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Essential
Problem Solving Skills

- ✓Lateral and vertical thinking enhanced by questions of varied types, level of difficulty and topic-to-strategy approach
- ✓Pre-exercises designed to develop conceptual understanding
- ✓Review section by mixed topics, combined problem solving concepts

Based on Latest MOE Syllabus

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P5 Full Solutions

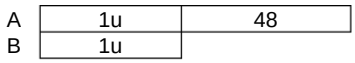
Note: In all solutions, u represent units and p represents parts.

Chapter 1 Whole Numbers

Answers to Unit 1.1 – More than / Less than

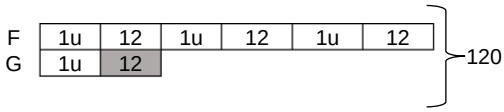
Let's Get Started 1.1

2.



3.

4.



Let's Learn 1.1

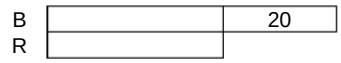
Ask Yourself

There are 80 more men than women at the seminar at first.

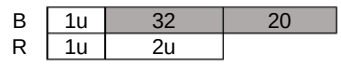
Let's Practise 1.1

Question 1

At first



End



2u = 32

1u = 32 ÷ 2

= 16

1u + 52 = 16 + 52

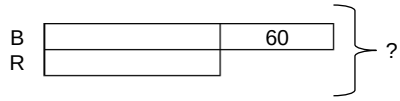
= 68

Bernard had **$68** at first.

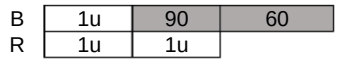
Answers to Unit 1.1 – More than / Less than

Question 2

At first



End



1u = 90

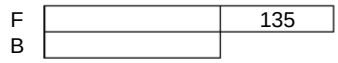
4u + 60 = 4 × 90 + 60

= 420

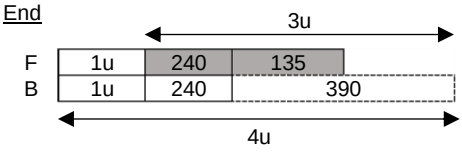
Penny had **420** ribbons at first.

Question 3

At first



End



3u = 240 + 390

= 630

1u = 630 ÷ 3

= 210

F (at first) = 210 + 240 + 135

= 585

B (at first) = 210 + 240

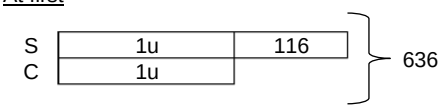
= 450

585 + 450 = 1035

1035 items were on sale at first.

Question 4

At first



2u = 636 – 116

= 520

1u = 520 ÷ 2

= 260

S (at first) = 260 + 116

= 376

C (at first) = 260

Question 4 (Cont.)

End

S = 376 – 226

= 150

C = 4 × 150

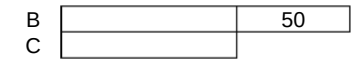
= 600

600 – 260 = 340

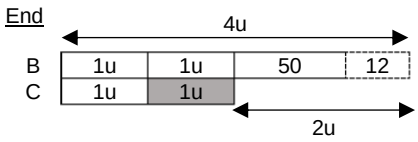
Andrew bought **340** toy cars.

Question 5

At first



End



2u = 50 + 12

= 62

1u = 62 ÷ 2

= 31

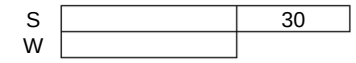
2u + 50 = 2 × 31 + 50

= 112

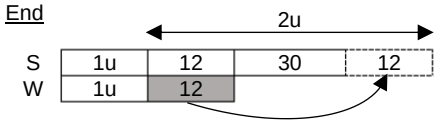
There were **112** button pins at first.

Question 6

At first



End



2u = 12 + 30 + 12

= 54

1u = 54 ÷ 2

= 27

1u + 12 = 27 + 12

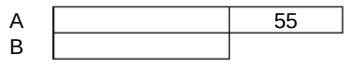
= 39

Wendy had **39** stickers at first.

