^\circ$ (vert. opp. s)
 $\angle BAC = 180^\circ - 44^\circ - 90^\circ$ (\angle sum of Δ)
 $= 46^\circ$

7. $\angle BCD = 90^\circ$ (\angle s of a square)
 $\angle BCE + \angle DCE$
 $= 360^\circ - 90^\circ$ (\angle s at a point)
 $= 270^\circ$



- 9 units = 270°
1 unit = $270^\circ \div 9$
 $= 30^\circ$
5 units = $5 \times 30^\circ$
 $= 150^\circ$
 $\angle DCE = 150^\circ$
8. $\angle FBD = \angle ABC$ (vert. opp. \angle s)
 $= 140^\circ$
 $\angle EBF = 140^\circ - 47^\circ$
 $= 93^\circ$
9. $\angle ACB = (180^\circ - 90^\circ) \div 2$ (isos. Δ)
 $= 90^\circ \div 2$
 $= 45^\circ$
 $\angle ECD = (180^\circ - 70^\circ) \div 2$ (isos. Δ)
 $= 110^\circ \div 2$
 $= 55^\circ$

$$\begin{aligned}\angle BCD &= \angle ACB + \angle ECD \\ &= 45^\circ + 55^\circ \\ &= 100^\circ\end{aligned}$$

Perform

Exercise 1

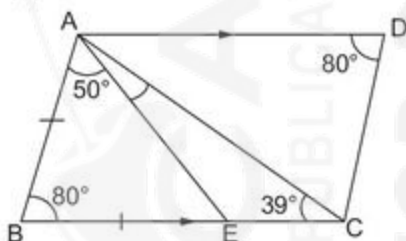
1. (3)

$$\begin{aligned}\angle ACB &= (180^\circ - 56^\circ) \div 2 \text{ (isos. } \triangle) \\ &= 124^\circ \div 2 \\ &= 62^\circ \\ \angle ACD &= 180^\circ - 62^\circ \text{ (}\angle\text{s on a straight line)} \\ &= 118^\circ\end{aligned}$$

2. (3)

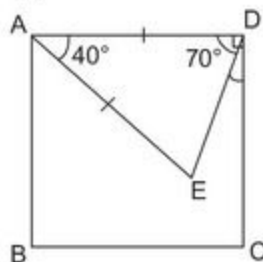
$$\begin{aligned}\angle ACB &= 180^\circ - 100^\circ - 43^\circ \text{ (}\angle\text{ sum of } \triangle) \\ &= 37^\circ \\ \angle DCE &= \angle ACB \text{ (vert. opp. } \angle\text{s)} \\ &= 37^\circ \\ \angle CED &= 180^\circ - 80^\circ - 37^\circ \text{ (}\angle\text{ sum of } \triangle) \\ &= 63^\circ \\ \angle x &= 180^\circ - 63^\circ \text{ (}\angle\text{s on a straight line)} \\ &= 117^\circ\end{aligned}$$

3. (2)



$$\begin{aligned}\angle ABC &= 80^\circ \text{ (opp. } \angle\text{s of a parallelogram)} \\ \angle BAE &= (180^\circ - 80^\circ) \div 2 \text{ (isos. } \triangle) \\ &= 100^\circ \div 2 \\ &= 50^\circ \\ \angle BAC &= 180^\circ - 80^\circ - 39^\circ \text{ (}\angle\text{ sum of } \triangle) \\ &= 61^\circ \\ \angle CAE &= 61^\circ - 50^\circ \\ &= 11^\circ\end{aligned}$$

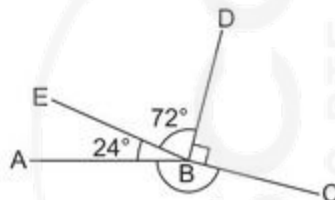
4. (1)



$$\begin{aligned}\angle ADE &= (180^\circ - 40^\circ) \div 2 \text{ (isos. } \triangle) \\ &= 140^\circ \div 2 \\ &= 70^\circ \\ \angle ADC &= 90^\circ \text{ (}\angle\text{s of a square)} \\ \angle CDE &= 90^\circ - 70^\circ \\ &= 20^\circ\end{aligned}$$

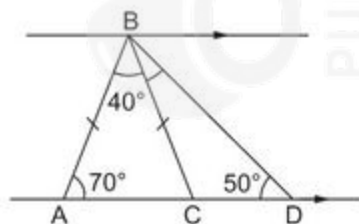
Exercise 2

1.



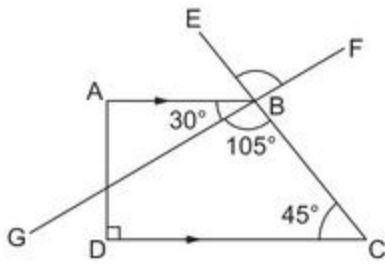
$$\begin{aligned}\angle DBE &= 3 \times 24^\circ \\ &= 72^\circ \\ \angle ABC &= 360^\circ - 24^\circ - 72^\circ - 90^\circ \\ &\text{ (}\angle\text{s at a point)} \\ &= 174^\circ\end{aligned}$$

2.



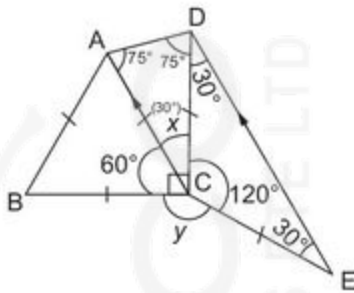
$$\begin{aligned}\angle BAC &= (180^\circ - 40^\circ) \div 2 \text{ (isos. } \triangle) \\ &= 140^\circ \div 2 \\ &= 70^\circ \\ \angle ABD &= 180^\circ - 70^\circ - 50^\circ \text{ (}\angle\text{ sum of } \triangle) \\ &= 60^\circ \\ \angle CBD &= 60^\circ - 40^\circ \\ &= 20^\circ\end{aligned}$$

3.



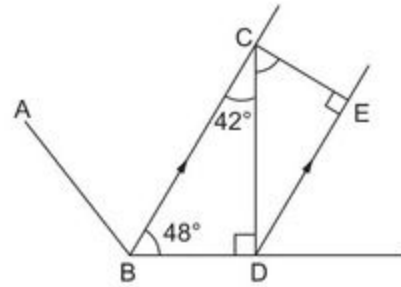
$$\begin{aligned}\angle ABC &= 180^\circ - 45^\circ \text{ (\angle s between // lines)} \\ &= 135^\circ \\ \angle CBG &= 135^\circ - 30^\circ \\ &= 105^\circ \\ \angle EBF &= 105^\circ \text{ (vert. opp. \angle s)}\end{aligned}$$

4.



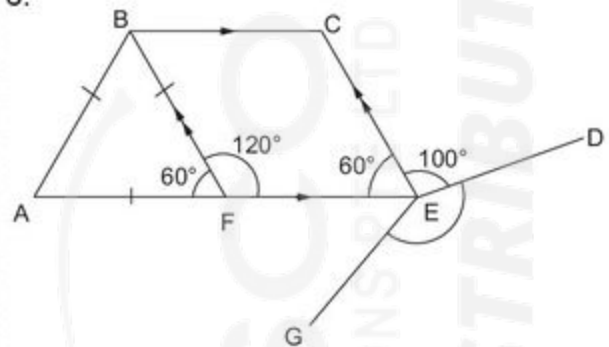
$$\begin{aligned}\text{(a) } \angle ACB &= 180^\circ \div 3 \text{ (equi. } \Delta) \\ &= 60^\circ \\ \angle x &= 90^\circ - 60^\circ \\ &= 30^\circ \\ \text{(b) } \angle ADC &= (180^\circ - 30^\circ) \div 2 \text{ (isos. } \Delta) \\ &= 150^\circ \div 2 \\ &= 75^\circ \\ \angle CDE &= 180^\circ - 75^\circ - 75^\circ \\ &\quad \text{(\angle s between // lines)} \\ &= 30^\circ \\ \angle DCE &= 180^\circ - 30^\circ - 30^\circ \\ &\quad \text{(\angle sum of } \Delta) \\ &= 120^\circ \\ \angle y &= 360^\circ - 60^\circ - 30^\circ - 120^\circ \\ &\quad \text{(\angle s at a point)} \\ &= 150^\circ\end{aligned}$$

5.

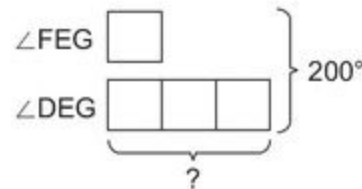


$$\begin{aligned}\angle BCD &= 180^\circ - 90^\circ - 48^\circ \text{ (\angle sum of } \Delta) \\ &= 42^\circ \\ \angle DCE &= 180^\circ - 42^\circ - 90^\circ \\ &\quad \text{(\angle s between // lines)} \\ &= 48^\circ\end{aligned}$$

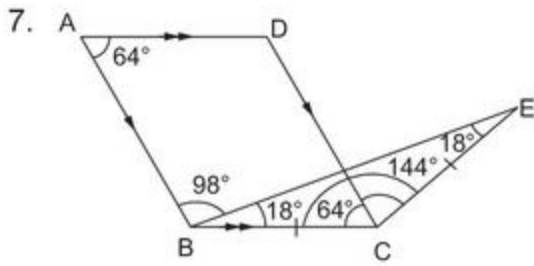
6.



$$\begin{aligned}\angle AFB &= 180^\circ \div 3 \text{ (equi. } \Delta) \\ &= 60^\circ \\ \angle BFE &= 180^\circ - 60^\circ \text{ (\angle s on a straight line)} \\ &= 120^\circ \\ \angle CDF &= 180^\circ - 120^\circ \text{ (\angle s between // lines)} \\ &= 60^\circ \\ \angle FEG + \angle DEG \\ &= 360^\circ - 60^\circ - 100^\circ \text{ (\angle s at a point)} \\ &= 200^\circ\end{aligned}$$



$$\begin{aligned}4 \text{ units} &= 200^\circ \\ 1 \text{ unit} &= 200^\circ \div 4 \\ &= 50^\circ \\ 3 \text{ units} &= 3 \times 50^\circ \\ &= 150^\circ \\ \angle DEG &= 150^\circ\end{aligned}$$

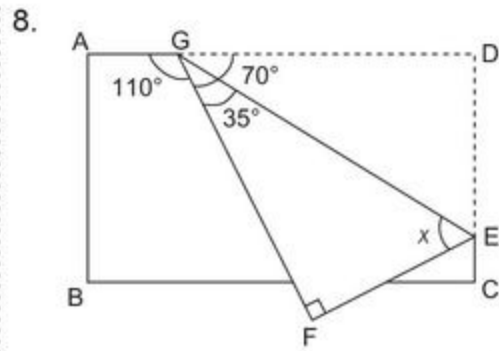


$$\begin{aligned}\angle CBE &= 180^\circ - 64^\circ - 98^\circ \\ & \quad (\angle\text{s between } // \text{ lines}) \\ &= 18^\circ\end{aligned}$$

$$\begin{aligned}\angle BCE &= 180^\circ - 18^\circ - 18^\circ \quad (\angle\text{sum of } \Delta) \\ &= 144^\circ\end{aligned}$$

$$\angle BCD = 64^\circ \quad (\text{opp. } \angle\text{s of parallelogram})$$

$$\begin{aligned}\angle DCE &= 144^\circ - 64^\circ \\ &= 80^\circ\end{aligned}$$



$$\begin{aligned}\angle FGD &= 180^\circ - 110^\circ \quad (\angle\text{s on a straight line}) \\ &= 70^\circ\end{aligned}$$

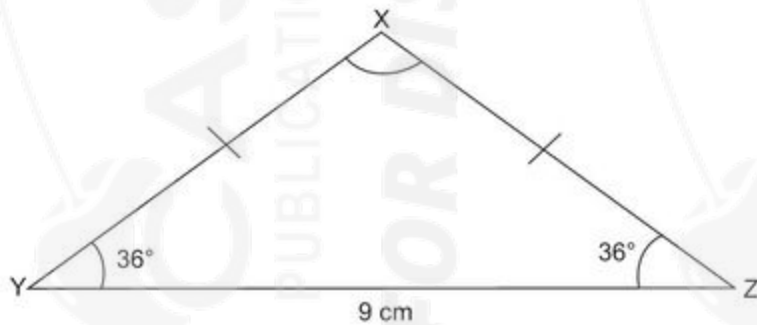
$$\begin{aligned}\angle FGE &= 70^\circ \div 2 \\ &= 35^\circ\end{aligned}$$

$$\begin{aligned}\angle GFE &= 90^\circ \quad (\angle\text{s of a rectangle}) \\ \angle x &= 180^\circ - 35^\circ - 90^\circ \quad (\angle\text{sum of } \Delta) \\ &= 55^\circ\end{aligned}$$

Achieve

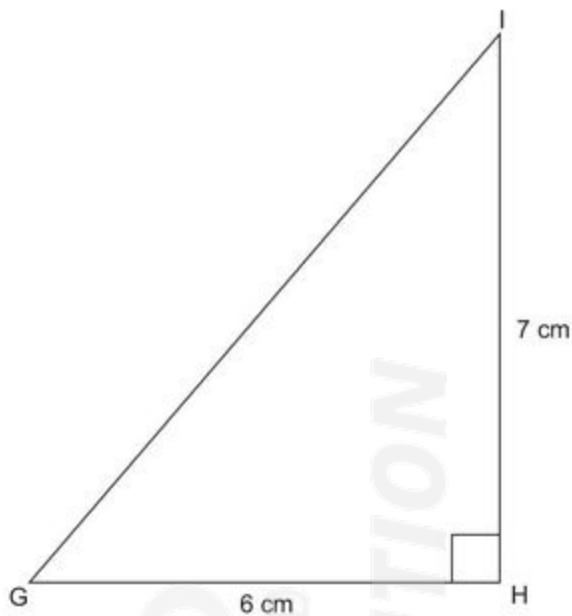
Exercise 1

1.



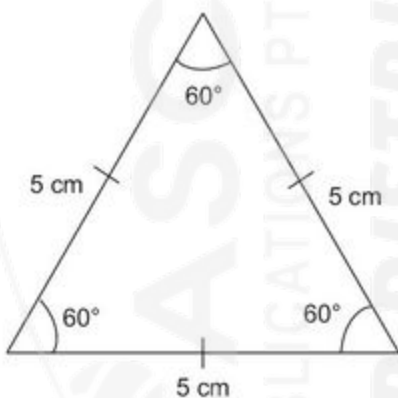
By measurement, $\angle YXZ = 108^\circ$.

2.

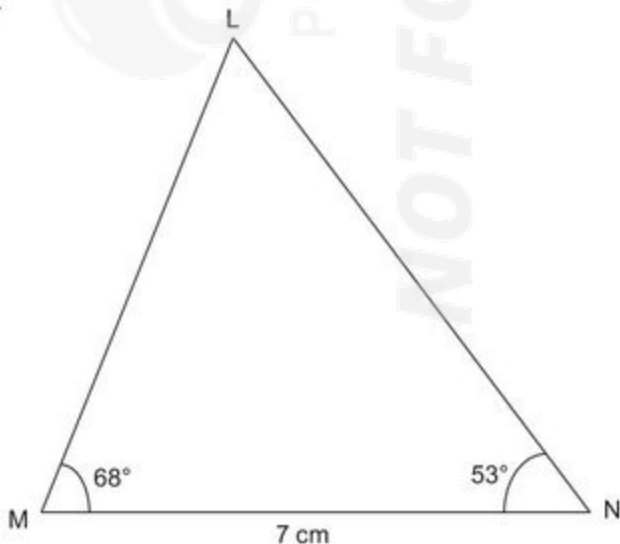


By measurement, $GI = 9.2$ cm.