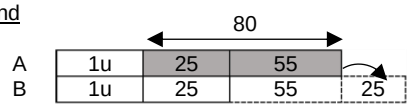
Let's Get Started 1.2

2.

At first



End



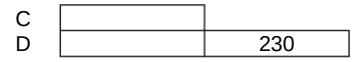
Answer

25 + 80 = 105

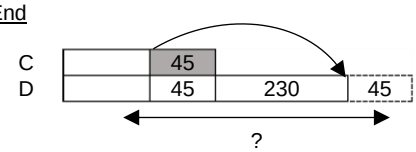
Bryan has **105** more game cards than Alvin in the end.

3.

At first



End



Answer

45 + 230 + 45 = 320

Diana had **320** more beads than Catherine in the end.

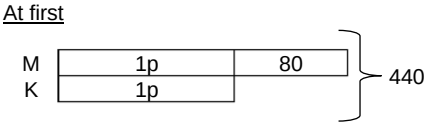
Let's Learn 1.2

Ask Yourself

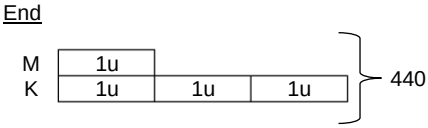
1. Mandy has more money than Kurt. (Hence, the bar model representing Mandy is longer than that of Kurt.)
2. Mandy gave some money to Kurt.
3. The total amount of money they had remained the same.

Think Further

At first



End



Think Further (Cont.)

4u = 440

1u = 440 ÷ 4

= 110

2p = 440 – 80

= 360

1p = 360 ÷ 2

= 180

M (at first) = 1p + 80

= 180 + 80

= 260

M (gave) = 260 – 110

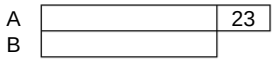
= 150

Mandy must give **$150** to Kurt.

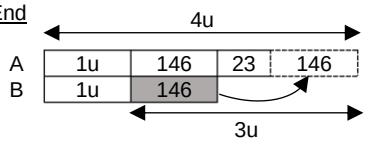
Let's Practise 1.2

Question 1

At first



End



3u = 146 + 23 + 146

= 315

1u = 315 ÷ 3

= 105

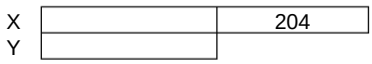
4u – 146 = 4 × 105 – 146

= 274

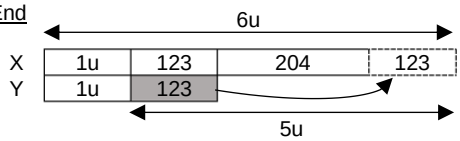
Amos had **274** marbles at first.

Question 2

At first



End



Question 2 (Cont.)

5u = 123 + 204 + 123

= 450

1u = 450 ÷ 5

= 90

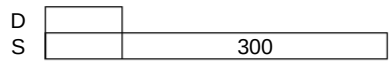
7u = 7 × 90

= 630

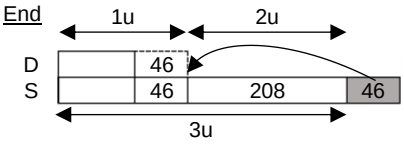
They had **$630** in total at first.

Question 3

At first



End



2u = 208

1u = 208 ÷ 2

= 104

4u = 4 × 104

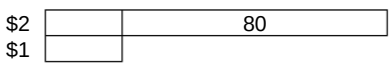
= 416

There were **416** participants altogether.