3.



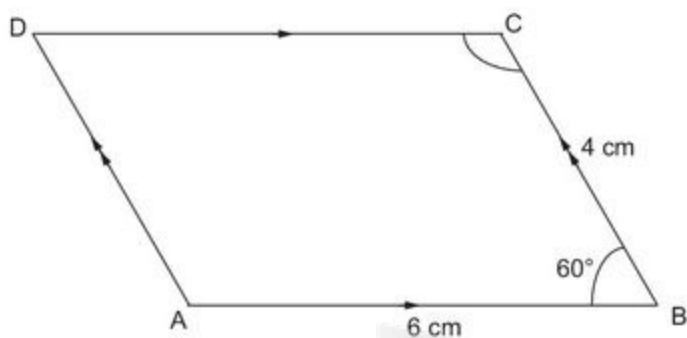
4.



By measurement, $LM = 6.5$ cm and $LN = 7.5$ cm.

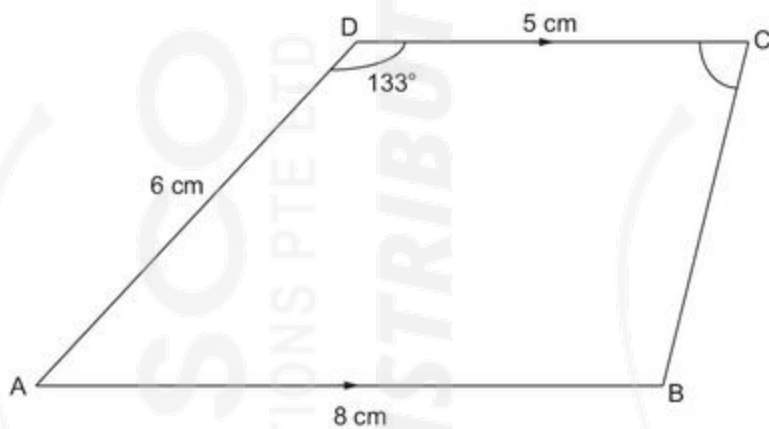
$$\begin{aligned} \text{Perimeter of triangle} &= 7 + 6.5 + 7.5 \\ &= 21 \text{ cm} \end{aligned}$$

5.



By measurement, $\angle BCD = 120^\circ$.

6.



By measurement, $\angle DCB = 76^\circ$.

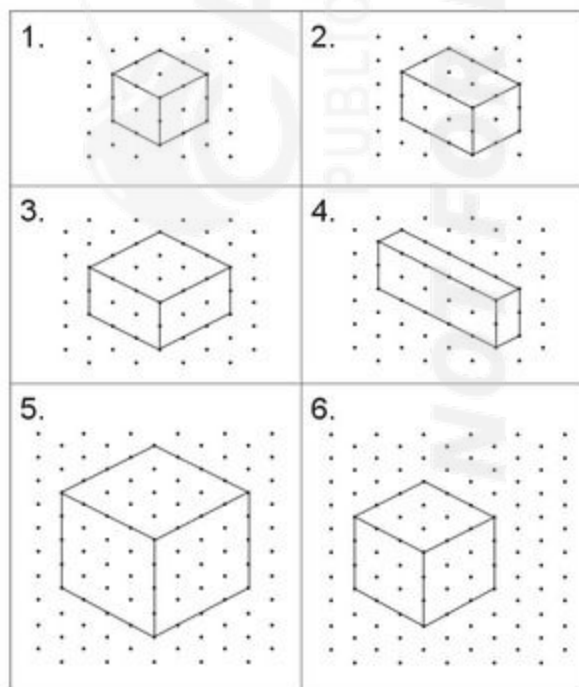
Unit 11 Volume of Cubes and Cuboids

Drills

Exercise 1

- $6 + 2 + 1 = 9$
9 unit cubes
- $7 + 4 + 1 = 12$
12 unit cubes
- $7 + 3 + 1 = 11$
11 unit cubes
- $6 + 2 + 1 = 9$
9 unit cubes
- $5 + 3 + 2 + 1 = 11$
11 unit cubes
- $9 + 2 + 1 = 12$
12 unit cubes

Exercise 2



Exercise 3

No.	(a) Length	(b) Breadth	(a) × (b) = Base Area	(c) Height	(a) × (b) × (c) = Volume
1.	6 cm	5 cm		9 cm	270 cm ³
2.			45 cm ²	7 cm	315 cm ³
3.			63 cm ²	12 cm	756 cm ³
4.	9 cm	3 cm		7 cm	189 cm ³
5.			99 cm ²	5 cm	495 cm ³
6.	7 cm	7 cm		7 cm	343 cm ³
7.	7 cm	4 cm		13 cm	364 cm ³
8.			135 cm ²	8 cm	1080 cm ³
9.			56 cm ²	21 cm	1176 cm ³
10.	24 cm	22 cm		18 cm	9504 cm ³
11.			624 cm ²	16 cm	9984 cm ³
12.	19 cm	15 cm		13 cm	3705 cm ³
13.	25 cm	19 cm		17 cm	8075 cm ³
14.			198 cm ²	3 cm	594 cm ³
15.	14 cm	14 cm		14 cm	2744 cm ³

Exercise 4

- Volume of cuboid
= $15 \times 10 \times 18$
= 2700 cm^3
- Volume of cube
= $8 \times 8 \times 8$
= 512 cm^3
- Volume of rectangular box
= $7 \times 6 \times 5$
= 210 cm^3
- Volume of cubical container
= $15 \times 15 \times 15$
= 3375 cm^3
- Volume of rectangular container
= $13 \times 8 \times 11$
= 1144 cm^3

6. Volume of cubical tank
 $= 7 \times 7 \times 7$
 $= 343 \text{ cm}^3$

7. Volume of rectangular tank
 $= 9 \times 5 \times 3$
 $= 135 \text{ cm}^3$

8. Volume of cubical box
 $= 12 \times 12 \times 12$
 $= 1728 \text{ cm}^3$

Perform

Exercise 1

1. (4)
 Base area $= 6 \times 6$
 $= 36 \text{ cm}^2$
 Height $= 144 \text{ cm}^3 \div 36 \text{ cm}^2$
 $= 4 \text{ cm}$

2. (4)
 Volume of cement
 $= 15 \times 12 \times 8$
 $= 1440 \text{ cm}^3$

3. (3)
 Height $= 756 \text{ cm}^3 \div 108 \text{ cm}^2$
 $= 7 \text{ cm}$

4. (3)
 Length $= 6175 \div (19 \times 13)$
 $= 6175 \div 247$
 $= 25 \text{ cm}$

5. (2)
 $25 \text{ cm} \div 5 \text{ cm} = 5$
 $20 \text{ cm} \div 5 \text{ cm} = 4$
 $16 \text{ cm} \div 5 \text{ cm} = 3 \text{ R } 1 \text{ cm}$

Number of cubes
 $= 5 \times 4 \times 3$
 $= 60$

6. (3)
 $15 \text{ cm} \div 1\frac{1}{2} \text{ cm} = 10$
 $10 \times 10 \times 10 = 1000$

1000 cubes can be put into a hollow cubical container of sides 15 cm.

7. (4)
 $361 = 19 \times 19$

Volume of cube
 $= 19 \times 19 \times 19$
 $= 6859 \text{ cm}^3$

Exercise 2

1. Height $= 2584 \text{ cm}^3 \div 323 \text{ cm}^2$
 $= 8 \text{ cm}$

2. Volume of 1 cubical box
 $= 72 \text{ cm}^3 \div 9$
 $= 8 \text{ cm}^3$
 $8 = 2 \times 2 \times 2$
 Length of each side of box $= 2 \text{ cm}$

Area of each face
 $= 2 \times 2$
 $= 4 \text{ cm}^2$

Total area
 $= 6 \times 4 \text{ cm}^2$
 $= 24 \text{ cm}^2$

3. Height $= 448 \text{ cm}^3 \div 56 \text{ cm}^2$
 $= 8 \text{ cm}$

4. Area of base
 $= 9 \times 9$
 $= 81 \text{ cm}^2$

Height of container
 $= 405 \text{ cm}^3 \div 81 \text{ cm}^2$
 $= 5 \text{ cm}$

5. Volume of metal bar
 $= 12 \times 9 \times 6$
 $= 648 \text{ cm}^3$

$$\begin{aligned} 1 \text{ cm}^3 &\longrightarrow 8 \text{ g} \\ 648 \text{ cm}^3 &\longrightarrow 648 \times 8 \text{ g} \\ &= 5184 \text{ g} \\ &= 5.184 \text{ kg} \end{aligned}$$

6. $9 \text{ l} = 9000 \text{ cm}^3$

Area of base
 $= 45 \times 20$
 $= 900 \text{ cm}^2$

Height of tank
 $= 9000 \text{ cm}^3 \div 900 \text{ cm}^2$
 $= 10 \text{ cm}$

7. $11\ 250 \text{ ml} = 11\ 250 \text{ cm}^3$

Height of tank
 $= 11\ 250 \text{ cm}^3 \div 250 \text{ cm}^2$
 $= 45 \text{ cm}$

8. $50 \text{ cm} \div 6 \text{ cm} = 8 \text{ R } 2 \text{ cm}$
 $18 \text{ cm} \div 6 \text{ cm} = 3$
 $7 \text{ cm} \div 6 = 1 \text{ R } 1 \text{ cm}$

Maximum number of cubes
 $= 8 \times 3 \times 1$
 $= 24$

9. Breadth
 $= 1280 \div (16 \times 8)$
 $= 1280 \div 128$
 $= 10 \text{ cm}$

10. $6 \times 6 \times 6 = 216$

Base area of cube
 $= 6 \times 6$
 $= 36 \text{ cm}^2$

11. Volume of water
 $= 9 \times 6 \times 4$
 $= 216 \text{ cm}^3$

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

$$\frac{1}{3} \longrightarrow 216 \text{ cm}^3$$

$$\frac{2}{3} \longrightarrow 2 \times 216 \text{ cm}^3 = 432 \text{ cm}^3$$

432 cm³ more water is needed to fill the tank completely.

12. (a) Volume of each 1-cm cube
 $= 1 \times 1 \times 1$
 $= 1 \text{ cm}^3$

Number of 1-cm cubes in solid
 $= 6 + 3 + 3 + 2$
 $= 14$

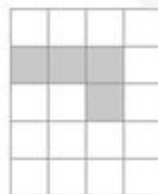
Volume of solid
 $= 14 \times 1 \text{ cm}^3$
 $= 14 \text{ cm}^3$

(b) Number of 1-cm cubes in a bigger cube of sides 4 cm
 $= 4 \times 4 \times 4$
 $= 64$

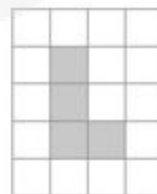
$$64 - 14 = 50$$

50 1-cm cubes must be added.

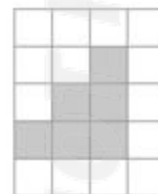
13.



Top view



Front view



Side view

Achieve

Exercise 1

1. Capacity of Tank N
 $= 32.2 \times 20 \times 11$
 $= 7084 \text{ cm}^3$

Capacity of Tank M
 $= \frac{2}{5} \times 7084 \text{ cm}^3$
 $= 2833.6 \text{ cm}^3$

The capacity of Tank M is **2833.6 cm³**.

2. Cube G : Cube H
8 : 5

Volume of Cube G
 $= 12 \times 12 \times 12$
 $= 1728 \text{ cm}^3$

8 units = 1728 cm^3
1 unit = $1728 \text{ cm}^3 \div 8$
 $= 216 \text{ cm}^3$

13 units = $13 \times 216 \text{ cm}^3$
 $= 2808 \text{ cm}^3$

8 units + 5 units
= 13 units

The total volume of two cubes is **2808 cm³**.

3. Volume of Cube A
 $= 10 \times 10 \times 10$
 $= 1000 \text{ cm}^3$

Cube A : Cuboid B
2 : 3

2 units = 1000 cm^3
1 unit = $1000 \text{ cm}^3 \div 2$
 $= 500 \text{ cm}^3$
3 units = $3 \times 500 \text{ cm}^3$
 $= 1500 \text{ cm}^3$

The volume of Cuboid B is **1500 cm³**.

Height of Cuboid B
 $= 1500 \div (20 \times 15)$
 $= 1500 \div 300$
 $= 5 \text{ cm}$

$(20 \times 15) \times 2 = 600 \text{ cm}^2$
 $(15 \times 5) \times 2 = 150 \text{ cm}^2$
 $(20 \times 5) \times 2 = 200 \text{ cm}^2$
 $600 + 150 + 200 = 950 \text{ cm}^2$

The total surface area of Cuboid B is **950 cm²**.

4. Volume of water in 1st tank
 $= 22 \times 20 \times 18$
 $= 7920 \text{ cm}^3$

Height of water in 2nd tank
 $= 7920 \div (24 \times 22)$
 $= 7920 \div 528$
 $= 15 \text{ cm}$

The height of the water in this tank is **15 cm**.

5. $16 \text{ cm} - 7 \text{ cm} = 9 \text{ cm}$

Volume of water required
 $= 22 \times 20 \times 9$
 $= 3960 \text{ cm}^3$

3960 cm³ more water is required to fill up the tank.

6. $6 \text{ l} + 4 \text{ l} = 10 \text{ l}$
 $10 \text{ l} = 10\,000 \text{ cm}^3$

Capacity of each container
 $= 10 \times 4 \times 2$
 $= 80 \text{ cm}^3$

Number of containers
 $= 10\,000 \text{ cm}^3 \div 80 \text{ cm}^3$
 $= 125$

She could fill **125** such containers.

7. Volume of water in tank at first

$$= \frac{4}{5} \times (15 \times 15 \times 15)$$

$$= \frac{4}{5} \times 3375$$

$$= 2700 \text{ cm}^3$$

$$2 \text{ l} = 2000 \text{ cm}^3$$

$$2700 \text{ cm}^3 - 2000 \text{ cm}^3 = 700 \text{ cm}^3$$

700 cm³ of water was left in the tank.

8. $\frac{7}{12} - \frac{1}{4} = \frac{7}{12} - \frac{3}{12}$

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

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

Amount of water needed

$$= \frac{1}{3} \times (90 \times 36 \times 40)$$

$$= \frac{1}{3} \times 129\,600$$

$$= 43\,200 \text{ cm}^3$$

43 200 cm³ more water is needed.

9. $6 \times 6 = 36$
The length of each side of the square base is 6 cm.

$$\text{Height of cuboid}$$

$$= 90 \text{ cm}^2 \div 6 \text{ cm}$$

$$= 15 \text{ cm}$$

The height of the cuboid is 15 cm.