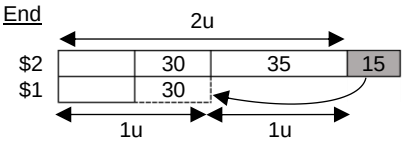
Question 4

15 $2 notes = 30 $1 coins

At first



End



1u = 35

Number of $2 notes = 2 × 35

= 70

Number of $1 coins = 35

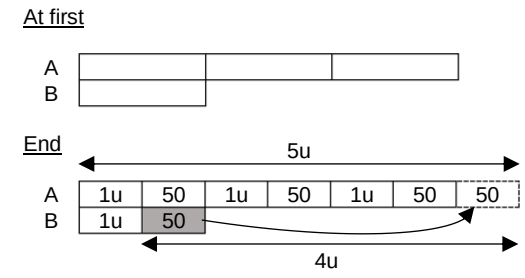
Amount of money = 70 × $2 + 35 × $1

= $175

There was **$175** in the piggy bank at first.

Answers to Unit 1.2 – Internal Transfer and Total Unchanged

Question 5



2u = 4 × 50

= 200

1u = 200 ÷ 2

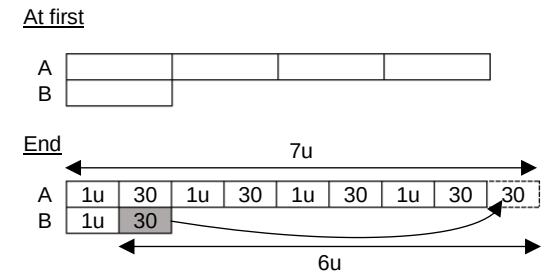
= 100

5u – 50 = 5 × 100 – 50

= 450

There was **450 mℓ** of water in Tank A.

Question 6



3u = 5 × 30

= 150

1u = 150 ÷ 3

= 50

1u + 30 = 50 + 30

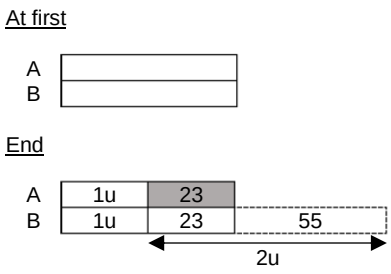
= 80

There were **80** oranges in Box B at first.

Answers to Unit 1.3 – Equal Stage (Beginning / End)

Let's Get Started 1.3

1.



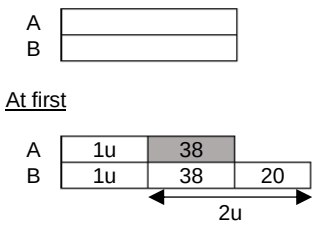
2u = 23 + 55

= 78

1u = 78 ÷ 2

= **39**

2.



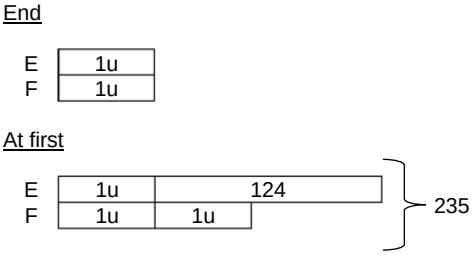
2u = 38 + 20

= 58

1u = 58 ÷ 2

= **29**

3. Draw from the **End**



3u = 235 – 124

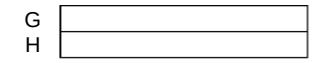
= 111

1u = 111 ÷ 3

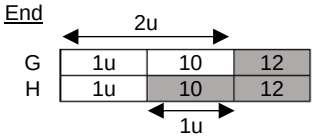
= **37**

4. Draw from the **Beginning**

At first



End



1u = **10**

Let's Learn 1.3

Ask Yourself

The keywords in this problem sum are 'an equal number of stamps left'.

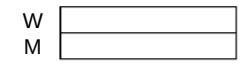
Think Further

We can solve from the beginning because the problem directly compares Billy and Anna's initial number of chicken nuggets. Starting from the end would be challenging as we don't know the exact number of chicken nuggets Billy ate.