10. Volume of water in Tank A at first

$$= \frac{7}{10} \times (48 \times 24 \times 30)$$

$$= \frac{7}{10} \times 34\,560$$

$$= 24\,192 \text{ cm}^3$$

Volume of water in Tank B after

$$= 20 \times 20 \times 40$$

$$= 16\,000 \text{ cm}^3$$

$$24\,192 \text{ cm}^3 - 16\,000 \text{ cm}^3 = 8192 \text{ cm}^3$$

8192 cm³ water was left in Tank A.

11. (a) $\frac{1}{2} - \frac{3}{8} = \frac{4}{8} - \frac{3}{8}$

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

$$\frac{1}{8} \rightarrow 14\,400 \text{ cm}^3$$

$$\frac{8}{8} \rightarrow 8 \times 14\,400 \text{ cm}^3$$

$$= 115\,200 \text{ cm}^3$$

The capacity of the tank is 115 200 cm³.

(b) Height of tank

$$= 115\,200 \div (40 \times 40)$$

$$= 115\,200 \div 1600$$

$$= 72 \text{ cm}$$

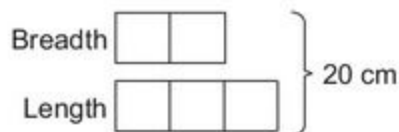
The height of the tank is 72 cm.

Challenge

Exercise 1

1. Length + Breadth = 40 cm \div 2

$$= 20 \text{ cm}$$



$$5 \text{ units} = 20 \text{ cm}$$

$$1 \text{ unit} = 20 \text{ cm} \div 5$$

$$= 4 \text{ cm}$$

$$2 \text{ units} = 2 \times 4 \text{ cm}$$

$$= 8 \text{ cm (Breadth)}$$

$$3 \text{ units} = 3 \times 4 \text{ cm}$$

$$= 12 \text{ cm (Length)}$$

$$\begin{aligned} \text{Height of cuboid} &= 576 \div (12 \times 8) \\ &= 576 \div 96 \\ &= 6 \text{ cm} \end{aligned}$$

The height of the cuboid is **6 cm**.

$$\begin{aligned} 2. \quad \frac{3}{4} - \frac{2}{5} &= \frac{15}{20} - \frac{8}{20} \\ &= \frac{7}{20} \end{aligned}$$

$$\frac{7}{20} \longrightarrow 1.75 \text{ l} = 1750 \text{ cm}^3$$

$$\frac{1}{20} \longrightarrow 1750 \text{ cm}^3 \div 7 = 250 \text{ cm}^3$$

$$\frac{8}{20} \longrightarrow 8 \times 250 \text{ cm}^3 = 2000 \text{ cm}^3$$

$$\begin{aligned} \text{Height of the water} &= 2000 \text{ cm}^3 \div 500 \text{ cm}^2 \\ &= 4 \text{ cm} \end{aligned}$$

The height of the water in the container at first was **4 cm**.

$$3. \quad \frac{\text{Length}}{18} : \frac{\text{Breadth}}{11} : \frac{\text{Height}}{12}$$

$$18 - 11 = 7 \text{ units}$$

$$7 \text{ units} = 14 \text{ cm}$$

$$\begin{aligned} 1 \text{ unit} &= 14 \text{ cm} \div 7 \\ &= 2 \text{ cm} \end{aligned}$$

$$\begin{aligned} 18 \text{ units} &= 18 \times 2 \text{ cm} \\ &= 36 \text{ cm (Length)} \end{aligned}$$

$$\begin{aligned} 11 \text{ units} &= 11 \times 2 \text{ cm} \\ &= 22 \text{ cm (Breadth)} \end{aligned}$$

$$\begin{aligned} 12 \text{ units} &= 12 \times 2 \text{ cm} \\ &= 24 \text{ cm (Height)} \end{aligned}$$

$$\begin{aligned} \text{Height of water} &= \frac{75}{100} \times 24 \text{ cm} \\ &= 18 \text{ cm} \end{aligned}$$

$$\begin{aligned} \text{Volume of water in tank} &= 36 \times 22 \times 18 \\ &= 14\,256 \text{ cm}^3 \end{aligned}$$

There will be **14 256 cm³** of water in the tank.

$$\begin{aligned} 4. \quad 12 \text{ cm} - 10 \text{ cm} &= 2 \text{ cm} \\ \text{There is an increase of } &2 \text{ cm in height.} \end{aligned}$$

$$\begin{aligned} 392 \text{ cm}^3 \div 2 \text{ cm} &= 196 \text{ cm}^2 \\ \text{The base area of the tank is } &196 \text{ cm}^2. \end{aligned}$$

$$\begin{aligned} \text{Volume of water in tank at first} &= 196 \times 10 \\ &= 1960 \text{ cm}^3 \end{aligned}$$

There was **1960 cm³** of water in the tank at first.

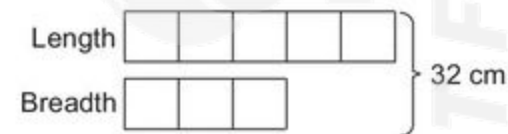
$$\begin{aligned} 5. \quad \text{Volume of wine in tank} &= \frac{20}{100} \times (18 \times 18 \times 15) \\ &= \frac{1}{5} \times 4860 \\ &= 972 \text{ cm}^3 \end{aligned}$$

$$\begin{aligned} \text{Volume of wine in container} &= 12 \times 8 \times 6 \\ &= 576 \text{ cm}^3 \end{aligned}$$

$$972 \text{ cm}^3 - 576 \text{ cm}^3 = 396 \text{ cm}^3$$

396 cm³ of wine is left in the tank.

$$\begin{aligned} 6. \quad \text{Length} + \text{Breadth} &= 64 \text{ cm} \div 2 \\ &= 32 \text{ cm} \end{aligned}$$



$$\begin{aligned} 8 \text{ units} &= 32 \text{ cm} \\ 1 \text{ unit} &= 32 \text{ cm} \div 8 \\ &= 4 \text{ cm} \\ 5 \text{ units} &= 5 \times 4 \text{ cm} \\ &= 20 \text{ cm (Length)} \\ 3 \text{ units} &= 3 \times 4 \text{ cm} \\ &= 12 \text{ cm (Breadth)} \end{aligned}$$

$$\begin{aligned} \text{Height of container} &= 2040 \div (20 \times 12) \\ &= 2040 \div 240 \\ &= 8.5 \text{ cm} \end{aligned}$$

The height of the container is **8.5 cm**.

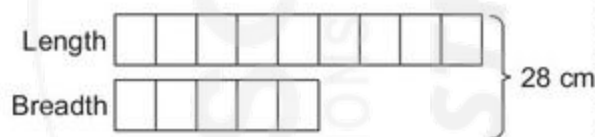
$$\begin{aligned} 7. \quad \frac{80}{100} \times (30 \times 20 \times 20) & \\ &= \frac{4}{5} \times 12\,000 \\ &= 9600 \text{ cm}^3 \\ &= 9.6 \text{ l} \end{aligned}$$

$$4.8 \text{ l} \longrightarrow 1 \text{ min}$$

$$9.6 \text{ l} \longrightarrow 2 \text{ min}$$

It will take **2 min** to fill up 80% of the tank.

$$8. \quad \text{Length} + \text{Breadth} = 56 \text{ cm} \div 2 \\ = 28 \text{ cm}$$



$$14 \text{ units} = 28 \text{ cm}$$

$$\begin{aligned} 1 \text{ unit} &= 28 \text{ cm} \div 14 \\ &= 2 \text{ cm} \end{aligned}$$

$$\begin{aligned} 9 \text{ units} &= 9 \times 2 \text{ cm} \\ &= 18 \text{ cm (Length)} \end{aligned}$$

$$\begin{aligned} 5 \text{ units} &= 5 \times 2 \text{ cm} \\ &= 10 \text{ cm (Breadth)} \end{aligned}$$

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

$$\frac{3}{5} \longrightarrow 1296 \text{ cm}^3$$

$$\frac{1}{5} \longrightarrow 1296 \text{ cm}^3 \div 3 = 432 \text{ cm}^3$$

$$\frac{5}{5} \longrightarrow 5 \times 432 \text{ cm}^3 = 2160 \text{ cm}^3$$

The capacity of the tin is **2160 cm³**.

$$\begin{aligned} \text{Height} &= 2160 \div (18 \times 10) \\ &= 2160 \div 180 \\ &= 12 \text{ cm} \end{aligned}$$

The height of the tin is **12 cm**.

$$\begin{aligned} 9. \quad \text{Volume of water in fish tank at first} &= \frac{1}{5} \times (40 \times 35 \times 25) \\ &= \frac{1}{5} \times 35\,000 \\ &= 7000 \text{ cm}^3 \end{aligned}$$

$$\begin{aligned} \text{Volume of water transferred to tin} &= 7000 \text{ cm}^3 - 1000 \text{ cm}^3 \\ &= 6000 \text{ cm}^3 \end{aligned}$$

$$\frac{5}{6} \longrightarrow 6000 \text{ cm}^3$$

$$\frac{1}{6} \longrightarrow 6000 \text{ cm}^3 \div 5 = 1200 \text{ cm}^3$$

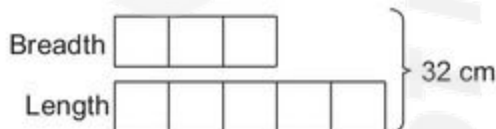
$$\frac{6}{6} \longrightarrow 6 \times 1200 \text{ cm}^3 = 7200 \text{ cm}^3$$

The capacity of the tin is **7200 cm³**.

$$\begin{aligned} \text{Height of tin} &= 7200 \div (20 \times 20) \\ &= 7200 \div 400 \\ &= 18 \text{ cm} \end{aligned}$$

The height of the tin is **18 cm**.

$$10. \quad \text{Length} + \text{Breadth} = 64 \text{ cm} \div 2 \\ = 32 \text{ cm}$$



$$8 \text{ units} = 32 \text{ cm}$$

$$\begin{aligned} 1 \text{ unit} &= 32 \text{ cm} \div 8 \\ &= 4 \text{ cm} \end{aligned}$$

$$\begin{aligned} 3 \text{ units} &= 3 \times 4 \text{ cm} \\ &= 12 \text{ cm (Breadth)} \end{aligned}$$

$$\begin{aligned} 5 \text{ units} &= 5 \times 4 \text{ cm} \\ &= 20 \text{ cm (Length)} \end{aligned}$$

$$360 \text{ ml} = 360 \text{ cm}^3$$

$$\begin{aligned} &\text{Increase in water level} \\ &= 360 \div (20 \times 12) \\ &= 360 \div 240 \\ &= 1.5 \text{ cm} \end{aligned}$$

$$\frac{2}{3} \rightarrow 4.5 \text{ cm} + 1.5 \text{ cm} = 6 \text{ cm}$$

$$\frac{1}{3} \rightarrow 6 \text{ cm} \div 2 = 3 \text{ cm}$$

$$\frac{3}{3} \rightarrow 3 \times 3 \text{ cm} = 9 \text{ cm}$$

The depth of the hole is **9 cm**.

Challenging Problems

$$1. \quad \frac{\text{Michael}}{2 \times 3} : \frac{\text{Jun Kang}}{7 \times 3} : \frac{\text{Rafi}}{3 \times 7} : \frac{\text{}}{4 \times 7}$$

$$6 : 21 : 28$$

The new ratio is 6 : 21 : 28.

$$28 \text{ units} - 6 \text{ units} = 22 \text{ units}$$

$$\begin{aligned} 22 \text{ units} &= 396 \text{ stamps} \\ 1 \text{ unit} &= 396 \div 22 \\ &= 18 \text{ stamps} \end{aligned}$$

$$6 \text{ units} + 21 \text{ units} + 28 \text{ units} = 55 \text{ units}$$

$$\begin{aligned} 55 \text{ units} &= 55 \times 18 \\ &= 990 \text{ stamps} \end{aligned}$$

They have **990 stamps** altogether.

$$\begin{aligned} 2. \quad &\frac{1}{9} \times (20 \times 15 \times 12) \\ &= \frac{1}{9} \times 3600 \\ &= 400 \text{ cm}^3 \end{aligned}$$

Alan fills the tank with 400 cm^3 of water.

$$\begin{aligned} 400 \text{ cm}^3 + 2300 \text{ cm}^3 &= 2700 \text{ cm}^3 \\ &= 2.7 \text{ l} \end{aligned}$$

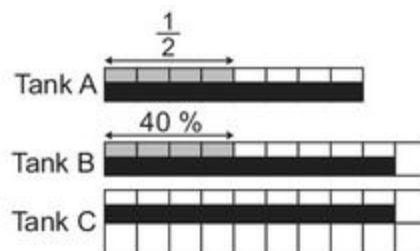
There is **2.7 l** of water in the tank in the end.

$$0.3 \text{ l} \rightarrow 1 \text{ min}$$

$$2.7 \text{ l} \rightarrow 9 \times 1 \text{ min} = 9 \text{ min}$$

It will take **9 min** to empty the tank.

3.



$$10 \text{ units} = 15 \text{ terrapins}$$

$$1 \text{ unit} = \frac{15}{10} \text{ terrapins}$$

$$8 \text{ units} = 8 \times \frac{15}{10} = 12 \text{ terrapins (Tank A)}$$

$$20 \text{ units} = 2 \times 15 = 30 \text{ terrapins (Tank C)}$$

There are 12 terrapins in Tank A, 15 terrapins in Tank B and 30 terrapins in Tank C.

$$12 + 15 + 30 = 57$$

$$57 \div 3 = 19$$

There should be 19 terrapins in each tank.

$$19 - 12 = 7 \text{ (Tank A)}$$

$$19 - 15 = 4 \text{ (Tank B)}$$

Professor Long should transfer 7 terrapins to Tank A and 4 terrapins to Tank B.

4. Height of each triangle
 $= 20 \text{ cm} \div 2$
 $= 10 \text{ cm}$

$$\begin{aligned} \text{Base of each triangle} &= 54 \text{ cm} \div 2 \\ &= 27 \text{ cm} \end{aligned}$$

$$\begin{aligned} \text{Area of each triangle} &= \frac{1}{2} \times 27 \times 10 \\ &= 135 \text{ cm}^2 \end{aligned}$$

$$\begin{aligned} \text{Area of whole pizza} &= 6 \times 135 \text{ cm}^2 \\ &= 810 \text{ cm}^2 \end{aligned}$$

The area of the surface of the pizza is **810 cm²**.

5. Assume all 32 are motorcycles.
 $32 \times 2 \text{ wheels} = 64 \text{ wheels}$
 32 motorcycles have 64 wheels.

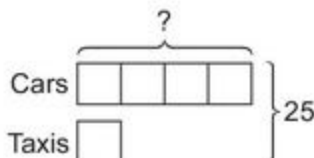
$$114 - 64 = 50$$

There are 50 extra wheels.

As each car / taxi has 2 more wheels than each motorcycle,

$$50 \div 2 \text{ wheels} = 25$$

There are 25 private cars and taxis.



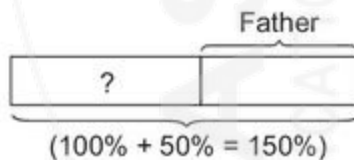
$$5 \text{ units} = 25 \text{ vehicles}$$

$$\begin{aligned} 1 \text{ unit} &= 25 \div 5 \\ &= 5 \text{ vehicles} \end{aligned}$$

$$\begin{aligned} 4 \text{ units} &= 4 \times 5 \\ &= 20 \text{ vehicles} \end{aligned}$$

20 private cars are parked at the car park.

6.



$$100\% \rightarrow \$280$$

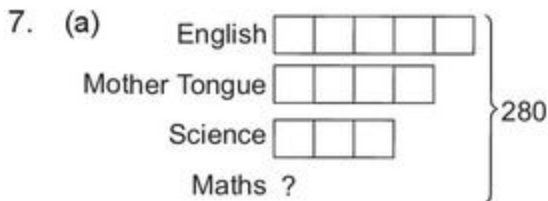
$$1\% \rightarrow \$280 \div 100 = \$2.80$$

$$150\% \rightarrow 150 \times \$2.80 = \$420$$

Xiao Man had \$420 after getting the money from her father.

$$\$420 \div 2 = \$210$$

Xiao Man had **\$210** at first.



$$75\% = \frac{75}{100} = \frac{3}{4}$$

$$4 \text{ units} = 68 \text{ marks}$$

$$1 \text{ unit} = 68 \div 4 \\ = 17 \text{ marks}$$

$$12 \text{ units} = 12 \times 17 \\ = 204 \text{ marks}$$

$$280 - 204 = 76$$

She scored **76** marks for her Maths.

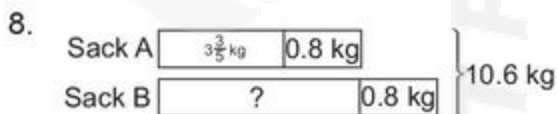
(b) Average mark now
 $= 280 \div 4$
 $= 70$

New average mark
 $= 70 + 2$
 $= 72$

New total marks
 $= 4 \times 72$
 $= 288$

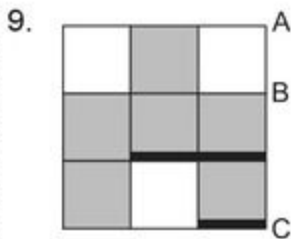
$$288 - 280 = 8$$

She must score **8** more marks for her next round of tests.



Mass of flour in Sack B at first
 $= 10.6 \text{ kg} - 3.6 \text{ kg} - (2 \times 0.8 \text{ kg})$
 $= 10.6 \text{ kg} - 3.6 \text{ kg} - 1.6 \text{ kg}$
 $= 5.4 \text{ kg}$

There was **5.4 kg** of flour in Sack B at first.



$$\text{Perimeter} = 48 \text{ cm}$$

$$\text{Side of big square (AC)} \\ = 48 \text{ cm} \div 4 \\ = 12 \text{ cm}$$

$$AB = \frac{1}{3} \times 12 \text{ cm} = 4 \text{ cm}$$

$$\text{Area of 1 small square} \\ = 4 \times 4 \\ = 16 \text{ cm}^2$$

$$\text{Area of 3 small squares} \\ = 3 \times 16 \text{ cm}^2 \\ = 48 \text{ cm}^2$$

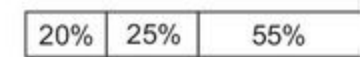
$$\text{Area of big square} \\ = 12 \times 12 \\ = 144 \text{ cm}^2$$

$$\text{Required ratio} \\ = 48 \text{ cm}^2 : 144 \text{ cm}^2 \\ = 1 : 3$$

The required ratio is **1 : 3**.

10. (a) $\frac{1}{5} = 20\%$

$$100\% - 20\% - 25\% = 55\%$$



Esther Ting Ting Angela & Fatimah

$$25\% - 20\% = 5\%$$

5% → 9 flowers

$$1\% \rightarrow \left(\frac{9}{5}\right) \text{ flowers}$$

$$55\% \rightarrow 55 \times \frac{9}{5} = 99 \text{ flowers}$$

(Angela and Fatimah)

$$1 \text{ unit} + 8 \text{ units} = 9 \text{ units}$$

$$9 \text{ units} = 99 \text{ flowers}$$

$$1 \text{ unit} = 99 \div 9 \\ = 11 \text{ flowers (Angela)}$$

$$8 \text{ units} = 8 \times 11 \\ = 88 \text{ flowers (Fatimah)}$$

Fatimah folded 88 paper flowers.

$$(b) \quad 1\% \longrightarrow \frac{9}{5} \text{ flowers}$$

$$100\% \longrightarrow 100 \times \frac{9}{5} \\ = 180 \text{ flowers}$$

$$180 \div 10 = 18$$

They made 18 bouquets of paper flowers.

$$18 \times \$9 = \$162$$

They raised \$162 for their school.

$$11. (a) \quad 12 \text{ units} - 5 \text{ units} = 7 \text{ units}$$

$$72 + 96 = 168$$

$$7 \text{ units} = 168 \text{ pens}$$

$$1 \text{ unit} = 168 \div 7 \\ = 24 \text{ pens}$$

$$12 \text{ units} = 12 \times 24 \\ = 288 \text{ pens}$$

There are 288 pens in the box.

$$(b) \quad 288 - 168 = 120$$

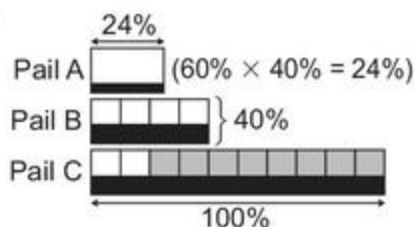
There are 120 red pens.

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

$$\frac{3}{4} \times 120 = 90$$

He had 90 red pens left.

12.



$$2 \text{ units} = 250 \text{ cm}^3$$

$$1 \text{ unit} = 250 \text{ cm}^3 \div 2 \\ = 125 \text{ cm}^3$$

$$10 \text{ units} = 10 \times 125 \text{ cm}^3 \\ = 1250 \text{ cm}^3$$

There was 1250 cm³ of sand in Pail C.

$$\frac{24}{100} \times 1250 \text{ cm}^3 = 300 \text{ cm}^3$$

There was 300 cm³ of sand in Pail A.

$$13. (a) \quad 10 \text{ units} - 7 \text{ units} = 3 \text{ units}$$

$$3 \text{ units} = 12 \text{ cm}$$

$$1 \text{ unit} = 12 \text{ cm} \div 3 \\ = 4 \text{ cm}$$

$$10 \text{ units} = 10 \times 4 \text{ cm} \\ = 40 \text{ cm (Length)}$$

$$7 \text{ units} = 7 \times 4 \text{ cm} \\ = 28 \text{ cm (Breadth)}$$

$$1792 \text{ ml} = 1792 \text{ cm}^3$$

Increase in water level

$$= 1792 \div (40 \times 28) \\ = 1792 \div 1120 \\ = 1.6 \text{ cm}$$

New height of water

$$= 6.4 \text{ cm} + 1.6 \text{ cm} \\ = 8 \text{ cm}$$

The new height of the water in the tank is 8 cm.

$$(b) \quad 10 \text{ cm} - 8 \text{ cm} = 2 \text{ cm}$$

Amount of water needed

$$= 40 \times 28 \times 2 \\ = 2240 \text{ cm}^3$$

James should pour 2240 cm³ more water into the tank to completely fill it up.

$$14. 1 - \frac{4}{9} - \frac{1}{6} = \frac{18}{18} - \frac{8}{18} - \frac{3}{18}$$

$$= \frac{7}{18}$$

Si Yong had $\frac{7}{18}$ of her money left after buying the dress and the hat.

$$30\% \rightarrow \$21$$

$$1\% \rightarrow \$\left(\frac{21}{30}\right)$$

$$100\% \rightarrow 100 \times \$\left(\frac{21}{30}\right) = \$70$$

$$\frac{7}{18} \rightarrow \$70$$

$$\frac{1}{18} \rightarrow \$70 \div 7 = \$10$$

$$\frac{18}{18} \rightarrow 18 \times \$10 = \$180$$

She brought **\$180** along for shopping.

$$15. \text{ Total cost of 12 mangoes}$$

$$= 12 \times \$2.10$$

$$= \$25.20$$

$$12 - 2 = 10$$

$$\text{Total cost of 10 mangoes given away}$$

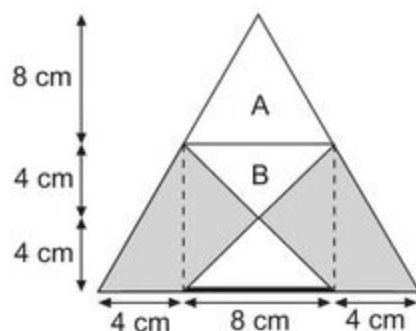
$$= 10 \times \$2.14$$

$$= \$21.40$$

$$\$25.20 - \$21.40 = \$3.80$$

The total cost of the mangoes he kept for himself was **\$3.80**.

16.



Area of big triangle

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

$$= 128 \text{ cm}^2$$

Area of $\triangle A$

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

$$= 32 \text{ cm}^2$$

Area of $\triangle B$

$$= \frac{1}{2} \times 8 \times 4$$

$$= 16 \text{ cm}^2$$

Total area of shaded parts

$$= \text{Area of big triangle} - \text{Area of } \triangle A$$

$$- 2 \times \text{Area of } \triangle B$$

$$= 128 \text{ cm}^2 - 32 \text{ cm}^2 - (2 \times 16 \text{ cm}^2)$$

$$= 128 \text{ cm}^2 - 32 \text{ cm}^2 - 32 \text{ cm}^2$$

$$= 64 \text{ cm}^2$$

The total area of the shaded parts is **64 cm²**.

$$17. \text{ (a) Total score}$$

$$= 4 \times 76$$

$$= 304$$

Science's score

$$= 304 - (86 + 92 + 74)$$

$$= 304 - 252$$

$$= 52$$

His score for Science is **52**.

(b) New average score
 $= 76 + 4$
 $= 80$

New total score
 $= 4 \times 80$
 $= 320$

New Science score
 $= 320 - 252$
 $= 68$

$68 - 52 = 16$

He scored **16** more marks.



$2 \text{ units} = 98 - 26$
 $= 72 \text{ children}$

$1 \text{ unit} = 72 \div 2$
 $= 36 \text{ children}$

$16 \text{ units} = 16 \times 36$
 $= 576 \text{ children}$

$576 + 98 + 26 = 700$

There were **700** children in the music hall at first.

(b) $576 + 112 + 105 = 793$

There were **793** children in the hall in the end.

19. (a) Assume Margaret had 48 two-dollar notes.

$48 \times \$2 = \96

$\$128 - \$96 = \$32$

Each ten-dollar note is \$8 more than each two-dollar note.

$\$32 \div \$8 = 4$

She had **4** ten-dollar notes.

$48 - 4 = 44$

She had **44** two-dollar notes.

(b) $4 \times \$10 = \40
 $\$40 \div 16 = \2.50

Each notebook cost **\$2.50**.

20. $8 - 5 = 3 \text{ units}$

$\text{Ham} : \text{Egg}$
 $- 2 \text{ units} \left(\begin{array}{l} 5 : 3 \\ 3 : 1 \end{array} \right) - 2 \text{ units}$

$3 \text{ units} = 18 \text{ sandwiches}$

$1 \text{ unit} = 18 \div 3$
 $= 6 \text{ sandwiches}$

$5 \text{ units} = 5 \times 6$
 $= 30 \text{ sandwiches}$

There were **30** ham sandwiches at first.

Trial Examination 1

PAPER 1

Section A:

1. (4)

$$\begin{aligned} 103\ 375 + 354\ 643 \\ = 458\ 018 \\ \approx \underline{500\ 000} \end{aligned}$$

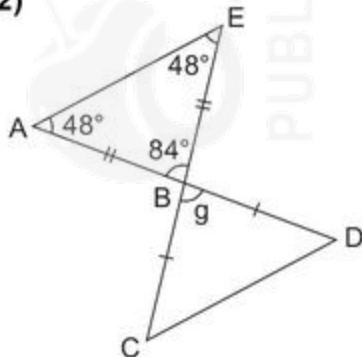
2. (4)

$$\begin{aligned} 764 - 715 \div (13 \times 5) + 2867 \\ = 764 - 715 \div 65 + 2867 \\ = 764 - 11 + 2867 \\ = \underline{3620} \end{aligned}$$

3. (4)

$$\begin{aligned} 8\frac{2}{5} - 1\frac{3}{10} &= 8\frac{4}{10} - 1\frac{3}{10} \\ &= 7\frac{1}{10} \\ 4\frac{1}{2} + 7\frac{1}{10} &= 4\frac{5}{10} + 7\frac{1}{10} \\ &= 11\frac{6}{10} \\ &= \underline{11\frac{3}{5}} \end{aligned}$$

4. (2)



$$\begin{aligned} \angle ABE &= 180^\circ - 48^\circ - 48^\circ \text{ (\angle sum of } \triangle) \\ &= 84^\circ \\ \angle g &= \underline{84^\circ} \text{ (vert. opp. } \angle\text{s)} \end{aligned}$$

5. (2)

$$\begin{aligned} 12 \times \$280 &= \$3360 \\ \$3360 + \$654 &= \$4014 \end{aligned}$$

She spent \$4014 in all.

6. (3)

$$\begin{aligned} 1 \text{ min} &\longrightarrow 5 \text{ toy trains} \\ 60 \text{ min} &\longrightarrow 60 \times 5 = \underline{300} \text{ toy trains} \end{aligned}$$

$$\uparrow \\ 1 \text{ h} = 60 \text{ min}$$

7. (3)

$$\begin{aligned} \text{Glenn} : \text{Sally} \\ 4 : 7 \\ 7 \text{ units} - 4 \text{ units} &= 3 \text{ units} \\ 3 \text{ units} &= 36 \text{ stickers} \\ 1 \text{ unit} &= 36 \div 3 \\ &= 12 \text{ stickers} \\ 7 \text{ units} &= 7 \times 12 \\ &= 84 \text{ stickers} \end{aligned}$$

Sally has 84 stickers.

8. (2)

$$\begin{aligned} 12 \div 3 &= 4 \\ 4 \times \$1.40 &= \$5.60 \end{aligned}$$

12 such erasers cost \$5.60.

9. (4)

$$\begin{aligned} \text{Breadth} &= 108.5 \text{ cm}^2 \div 7 \text{ cm} \\ &= 15.5 \text{ cm} \end{aligned}$$

$$\begin{aligned} \text{Perimeter} \\ &= 15.5 + 7 + 15.5 + 7 \\ &= \underline{45 \text{ cm}} \end{aligned}$$

10. (3)

$$\begin{aligned} \text{Number of unit cubes} \\ &= 13 + 5 + 1 \\ &= 19 \end{aligned}$$

$$\begin{aligned} \text{Volume of each cube} \\ &= 1 \times 1 \times 1 \\ &= 1 \text{ cm}^3 \end{aligned}$$

$$\begin{aligned} \text{Volume of solid figure} \\ &= 19 \times 1 \text{ cm}^3 \\ &= \underline{19 \text{ cm}^3} \end{aligned}$$

11. (3)
 $0.4 = \frac{4}{10} = \frac{2}{5}$ (Girls)

$$\frac{\text{Girls}}{2} : \frac{\text{Boys}}{3}$$

$$3 \text{ units} - 2 \text{ units} = 1 \text{ unit}$$

$$\begin{aligned} 1 \text{ unit} &= 16 \text{ children} \\ 5 \text{ units} &= 5 \times 16 \\ &= 80 \text{ children} \end{aligned}$$

There are 80 children altogether.