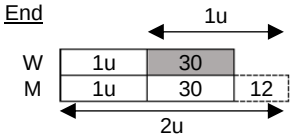
Let's Practise 1.3

Question 1

At first



End



1u = 30 + 12

= 42

1u + 30 = 42 + 30

= 72

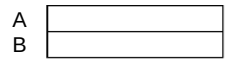
Total = 2 × 72

= 144

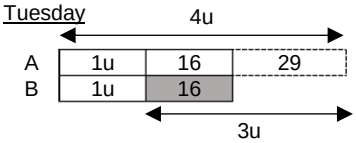
144 people were at the opening ceremony at first.

Question 2

Monday



Tuesday



3u = 16 + 29

= 45

1u = 45 ÷ 3

= 15

1u + 16 = 15 + 16

= 31

Total coins at first = 2 × 31

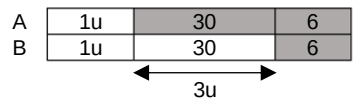
= 62

There were **62** coins in the boxes altogether at first.

Question 3

At first

End



3u = 30

1u = 30 ÷ 3

= 10

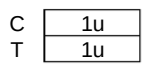
4u + 6 = 4 × 10 + 6

= 46

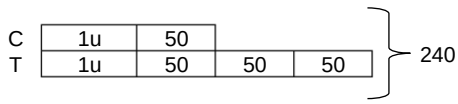
There were **46** mattresses in each room.

Question 4

End



At first



Question 4 (Cont.)

2u = 240 – 4 × 50

= 40

1u = 40 ÷ 2

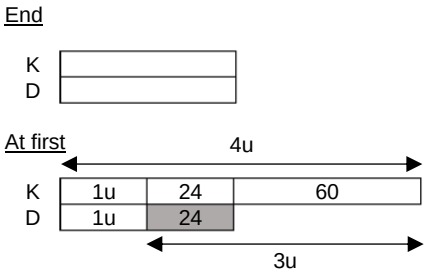
= 20

1u + 50 = 20 + 50

= 70

Mrs Chin had **70** cabbages at first.

Question 5



3u = 24 + 60

= 84

1u = 84 ÷ 3

= 28

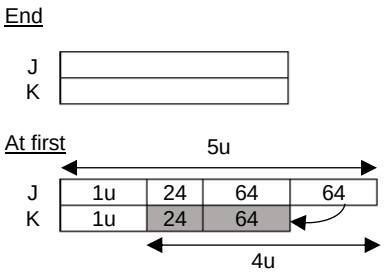
Dave (end) = 1u + 24

= 28 + 24

= 52

Dave had **52** badges in the end.

Question 6



4u = 24 + 64 + 64

= 152

1u = 152 ÷ 4

= 38

Kennard had **38** keychains at first.

Let's Get Started 1.4

	What has changed?	What remains the same?
1.	Ken had **14** marbles left.	May had **90** marbles.
2.	May had **112** marbles left.	Ken had **20** marbles.
3.	Ken had 2u – 6 marbles left.	May had **3u** marbles.
4.	May had **3u + 22** marbles left.	Ken had **2u** marbles.

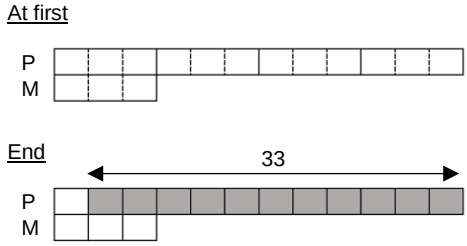
Let's Learn 1.4

Ask Yourself

1. Two. The relationships in the 'At first' and 'In the end'.
2. The number of units for the blouses must be the same 'At first' and 'In the end'.

Let's Practise 1.4

Question 1



11u = 33

1u = 33 ÷ 11

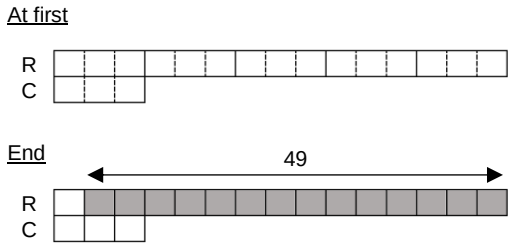
= 3

9u = 9 × 3

= 27

Henry had **27** more paper clips than fridge magnets.