12. (4)
 $100\% - 65\% = 35\%$
 $35\% \rightarrow \$560$
 $1\% \rightarrow \$\left(\frac{560}{35}\right)$
 $100\% \rightarrow 100 \times \$\left(\frac{560}{35}\right) = \1600
 $12 \times \$1600 = \$19\,200$

She earns \$19 200 in a year.

13. (1)
 Total mass of 5 girls
 $= 5 \times 64.5 \text{ kg}$
 $= 322.5 \text{ kg}$
 Mass of other 3 girls
 $= 322.5 \text{ kg} - 58 \text{ kg} - 47 \text{ kg}$
 $= 217.5 \text{ kg}$

$$\begin{aligned} \text{Average mass of other 3 girls} \\ &= 217.5 \text{ kg} \div 3 \\ &= \underline{72.5 \text{ kg}} \end{aligned}$$

14. (1)
 Average of triangle
 $= \frac{1}{2} \times 8 \times 8$
 $= 32 \text{ cm}^2$

$$\begin{aligned} \text{Area of rectangle} \\ &= \frac{3}{4} \times 32 \text{ cm}^2 \\ &= 24 \text{ cm}^2 \end{aligned}$$

$$\begin{aligned} \text{Breadth} \\ &= 24 \text{ cm}^2 \div 6 \text{ cm} \\ &= \underline{4 \text{ cm}} \end{aligned}$$

15. (1)
 Capacity of Container A
 $= 20 \times 15 \times 12$
 $= 3600 \text{ cm}^3$

$$\begin{aligned} \text{Height of Container B} \\ &= 3600 \text{ cm}^3 \div 200 \text{ cm}^2 \\ &= \underline{18 \text{ cm}} \end{aligned}$$

Section B:

16. $684\,238 - 600\,000 - 4238 = 80\,000$
 $80\,000 \div 8 = 10\,000$

17. $2\frac{4}{7} \times 3 = \frac{18}{7} \times 3$
 $= \frac{54}{7}$
 $= 7\frac{5}{7}$

$$\begin{aligned} 21\frac{5}{14} - 7\frac{5}{7} &= 21\frac{5}{14} - 7\frac{10}{14} \\ &= 20\frac{19}{14} - 7\frac{10}{14} \\ &= 13\frac{9}{14} \end{aligned}$$

$13\frac{9}{14}$ must be added.

18. $5.4 \text{ l} = 5400 \text{ cm}^3$
 $5400 \text{ cm}^3 \div 8 = 675 \text{ cm}^3$

There is 675 cm³ tea in each mug.

19. Boys : Girls
17 : 8

17 units + 8 units = 25 units

Percentage of boys

$$= \frac{17}{25} \times 100\%$$

$$= 68\%$$

20. Area of triangle

$$= \frac{1}{2} \times 5 \times 7$$

$$= 17.5 \text{ cm}^2$$

21. $\angle y = 180^\circ - 53^\circ - 48^\circ$ (\angle s between // lines)
 $= 79^\circ$

22. $100\% - 10\% = 90\%$

90% \rightarrow 36 pupils

1% \rightarrow $(\frac{36}{90})$ pupils

100% \rightarrow $100 \times \frac{36}{90} = 40$ pupils

There are 40 pupils in P5A.

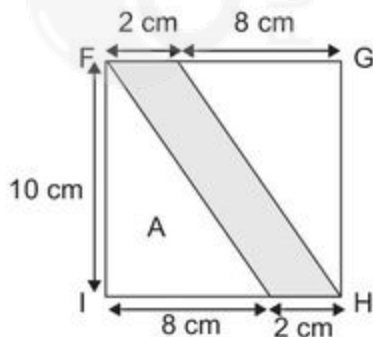
23. 9 pencils \rightarrow \$7.65

1 pencil \rightarrow $\$7.65 \div 9 = \0.85

6 pencils \rightarrow $6 \times \$0.85 = \5.10

The cost of 6 such pencils is \$5.10.

24.



$10 \text{ cm} - 2 \text{ cm} = 8 \text{ cm}$

Area of $\triangle A$

$$= \frac{1}{2} \times 8 \times 10$$

$$= 40 \text{ cm}^2$$

Area of square

$$= 10 \times 10$$

$$= 100 \text{ cm}^2$$

Shaded area of square

$$= 100 \text{ cm}^2 - 40 \text{ cm}^2 - 40 \text{ cm}^2$$

$$= 20 \text{ cm}^2$$

25. $19 \text{ cm} \div 2 \text{ cm} = 9 \text{ R } 1 \text{ cm}$

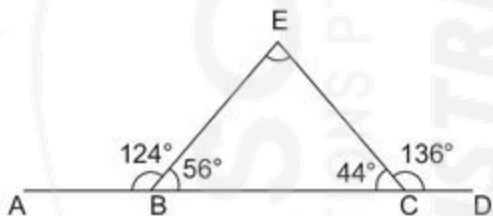
$9 \text{ cm} \div 2 \text{ cm} = 4 \text{ R } 1 \text{ cm}$

$8 \text{ cm} \div 2 \text{ cm} = 4$

$9 \times 4 \times 4 = 144$

144 2-cm cubes can be placed in the box at most.

26.

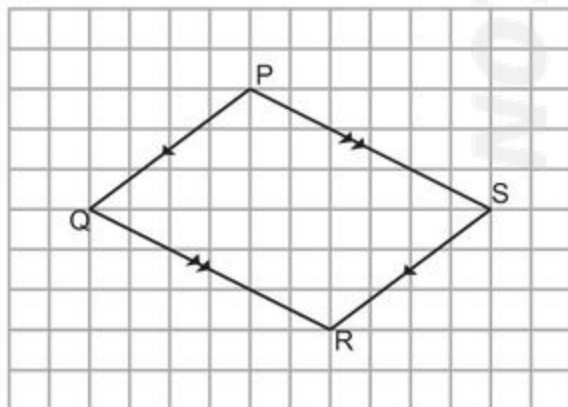


$\angle CBE = 180^\circ - 124^\circ$ (\angle s on a straight line)
 $= 56^\circ$

$\angle BCE = 180^\circ - 136^\circ$ (\angle s on a straight line)
 $= 44^\circ$

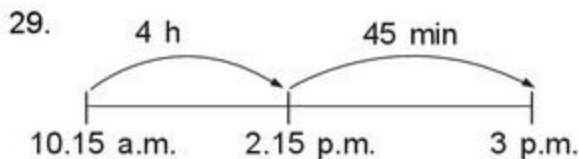
$\angle BEC = 180^\circ - 56^\circ - 44^\circ$ (\angle sum of \triangle)
 $= 80^\circ$

27.



28. $1656 - 136 = 1520$
 $1520 \div 20 = 76$

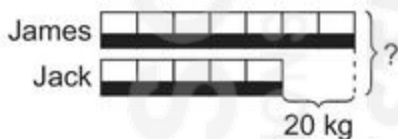
She packed **76** boxes of cupcakes.



$4 \text{ h } 45 \text{ min} - 1 \text{ h}$
 $= 3 \text{ h } 45 \text{ min}$
 $= 8 \text{ half hours or part thereof}$

Parking charges
 $= \$2.20 + (8 \times \$1.50)$
 $= \$2.20 + \12
 $= \$14.20$

30. $1 \frac{2}{5} = \frac{7}{5}$



$2 \text{ units} = 20 \text{ kg}$
 $1 \text{ unit} = 20 \text{ kg} \div 2$
 $= 10 \text{ kg}$
 $12 \text{ units} = 12 \times 10 \text{ kg}$
 $= 120 \text{ kg}$

Their total mass is **120 kg**.

PAPER 2

1. Total mass of 7 children
 $= 7 \times 56.85 \text{ kg}$
 $= 397.95 \text{ kg}$

Total mass of 10 children
 $= 397.95 \text{ kg} + 45.2 \text{ kg} + 58.3 \text{ kg} + 54.9 \text{ kg}$
 $= 556.35 \text{ kg}$

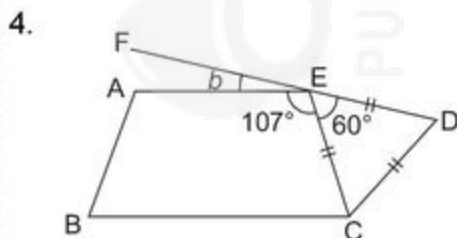
Average mass of 10 children
 $= 556.35 \text{ kg} \div 10$
 $= 55.635 \text{ kg}$

2. $\frac{\text{File}}{5} : \frac{\text{Pen}}{4} : \frac{\text{Pencil}}{2 \times 2} : \frac{\text{Pencil}}{5 \times 2}$
 $5 : 4 : 10$

$\frac{\text{File}}{5} : \frac{\text{Pencil}}{10}$
 $= 1 : 2$

3. Volume of metal block
 $= 12 \times 8 \times 5$
 $= 480 \text{ cm}^3$
 $1 \text{ cm}^3 \rightarrow 15 \text{ g}$
 $480 \text{ cm}^3 \rightarrow 480 \times 15 \text{ g} = 7200 \text{ g}$
 $= 7.2 \text{ kg}$

Its mass is **7.2 kg**.

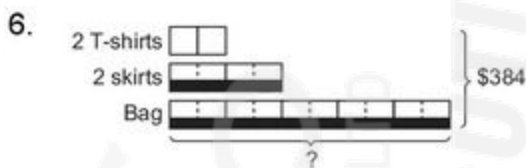


$\angle CED = 180^\circ \div 3$ (equi. Δ)
 $= 60^\circ$
 $\angle b = 180^\circ - 107^\circ - 60^\circ$ (\angle s on a straight line)
 $= 13^\circ$

5. $100\% - 30\% = 70\%$
 $70\% \rightarrow \$1050$
 $1\% \rightarrow \$1050 \div 70 = \15
 $30\% \rightarrow 30 \times \$15 = \$450$
 (Discount price of watch)

$80\% \rightarrow \$450$
 $1\% \rightarrow \$\left(\frac{450}{80}\right)$
 $100\% \rightarrow 100 \times \$\left(\frac{450}{80}\right) = \562.50

The original price of the watch was **\$562.50**.



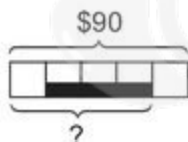
$16 \text{ units} = \$384$
 $1 \text{ unit} = \$384 \div 16$
 $= \$24$
 $10 \text{ units} = 10 \times \24
 $= \$240$

1 bag costs \$240.

$2 \times \$240 = \480

The cost of 2 such bags is **\$480**.

7. 1st iron:



$5 \text{ units} = \$90$
 $1 \text{ unit} = \$90 \div 5$
 $= \$18$
 $4 \text{ units} = 4 \times \18
 $= \$72$

The original price of the first iron was **\$72**.

- 2nd iron:

$80\% \rightarrow \$90$
 $1\% \rightarrow \$\left(\frac{90}{80}\right)$
 $100\% \rightarrow 100 \times \$\left(\frac{90}{80}\right) = \112.50

The original price of the second iron was **\$112.50**.

$\$72 + \$112.50 = \$184.50$

She paid **\$184.50** for the two irons.

8. $1 - \frac{1}{5} - \frac{2}{7} - \frac{1}{5} = \frac{11}{35}$

$\frac{11}{35} \rightarrow \264

$\frac{1}{35} \rightarrow \$264 \div 11 = \$24$

$\frac{35}{35} \rightarrow 35 \times \$24 = \$840$

He had **\$840** at first.

9. $4897 + 3789 = 8686$



$5 \text{ units} - 3 \text{ units} = 2 \text{ units}$

$2 \text{ units} = 64 \text{ stamps}$

$1 \text{ unit} = 64 \div 2$
 $= 32 \text{ stamps}$

$8 \text{ units} = 8 \times 32$
 $= 256 \text{ stamps}$

$8686 - 256 = 8430$

Glenn sold **8430** stamps.

10. $42 - 15 = 27$

Number of boys who scored 65 marks

$$= \frac{2}{3 + 4 + 2} \times 27$$

$$= \frac{2}{9} \times 27$$

$$= 6$$

Required fraction

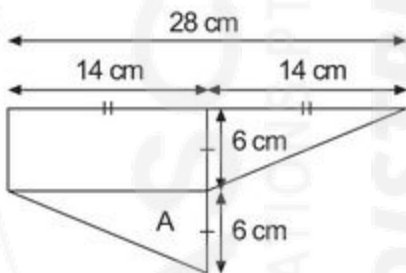
$$= \frac{15 + 6}{42}$$

$$= \frac{21}{42}$$

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

$\frac{1}{2}$ of the boys in the class scored 95 marks and 65 marks.

11.



$$28 \text{ cm} \div 2 = 14 \text{ cm}$$

Area of rectangle

$$= 14 \times 6$$

$$= 84 \text{ cm}^2$$

Area of $\triangle A$

$$= \frac{1}{2} \times 14 \times 6$$

$$= 42 \text{ cm}^2$$

Area of figure

$$= 84 + 42 + 42$$

$$= 168 \text{ cm}^2$$

The area of the figure is **168 cm²**.

12. $\frac{A}{4 \times 2} : \frac{B}{1 \times 2} : \frac{C}{2 : 3}$

$$8 : 2 : 3$$

$$3 \text{ units} = 24 \text{ cm}$$

$$1 \text{ unit} = 24 \text{ cm} \div 3$$

$$= 8 \text{ cm}$$

$$2 \text{ units} = 2 \times 8 \text{ cm}$$

$$= 16 \text{ cm (Breadth)}$$

$$8 \text{ units} = 8 \times 8 \text{ cm}$$

$$= 64 \text{ cm (Length)}$$

Volume of solid

$$= 64 \times 16 \times 24$$

$$= 24\,576 \text{ cm}^3$$

The volume of the solid is **24 576 cm³**.

13. $0.8 = \frac{8}{10} = \frac{4}{5}$, $0.5 = \frac{5}{10} = \frac{1}{2}$

Rotten : Red : Green

$$4 : 5$$

$$1 \times 2 : 2 \times 2$$

$$2 : 4 : 5$$

$$5 \text{ units} = 120 \text{ apples}$$

$$1 \text{ unit} = 120 \text{ apples} \div 5$$

$$= 24 \text{ apples}$$

$$11 \text{ units} = 11 \times 24$$

$$= 264 \text{ apples}$$

There are **264 apples** altogether.

14. Box + 40 Balls \rightarrow 2.06 kg
 Box + 120 Beads \rightarrow 2.06 kg = 2060 g
 Box + 20 Beads \rightarrow 560 g

$$100 \text{ Beads} \rightarrow 2060 \text{ g} - 560 \text{ g}$$

$$= 1500 \text{ g}$$

$$1 \text{ Bead} \rightarrow 1500 \text{ g} \div 100$$

$$= 15 \text{ g}$$

$$20 \text{ Beads} \rightarrow 20 \times 15$$

$$= 300 \text{ g}$$

$$560 \text{ g} - 300 \text{ g} = 260 \text{ g}$$

The mass of the empty box is **260 g**.

15. $20 \text{ l} = 20\,000 \text{ cm}^3$
 $20\,000 \div 2 = 10\,000 \text{ cm}^3$

Tank A : Tank B
 2 : 5

2 units = $10\,000 \text{ cm}^3$
 1 unit = $10\,000 \text{ cm}^3 \div 2$
 $= 5000 \text{ cm}^3$
 5 units = $5 \times 5000 \text{ cm}^3$
 $= 25\,000 \text{ cm}^3$

Capacity of Tank B
 $= 1000 \times 80$
 $= 80\,000 \text{ cm}^3$

$80\,000 \text{ cm}^3 - 25\,000 \text{ cm}^3$
 $= 55\,000 \text{ cm}^3$

55 000 cm³ more apple syrup is required to fill Tank B to its brim.

16. 70% \rightarrow 560 girls
 1% \rightarrow $560 \div 70 = 8$ girls
 35% \rightarrow $35 \times 8 = 280$ girls

$460 - 280 = 180$

60% \rightarrow 180 boys
 1% \rightarrow $180 \div 60 = 3$ boys
 100% \rightarrow $100 \times 3 = 300$ boys

There are **300** boys in the childcare centre.

17. (a)

21	}	49
21		

$49 - 7 = 42$
 $42 \div 2 = 21$

$21 \times \$1.50 = \31.50
 $\$90.30 - \$31.50 = \$58.80$
 $\$58.80 \div 49 = \1.20
 $\$1.20 + \$1.50 = \$2.70$
 A mango cost **\$2.70**.

(b) $28 \times \$1.20 = \33.60
 She paid **\$33.60** for the pears.

Trial Examination 2

PAPER 1

Section A:

1. (1)
 Factors of 35
 $= 1, 5, \textcircled{7}, 35$

Factors of 49
 $= 1, \textcircled{7}, 49$

The common factor of 35 and 49 is 7.

2. (3)

$$\begin{array}{ccccccccc} & +150 & & -120 & & +150 & & -120 & & +150 \\ & \curvearrowright & & \curvearrowright & & \curvearrowright & & \curvearrowright & & \curvearrowright \\ 322\,842, & 322\,992, & 322\,872, & 323\,022, & 322\,902, & 323\,052 \end{array}$$

3. (2)
 $\angle c = 180^\circ - 90^\circ - 23^\circ$ (\angle s on a straight line)
 $= \underline{67^\circ}$

4. (4)
 Option (1): $24 : 42 : 27 = 8 : 14 : 9$
 Option (2): $12 : 14 : 18 = 6 : 7 : 9$
 Option (3): $9 : 21 : 15 = 3 : 7 : 5$
 Option (4): $20 : 35 : 25 = 4 : 7 : 5$ (\checkmark)

5. (3)
 $1 - \frac{2}{5} = \frac{3}{5}$
 $\frac{3}{5} \times 45 = 27$
27 children failed the test.

6. (4)
 Amount of money left
 $= \$80 - \$45 - \$10$
 $= \$25$
 Required fraction
 $= \frac{\$25}{\$80}$
 $= \frac{5}{16}$

7. (4)
 52 hundreds + 458 tens
 = 5200 + 4580
 = 9780

$9780 \times 8 = \underline{78\ 240}$

8. (1)
 $0.5 = \frac{5}{10} = \frac{1}{2}$
 $\frac{1}{2} \times 250 = 125$

$250 - 125 - 92 = 33$

He had 33 muffins left.

9. (4)
 Area of each face
 = 9×9
 = 81 cm^2

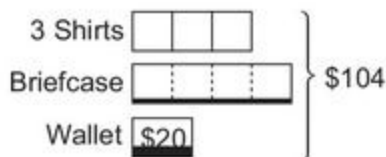
Total surface area
 = $6 \times 81\text{ cm}^2$
 = $\underline{486\text{ cm}^2}$

10. (3)
 Area of shaded triangle
 = $\frac{1}{2} \times 18 \times 16$
 = $\underline{144\text{ cm}^2}$

11. (4)
 9 units = 72 cm
 1 unit = $72\text{ cm} \div 9$
 = 8 cm
 17 units = $17 \times 8\text{ cm}$
 = 136 cm

The length of the original plank is 136 cm.

12. (2)
 $0.25 = \frac{25}{100} = \frac{1}{4}$

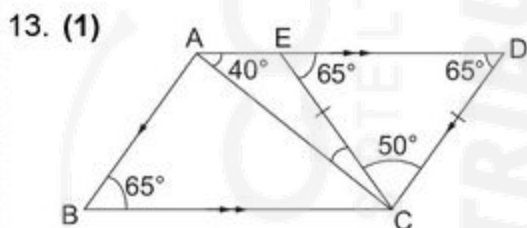


7 units = $\$104 - \20
 = $\$84$

1 unit = $\$84 \div 7$
 = $\$12$

4 units = $4 \times \$12$
 = $\$48$

The briefcase cost \$48.



$\angle ADC = 65^\circ$ (opp. \angle s of a parallelogram)

$\angle DCE = 180^\circ - 65^\circ - 65^\circ$ (\angle sum of \triangle)
 = 50°

$\angle ACD = 180^\circ - 40^\circ - 65^\circ$ (\angle sum of \triangle)
 = 75°

$\angle ACE = 75^\circ - 50^\circ$
 = $\underline{25^\circ}$

14. (4)
 25 revolutions \longrightarrow 1 min
 1 revolution \longrightarrow $(\frac{1}{25})$ min
 100 revolutions \longrightarrow $100 \times \frac{1}{25} = 4$ min

It takes 4 min to run 100 revolutions.

15. (1)
 $45\text{ cm} \div 5\text{ cm} = 9$
 $32\text{ cm} \div 5\text{ cm} = 6\text{ R } 2\text{ cm}$
 $10\text{ cm} \div 5\text{ cm} = 2$

Maximum number of cubes
 = $9 \times 6 \times 2$
 = 108

Section B:

16. $\frac{2}{7} \rightarrow 72$

$\frac{1}{7} \rightarrow 72 \div 2 = 36$

$\frac{7}{7} \rightarrow 7 \times 36 = 252$

$252 \div 2 = 126$

Half of the number is **126**.

17. $67 + 132 \div 11 \times 9$
 $= 67 + 12 \times 9$
 $= 67 + 108$
 $= 175$

18. $25 \times \frac{1}{3}$
 $= \frac{25}{3}$
 $= 8\frac{1}{3} \text{ cm}$

The height of a pile of 25 such books is $8\frac{1}{3}$ cm.

19. $\frac{\text{Jackson}}{2} : \frac{\text{Adrian}}{7} : \frac{\text{Eric}}{5}$

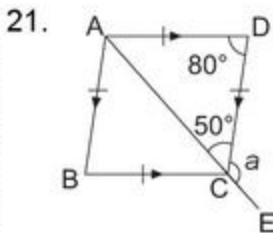
$7 \text{ units} + 5 \text{ units} = 12 \text{ units}$
 $2 \text{ units} + 7 \text{ units} + 5 \text{ units} = 14 \text{ units}$

Required fraction
 $= \frac{12}{14}$
 $= \frac{6}{7}$

20. $1\frac{1}{3} \text{ h} = \frac{4}{3} \times 60 = 80 \text{ min}$

$6 \text{ min} \rightarrow 144 \text{ words}$
 $1 \text{ min} \rightarrow 144 \div 6 = 24 \text{ words}$
 $80 \text{ min} \rightarrow 80 \times 24 = 1920 \text{ words}$

She can get type **1920** words in $1\frac{1}{3}$ h.



$\angle ACD = (180^\circ - 80^\circ) \div 2$ (isos. Δ)
 $= 100^\circ \div 2$
 $= 50^\circ$

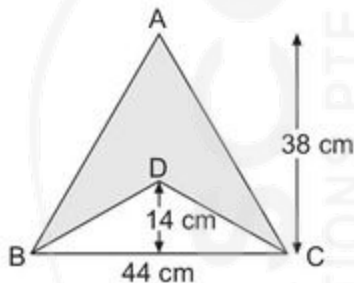
$\angle a = 180^\circ - 50^\circ$ (\angle s on a straight line)
 $= 130^\circ$

22. $25\% + 45\% = 70\%$

$\frac{70}{100} \times \$8400 = \5880

Her total expenditure was **\$5880**.

23.



Area of $\triangle ABC$
 $= \frac{1}{2} \times 44 \times 38$
 $= 836 \text{ cm}^2$

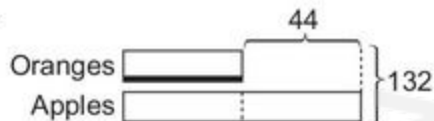
Area of $\triangle BCD$
 $= \frac{1}{2} \times 44 \times 14$
 $= 308 \text{ cm}^2$

Area of shaded part
 $= 836 \text{ cm}^2 - 308 \text{ cm}^2$
 $= 528 \text{ cm}^2$

$$24. \quad 7.5 \text{ l} = 7500 \text{ ml} \\ = 7500 \text{ cm}^3$$

$$\begin{aligned} \text{Base area of tank} \\ &= 7500 \text{ cm}^3 \div 10 \text{ cm} \\ &= 750 \text{ cm}^2 \end{aligned}$$

25.



$$\begin{aligned} 2 \text{ units} &= 132 - 44 \\ &= 88 \text{ fruits} \\ 1 \text{ unit} &= 88 \div 2 \\ &= 44 \text{ fruits} \end{aligned}$$

There were 44 oranges.

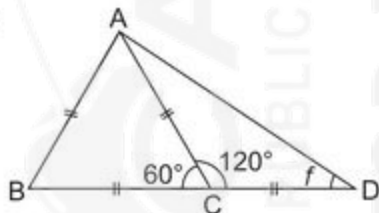
$$44 + 44 = 88$$

There were 88 apples.

Required fraction

$$\begin{aligned} &= \frac{44}{88} \\ &= \frac{1}{2} \end{aligned}$$

26.



$$\begin{aligned} \angle ACB &= 180^\circ \div 3 \text{ (equi. } \triangle) \\ &= 60^\circ \end{aligned}$$

$$\begin{aligned} \angle ACD &= 180^\circ - 60^\circ \text{ (}\angle\text{s on a straight line)} \\ &= 120^\circ \end{aligned}$$

$$\begin{aligned} \angle f &= (180^\circ - 120^\circ) \div 2 \\ &= 60^\circ \div 2 \\ &= 30^\circ \end{aligned}$$

27.



Side view

28. Before:

$$\text{Johnny} : \text{Susan} \\ 140 : 100$$

$$\frac{40}{100} \times 140 = 56$$

After:

$$\text{Johnny} : \text{Susan} \\ 56 : 100$$

$$100 \text{ units} - 56 \text{ units} = 44 \text{ units}$$

$$44 \text{ units} = 88 \text{ stamps}$$

$$\begin{aligned} 1 \text{ unit} &= 88 \div 44 \\ &= 2 \text{ stamps} \end{aligned}$$

$$\begin{aligned} 56 \text{ units} &= 56 \times 2 \\ &= 112 \text{ stamps} \end{aligned}$$

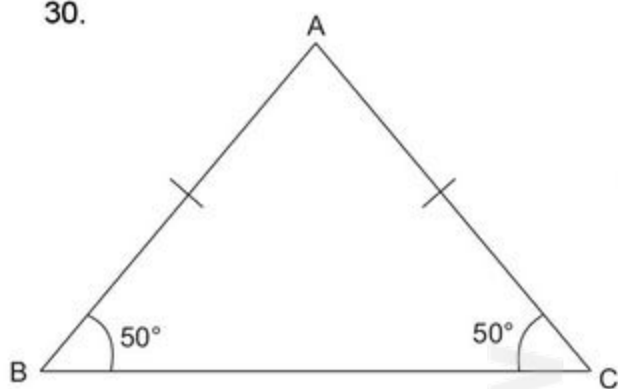
Johnny had 112 stamps left.

$$29. \quad \frac{1}{4} \text{ of sweater} \longrightarrow 1\frac{3}{4} \text{ days}$$

$$\begin{aligned} \frac{3}{4} \text{ of sweater} &\longrightarrow 3 \times 1\frac{3}{4} \\ &= 3 \times \frac{7}{4} \\ &= \frac{21}{4} \\ &= 5\frac{1}{4} \text{ days} \end{aligned}$$

She needs $5\frac{1}{4}$ days more to complete her sweater.

30.

**PAPER 2**

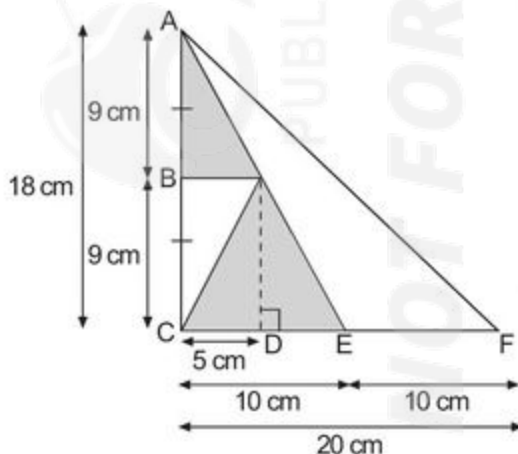
1. Total height of 9 children
 $= 9 \times 1.65 \text{ m}$
 $= 14.85 \text{ m}$

Total height of 3 children
 $= 3 \times 1.72 \text{ m}$
 $= 5.16 \text{ m}$

$$14.85 \text{ m} - 5.16 \text{ m} = 9.69 \text{ m}$$

Average height of remaining 6 children
 $= 9.69 \text{ m} \div 6$
 $= 1.615 \text{ m}$
 $= 161.5 \text{ cm}$

2.



$$\begin{aligned} BC &= 18 \text{ cm} \div 2 = 9 \text{ cm} \\ CE &= 20 \text{ cm} \div 2 = 10 \text{ cm} \\ CD &= 10 \text{ cm} \div 2 = 5 \text{ cm} \end{aligned}$$

Area of $\triangle ACE$

$$\begin{aligned} &= \frac{1}{2} \times 10 \times 18 \\ &= 90 \text{ cm}^2 \end{aligned}$$

Area of $\triangle BCF$

$$\begin{aligned} &= \frac{1}{2} \times 5 \times 9 \\ &= 22.5 \text{ cm}^2 \end{aligned}$$

Total area of shaded parts

$$\begin{aligned} &= 90 \text{ cm}^2 - 22.5 \text{ cm}^2 \\ &= 67.5 \text{ cm}^2 \end{aligned}$$

3. $3 \text{ calculators} + 2 \text{ CDs} \rightarrow \58.50
 $\times 3$ $1 \text{ calculator} + 3 \text{ CDs} \rightarrow \$58.50 + \$3$
 $ \phantom{1 \text{ calculator}} = \61.50
 $3 \text{ calculators} + 9 \text{ CDs} \rightarrow 3 \times \61.50
 $\phantom{3 \text{ calculators}} = \184.50

$$\begin{aligned} 7 \text{ CDs} &\rightarrow \$184.50 - \$58.50 = \$126 \\ 1 \text{ CD} &\rightarrow \$126 \div 7 = \$18 \end{aligned}$$

Each music CD cost **\$18**.

4. Before:
 Leslie : Terence
 2 : 5

After:
 Leslie : Terence
 2 : 1

$$5 \text{ units} - 1 \text{ unit} = 4 \text{ units}$$

$$\begin{aligned} 4 \text{ units} &= \$40 \\ 1 \text{ unit} &= \$40 \div 4 \\ &= \$10 \\ 5 \text{ units} &= 5 \times \$10 \\ &= \$50 \end{aligned}$$

Terence had **\$50** at first.

$$5. \quad \frac{15}{100} \times 14 \text{ m} = 2.1 \text{ m}$$

$$14 \text{ m} - 2.1 \text{ m} = 11.9 \text{ m}$$

$$\frac{25}{100} \times 11.9 \text{ m} = 2.975 \text{ m}$$

$$14 \text{ m} - 2.1 \text{ m} - 2.975 \text{ m} = 8.925 \text{ m}$$

She had **8.925 m** of cloth left.

$$6. \quad 15 \times 40 = 600$$

$$600 - 80 = 520$$

$$\$1040 \div 520 = \$2$$

He sold each durian for **\$2**.

$$7. \quad 1 - \frac{1}{3} - \frac{3}{7} = \frac{5}{21}$$

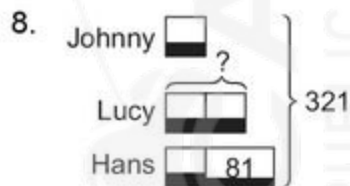
$$\frac{3}{7} - \frac{5}{21} = \frac{4}{21}$$

$$\frac{4}{21} \rightarrow 112 \text{ people}$$

$$\frac{1}{21} \rightarrow 112 \div 4 = 28 \text{ people}$$

$$\frac{21}{21} \rightarrow 21 \times 28 = 588 \text{ people}$$

The total number of people in the hall was **588**.



$$\text{Total number of stickers}$$

$$= 3 \times 107$$

$$= 321$$

$$4 \text{ units} = 321 - 81$$

$$= 240 \text{ stickers}$$

$$1 \text{ unit} = 240 \div 4$$

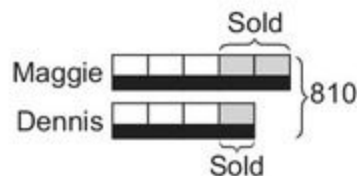
$$= 60 \text{ stickers}$$

$$2 \text{ units} = 2 \times 60$$

$$= 120 \text{ stickers}$$

Lucy collected **120** stickers.

9.



$$9 \text{ units} = 810 \text{ muffins}$$

$$1 \text{ unit} = 810 \div 9$$

$$= 90 \text{ muffins}$$

$$5 \text{ units} = 5 \times 90$$

$$= 450 \text{ muffins (Maggie)}$$

$$4 \text{ units} = 4 \times 90$$

$$= 360 \text{ muffins (Dennis)}$$

Maggie had **450** muffins and Dennis **360** muffins at first.

$$10. \quad \frac{\text{Chocolate cookies}}{3} : \frac{\text{Butter cookies}}{2}$$

$$5 \text{ units} = 750 \text{ cookies}$$

$$1 \text{ unit} = 750 \div 5$$

$$= 150 \text{ cookies}$$

$$3 \text{ units} = 3 \times 150$$

$$= 450 \text{ cookies (Chocolate)}$$

$$2 \text{ units} = 2 \times 150$$

$$= 300 \text{ cookies (Butter)}$$

$$\text{Mass of metal container of cookies}$$

$$= 12 \text{ g} + (450 \times 5 \text{ g}) + (300 \times 3 \text{ g})$$

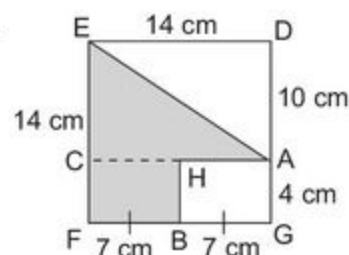
$$= 12 \text{ g} + 2250 \text{ g} + 900 \text{ g}$$

$$= 3162 \text{ g}$$

$$= 3.162 \text{ kg}$$

The mass of the metal container of cookies is **3.162 kg**.

11.



$$AG = \frac{2}{7} \times 14 \text{ cm} = 4 \text{ cm}$$

$$AD = 14 \text{ cm} - 4 \text{ cm} = 10 \text{ cm}$$

$$BG = 14 \text{ cm} \div 2 = 7 \text{ cm}$$

Area of $\triangle AEC$

$$= \frac{1}{2} \times 14 \times 10$$

$$= 70 \text{ cm}^2$$

Area of rectangle BFCH

$$= 7 \times 4$$

$$= 28 \text{ cm}^2$$

Area of shaded part

$$= 70 \text{ cm}^2 + 28 \text{ cm}^2$$

$$= 98 \text{ cm}^2$$

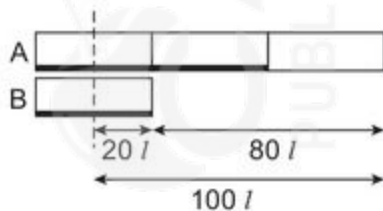
The area of the shaded part of the square is **98 cm²**.

12. Tank A

In 10 min, $10 \times 10 \text{ l} = 100 \text{ l}$
 100 l of water has drained out from Tank A in 10 min.

Tank B

In 10 min, $10 \times 2 \text{ l} = 20 \text{ l}$
 20 l of water has drained out from Tank B in 10 min.



$$2 \text{ units} = 100 \text{ l} - 20 \text{ l}$$

$$= 80 \text{ l}$$

$$1 \text{ unit} = 80 \text{ l} \div 2$$

$$= 40 \text{ l}$$

$$3 \text{ units} = 3 \times 40 \text{ l}$$

$$= 120 \text{ l}$$

There were **120 l** of water in Tank A at first.

13. $10 \times \$65 = \650
 $\$1018 + \$650 = \$1668$
 $\$1668 \div 4 = \417
 $\$417 \div 3 = \139

Each camera cost **\\$139**.

14. (a) Perimeter of rectangular swimming pool

$$= 50 + 37 + 50 + 37$$

$$= 174 \text{ m}$$

<u>Rectangular</u> swimming pool	:	<u>Square</u> flowerbed
3	:	4

$$3 \text{ units} = 174 \text{ m}$$

$$1 \text{ unit} = 174 \text{ m} \div 3$$

$$= 58 \text{ m}$$

$$4 \text{ units} = 4 \times 58 \text{ m}$$

$$= 232 \text{ m}$$

Total perimeter

$$= 174 \text{ m} + 232 \text{ m}$$

$$= 406 \text{ m}$$

Average perimeter

$$= 406 \text{ m} \div 2$$

$$= 203 \text{ m}$$

The average perimeter of the swimming pool and the flowerbed is **203 m**.

(b) Area of rectangular swimming pool

$$= 50 \times 37$$

$$= 1850 \text{ m}^2$$

Length of square flowerbed

$$= 232 \text{ m} \div 4$$

$$= 58 \text{ m}$$

Area of square flowerbed

$$= 58 \times 58$$

$$= 3364 \text{ m}^2$$

$$\begin{aligned} \text{Average area} &= (1850 \text{ m}^2 + 3364 \text{ m}^2) \div 2 \\ &= 2607 \text{ m}^2 \end{aligned}$$

The average area of both of them is **2607 m²**.

15. (a) $0.6 \text{ l} = 600 \text{ cm}^3$
 $600 \text{ cm}^3 \div (20 \text{ cm} - 14 \text{ cm})$
 $= 600 \div 6$
 $= 100 \text{ cm}^2$

The base area is **100 cm²**.

Length	10 cm	20 cm
Breadth	10 cm	5 cm
Area	100 cm ²	100 cm ²
Ratio	1 : 1	4 : 1 ✓

The length of container is **20 cm**.

(b) Capacity of container
 $= 20 \times 5 \times 24$
 $= 2400 \text{ cm}^3$

The capacity of the container is **2400 cm³**.

16. Family : Spent
 2 : 5

$$\begin{aligned} 5 \text{ units} &= \$300 + \$294 \\ &= \$594 \end{aligned}$$

$$\begin{aligned} 1 \text{ unit} &= \$594 \div 5 \\ &= \$118.80 \end{aligned}$$

$$\begin{aligned} 2 \text{ units} &= 2 \times \$118.80 \\ &= \$237.60 \end{aligned}$$

$$20\% \rightarrow \$237.60$$

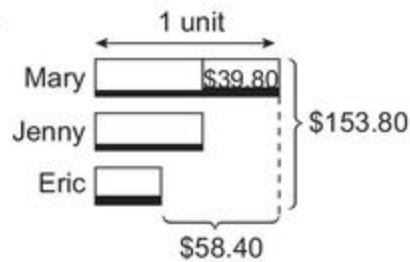
$$1\% \rightarrow \$237.60 \div 20 = \$11.88$$

$$100\% \rightarrow 100 \times \$11.88 = \$1188$$

$$\begin{aligned} \$1188 - \$237.60 - \$300 - \$294 \\ = \$356.40 \end{aligned}$$

She saved **\$356.40**.

17.



$$\begin{aligned} 3 \text{ units} &= \$153.80 + \$39.80 + \$58.40 \\ &= \$252 \end{aligned}$$

$$\begin{aligned} 1 \text{ unit} &= \$252 \div 3 \\ &= \$84 \end{aligned}$$

Mary collected **\$84**.

$$\begin{aligned} \$84 - \$58.40 &= \$25.60 \\ \text{Eric collected } &\$25.60. \end{aligned}$$

$$\$84 + \$25.60 = \$109.60$$

Mary and Eric collected **\$109.60** in all.

Trial Examination 3

PAPER 1

Section A:

1. (1)

$$\begin{aligned} & 23 \text{ thousands} \div 500 \\ & = 23\,000 \div 500 \\ & = 46 \end{aligned}$$

The value of the digit 6 is 6.

2. (3)

$$\begin{aligned} \text{Option (1): } & 17\,356 \approx 17\,000 \\ & \text{(nearest thousand)} \\ \text{Option (2): } & 17\,499 \approx 17\,000 \\ & \text{(nearest thousand)} \\ \text{Option (3): } & 17\,912 \approx 18\,000 \\ & \text{(nearest thousand) } (\checkmark) \\ \text{Option (4): } & 18\,503 \approx 19\,000 \\ & \text{(nearest thousand)} \end{aligned}$$

3. (2)

$$0.4 = \frac{4}{10} = \frac{2}{5}$$

The figure in Option (2) is 0.4 shaded.

4. (4)

$$\begin{aligned} & 25 : 60 \\ & = \underline{5 : 12} \end{aligned}$$

5. (4)

$$\begin{aligned} & 36 \times 14 + 309 \\ & = 504 + 309 \\ & = 813 \end{aligned}$$

$$\begin{aligned} \text{Option (1): } & 14 \times 36 + 309 \\ & = 504 + 309 \\ & = 813 (\checkmark) \end{aligned}$$

$$\begin{aligned} \text{Option (2): } & 309 + 14 \times 36 \\ & = 309 + 504 \\ & = 813 (\checkmark) \end{aligned}$$

$$\begin{aligned} \text{Option (3): } & 309 + 36 \times 14 \\ & = 309 + 504 \\ & = 813 (\checkmark) \end{aligned}$$

$$\begin{aligned} \text{Option (4): } & 36 \times 309 + 14 \\ & = 11\,124 + 14 \\ & = 11\,138 (X) \end{aligned}$$

6. (1)

$$\begin{aligned} \text{Option (1): } & (176 + 127 + 212 + 98) \div 4 \\ & = 613 \div 4 \\ & = 153.25 (\checkmark) \end{aligned}$$

$$\begin{aligned} \text{Option (2): } & (314 + 19 + 126 + 216) \div 4 \\ & = 675 \div 4 \\ & = 168.75 \end{aligned}$$

$$\begin{aligned} \text{Option (3): } & (76 + 287 + 164 + 193) \div 4 \\ & = 720 \div 4 \\ & = 180 \end{aligned}$$

$$\begin{aligned} \text{Option (4): } & (128 + 256 + 190 + 117) \div 4 \\ & = 691 \div 4 \\ & = 172.75 \end{aligned}$$

153.25 is the smallest average.

7. (1)

$$3 \text{ kg} = 3000 \text{ g}$$

$$\frac{15}{3000} \times 100\%$$

$$= \frac{15}{30} \%$$

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

$$= \underline{0.5\%}$$

8. (4)

Fraction of pizza Zhi Liang received

$$= \frac{5}{1 + 2 + 5}$$

$$= \frac{5}{8}$$

9. (4)

56 000, 65 000, 74 000, 83 000

The numbers in Option (4) are arranged in increasing order, that is, from the smallest to the greatest.

10. (3)

$$\angle x + \angle y$$

$$= 360^\circ - (82^\circ + 48^\circ + 102^\circ) \text{ } (\angle\text{s at a point})$$

$$= 360^\circ - 232^\circ$$

$$= 128^\circ$$

$$\angle x = 128^\circ \div 2$$

$$= \underline{64^\circ}$$

11. (1)

$$\frac{3}{4} \text{ m} = \frac{3}{4} \times 100 \text{ cm}$$
$$= 75 \text{ cm}$$

Length of each piece
 $= 75 \text{ cm} \div 5$
 $= \underline{15 \text{ cm}}$

12. (2)

Oranges	:	Pears	:	Mangoes
= 32	:	16	:	24
= 8	:	4	:	6
= 4	:	2	:	3

13. (3)

Area of A $= \frac{1}{2} \times 7 \times 9$
 $= 31.5 \text{ cm}^2$

Area of B $= \frac{1}{2} \times 9 \times 5$
 $= 22.5 \text{ cm}^2$

Area of C $= \frac{1}{2} \times 4 \times 10$
 $= 20 \text{ cm}^2$

Area of D $= \frac{1}{2} \times 3 \times 15$
 $= 22.5 \text{ cm}^2$

B and D have the same area.

14. (1)

$32 + 4 = 36$ years old (Maggie)
Total age 5 years ago
 $= (32 - 5) + (36 - 5)$
 $= 27 + 31$
 $= \underline{58 \text{ years}}$

15. (2)

$100\% - 32\% = 68\%$
 $68\% \rightarrow \$170$
 $1\% \rightarrow \$\left(\frac{170}{68}\right)$
 $100\% \rightarrow 100 \times \$\left(\frac{170}{68}\right) = \250

She bought \$250.

Section B:

16. $120 \div 3 \times 15 + (214 - 188)$
 $= 120 \div 3 \times 15 + 26$
 $= 40 \times 15 + 26$
 $= 600 + 26$
 $= \underline{626}$

17. $45\ 192$
 $= 40\ 000 + 5000 + 100 + 90 + 2$

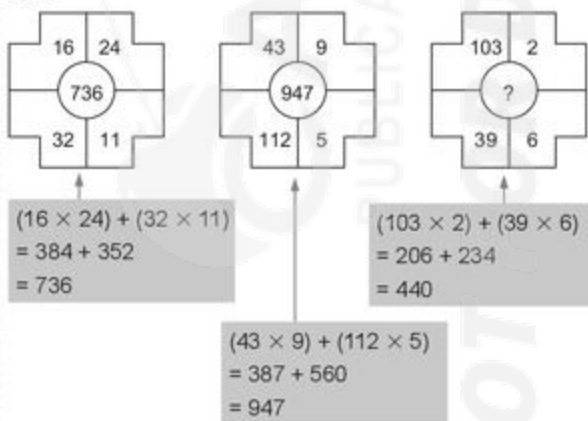
18. Required number
 $= (40 \times 38) + 3$
 $= 1520 + 3$
 $= \underline{1523}$

19. $65\% \rightarrow 104$
 $1\% \rightarrow \frac{104}{65}$
 $100\% \rightarrow 100 \times \frac{104}{65} = 160$

The number is 160.

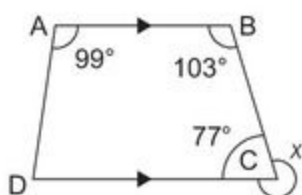
20. Capacity of tank
 $= 32 \times 10 \times 18$
 $= \underline{5760 \text{ cm}^3}$

21.



The missing number is 440.

22.

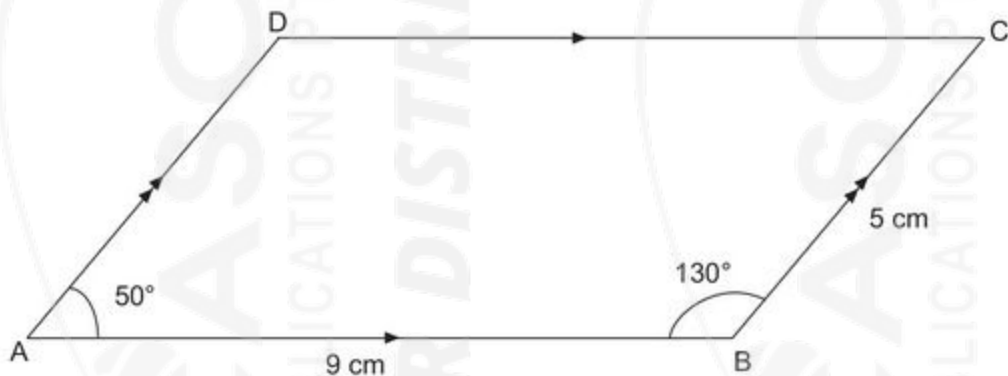


$$\begin{aligned}\angle BCD &= 180^\circ - 103^\circ \text{ (\angle s between parallel lines)} \\ &= 77^\circ \\ \angle x &= 360^\circ - 77^\circ \text{ (\angle s at a point)} \\ &= 283^\circ\end{aligned}$$

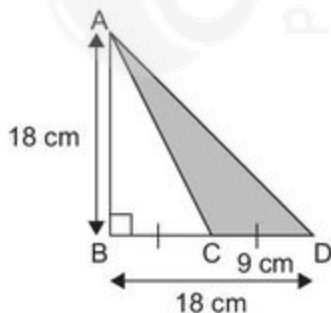
23. $100\% - 70\% = 30\%$ (Boys)
 $70\% - 30\% = 40\%$
 $40\% \rightarrow 280$ children
 $1\% \rightarrow 280 \div 40 = 7$ children
 $100\% \rightarrow 100 \times 7 = 700$ children

There are **700** children in the canteen.

24.



25.



$$\begin{aligned}CD &= 18 \text{ cm} \div 2 = 9 \text{ cm} \\ \text{Area of Triangle ACD} \\ &= \frac{1}{2} \times 9 \times 18 \\ &= 81 \text{ cm}^2\end{aligned}$$

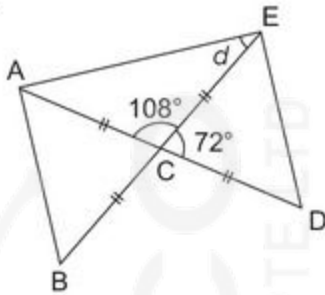
26. Number of unit cubes in big cube
 $= 4 \times 4 \times 4$
 $= 64$

Number of unit cubes in solid
 $= 16 + 13 + 7 + 2$
 $= 38$

$64 - 38 = 26$

The least number of unit cubes that need to be added is **26**.

27.



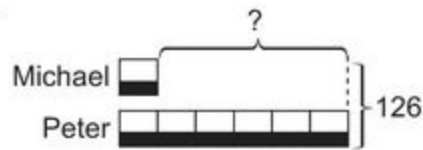
$\angle ACE = 180^\circ - 72^\circ$ (\angle s on a straight line)
 $= 108^\circ$
 $\angle d = (180^\circ - 108^\circ) \div 2$ (isos. Δ)
 $= 72^\circ \div 2$
 $= 36^\circ$

28. $85 \text{ g} = 20 \text{ g} + 65 \text{ g}$

Postage charge
 $= \$1.30 + (7 \times \$0.35)$
 $= \$1.30 + \2.45
 $= \$3.75$

He must pay **\$3.75** for postage charges.

29.



7 units = 126 stickers
 1 unit = $126 \div 7$
 $= 18$ stickers
 5 units = 5×18
 $= 90$ stickers

Peter received **90** more stickers than Michael.

30. $2\frac{3}{4} \text{ h} - 1\frac{5}{6} \text{ h}$
 $= 2\frac{9}{12} \text{ h} - 1\frac{10}{12} \text{ h}$
 $= 1\frac{21}{12} \text{ h} - 1\frac{10}{12} \text{ h}$
 $= \frac{11}{12} \text{ h}$

$\frac{11}{12} \text{ h} = \frac{11}{12} \times 60 \text{ min}$
 $= 55 \text{ min}$

She took **55 min** less to finish folding all the paper stars.

PAPER 2

1. $\frac{107}{100} \times \$600 = \642

She paid **\$642** for the ticket.

2. $240 \times \$1.80 = \432
 240 mangoes cost \$432.

$\$1.80 - 20\text{¢} = \1.60
 $\$432 \div \$1.60 = 270$
 He could buy 270 mangoes.

$270 - 240 = 30$

He could buy **30** more mangoes.

3. $24 \text{ cm} \div 3 \text{ cm} = 8$
 $20 \text{ cm} \div 3 \text{ cm} = 6 \text{ R } 2 \text{ cm}$
 $16 \text{ cm} \div 3 \text{ cm} = 5 \text{ R } 1 \text{ cm}$

Maximum number of 3-cm cubes
 $= 8 \times 6 \times 5$
 $= 240$

4. $\frac{1}{5} \times (24 \times 8 \times 20)$
 $= \frac{1}{5} \times 3840$
 $= 768 \text{ cm}^3$

Volume of water that has to be poured out
 $= (24 \times 8 \times 11) - 768$
 $= 2112 - 768$
 $= 1344 \text{ cm}^3$

5. $480 \times \$0.14 = \67.20
 $100\% - 15\% = 85\%$
 $\frac{85}{100} \times 480 = 408$
 $408 \times \$0.45 = \183.60
 $\$183.60 - \$67.20 = \$116.40$

He earned **\$116.40** from the sale of apples.

6. Nicholas : Angela : Kumar
 8 : 11 : 5

8 units + 5 units = 13 units

13 units = 117 sweets
 1 unit = $117 \div 13$
 $= 9$ sweets

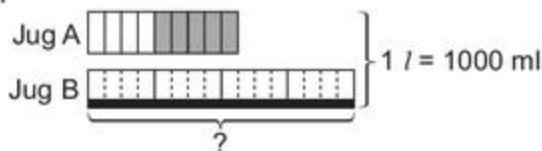
11 units = 11×9
 $= 99$ sweets

Angela received 99 sweets.

$99 - (2 \times 15)$
 $= 99 - 30$
 $= 69$

She would have **69** sweets left.

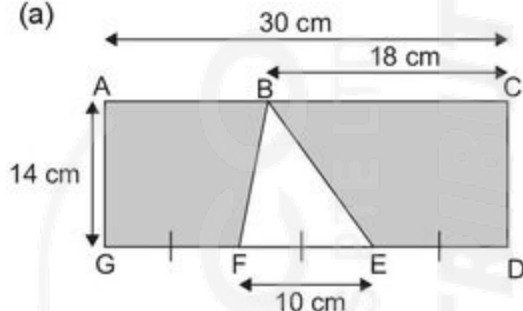
7.



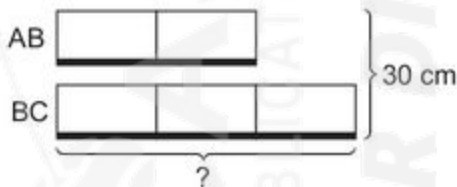
25 units = 1000 ml
 1 unit = $1000 \text{ ml} \div 25$
 $= 40 \text{ ml}$
 16 units = $16 \times 40 \text{ ml}$
 $= 640 \text{ ml}$

There was **640 ml** of blueberry drink in Jug B.

8. (a)



AC = 30 cm



5 units = 30 cm
 1 unit = $30 \text{ cm} \div 5$
 $= 6 \text{ cm}$
 3 units = $3 \times 6 \text{ cm}$
 $= 18 \text{ cm}$

The length of BC is **18 cm**.

(b) $EF = 30 \text{ cm} \div 3 = 10 \text{ cm}$

Area of rectangle ACDG
 $= 30 \times 14$
 $= 420 \text{ cm}^2$

Area of $\triangle BEF$
 $= \frac{1}{2} \times 10 \times 14$
 $= 70 \text{ cm}^2$

$420 \text{ cm}^2 - 70 \text{ cm}^2 = 350 \text{ cm}^2$

The total area of the shaded parts is **350 cm²**.

9. Total score (Johnson and Bryan)
 $= 2 \times 65$
 $= 130$

Total score (Raymond and Sam)
 $= 2 \times 59$
 $= 118$

Average score
 $= (130 + 118) \div 4$
 $= 248 \div 4$
 $= 62$

The 4 men's average score was **62**.

10. $\frac{5}{7} \times (60 \times 45 \times 35)$
 $= \frac{5}{7} \times 94\,500$
 $= 67\,500 \text{ cm}^3$
 $= 67.5 \text{ l}$

$2.5 \text{ l} \longrightarrow 1 \text{ min}$
 $67.5 \text{ l} \longrightarrow 67.5 \div 2.5 = 27 \text{ min}$

It will take **27 min** to fill $\frac{5}{7}$ of the tank with water.

11. $\frac{\text{Thomas}}{12 \times 2} : \frac{\text{Osman}}{7 \times 2} : \frac{\text{Wilson}}{14} : 9$

$24 : 14 : 9$

24 units = 120 marbles
 1 unit = $120 \div 24$
 $= 5$ marbles

$24 \text{ units} + 14 \text{ units} + 9 \text{ units} = 47 \text{ units}$

$47 \text{ units} = 47 \times 5$
 $= 235$ marbles

The three boys have **235** marbles altogether.

12. $\$8670 - \$800 = \$7870$
 $\frac{4}{100} \times \$7870 = \314.80
 $\$75 + \$314.80 = \$389.80$

He earned **\\$389.80**.



4 units = $188 - 4$
 $= 184$ marks
 1 unit = $184 \div 4$
 $= 46$ marks

Jia Yi scored 46 marks.

$50 - 46 = 4$

Jia Yi must score **4** more marks.

14. (a) $6 \times 10 = 60$
 $60 \times \$1 = \60
 Lisa had \$60.

Assume she received 10 five-dollar notes.

$$10 \times \$5 = \$50$$

$$\$60 - \$50 = \$10$$

Each ten-dollar note is \$5 more than each five-dollar note.

$$\$10 \div \$5 = 2$$

Lisa received 2 ten-dollar notes.

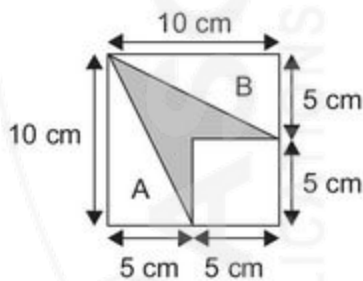
$$10 - 2 = 8$$

She received 8 five-dollar notes.

- (b) $2 \times \$10 = \20
 $\$20 \div 10 = \2

Each pen cost \$2.

15.



$$\text{Area of big square}$$

$$= 10 \times 10$$

$$= 100 \text{ cm}^2$$

$$\text{Area of small square}$$

$$= 5 \times 5$$

$$= 25 \text{ cm}^2$$

$$\text{Area of } \triangle A$$

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

$$= 25 \text{ cm}^2$$

$$\text{Area of } \triangle B$$

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

$$= 25 \text{ cm}^2$$

$$\text{Area of shaded part}$$

$$= 100 \text{ cm}^2 - (25 \text{ cm}^2 + 25 \text{ cm}^2 + 25 \text{ cm}^2)$$

$$= 100 \text{ cm}^2 - 75 \text{ cm}^2$$

$$= 25 \text{ cm}^2$$

$$\text{Total area of shaded parts}$$

$$= 4 \times 25 \text{ cm}^2$$

$$= 100 \text{ cm}^2$$

The total area of the shaded parts is **100 cm²**.

16. $\frac{1}{8} \times 80\% = 10\%$

10% of the apples in the crate are red and rotten.

$$100\% - 80\% = 20\%$$

$$\frac{1}{4} \times 20\% = 5\%$$

5% of the apples in the crate are green and rotten.

$$10\% - 5\% = 5\%$$

$$5\% \rightarrow 7 \text{ apples}$$

$$1\% \rightarrow \left(\frac{7}{5}\right) \text{ apples}$$

$$100\% \rightarrow 100 \times \frac{7}{5} = 140 \text{ apples}$$

There were 140 apples.

$$10\% + 5\% = 15\%$$

$$\frac{15}{100} \times 140 = 21$$

21 apples were rotten.

$$140 - 24 - 21 = 95$$

95 apples were left in the crate.

17. Butter : Chocolate : Raisin
4 : 7 : 1

$$4 \text{ units} + 7 \text{ units} + 1 \text{ unit} = 12 \text{ units}$$

$$12 \text{ units} = 120 \text{ cookies}$$

$$1 \text{ unit} = 120 \div 12 \\ = 10 \text{ cookies (Raisin)}$$

$$4 \text{ units} = 4 \times 10 \\ = 40 \text{ cookies (Butter)}$$

$$7 \text{ units} = 7 \times 10 \\ = 70 \text{ cookies (Chocolate)}$$

Mrs Cheng had 10 raisin cookies, 40 butter cookies and 70 chocolate cookies.

$$100\% \longrightarrow 40 \text{ butter cookies}$$

$$50\% \longrightarrow 40 \div 2 = 20 \text{ butter cookies}$$

She put 20 butter cookies into the box.

$$30 - 20 = 10$$

She put 10 raisin cookies into the box.

Required percentage

$$= \frac{10}{10} \times 100\%$$

$$= 100\%$$

The number of raisin cookies was increased by **100%**.