Question 2



Question 2 (Cont.)

14u = 49

1u = 49 ÷ 14

= 3.5

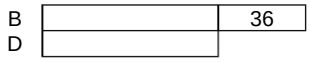
18u = 18 × 3.5

= 63

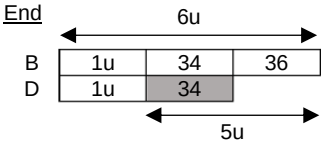
There were **63** rulers and crayons at first.

Question 3

<u>At first</u>



<u>End</u>



5u = 34 + 36

= 70

1u = 70 ÷ 5

= 14

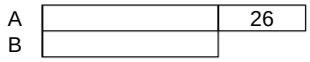
1u + 34 = 14 + 34

= 48

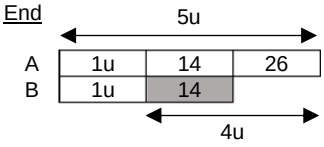
Dylan had **48** cards.

Question 4

<u>At first</u>



<u>End</u>



4u = 14 + 26

= 40

1u = 40 ÷ 4

= 10

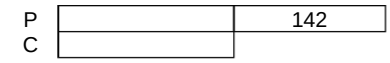
6u = 6 × 10

= 60

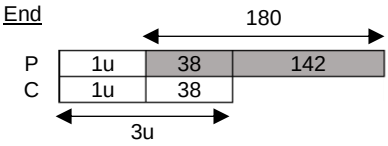
There were **60** students altogether in both buses in the end.

Question 5

<u>At first</u>



<u>End</u>



2u = 38

1u = 38 ÷ 2

= 19

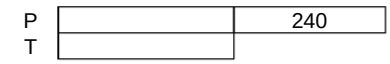
3u = 3 × 19

= 57

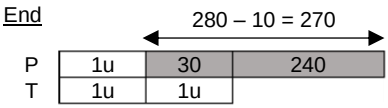
Celine had **57** buttons.

Question 6

<u>At first</u>



<u>End</u>



1u = 30

1u + 270 = 30 + 270

= 300

Percy brought **$300** to shop.

Let's Get Started 1.5

The table can be completed using any acceptable answers given. Ensure that the same student and parent are being used across all the years indicated in the table. You will realise that the age difference between the student and the parent remains the same throughout.

Let's Learn 1.5

Ask Yourself

The difference in age between any two people will always remain the same.

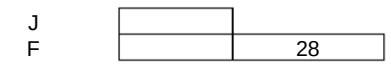
Think Further

When equal parts are added to the model, in this instance 8 years, we draw the equal parts to the left of the model to show clearly the difference did not change (as can be seen on the right side of the model).

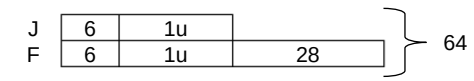
Let's Practise 1.5

Question 1

Now



In 6 years' time

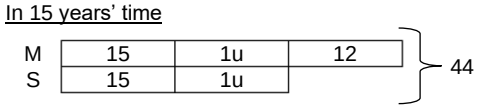


2u = 64 – 28 – 6 – 6
= 24
1u = 24 ÷ 2
= 12
Josh's age in 9 years' time = 12 + 9
= 21
Josh will be **21 years old** in 9 years' time.

Question 2

Now

In 15 years' time



2u = 44 – 12 – 15 – 15
= 2
1u = 2 ÷ 2
= 1
M (now) = 1 + 12
= 13
M (in 3 years' time) = 13 + 3
= 16
Mary will be **16 years old** in 3 years' time.

Answers to Unit 1.5 – Difference Unchanged

Question 3

6 years' ago
K = 3u
S = 1u
Difference = 2u

2u = 24
1u = 24 ÷ 2
= 12
K (now) = 3 × 12 + 6
= 42
K (in 10 years' time) = 42 + 10
= 52
Mrs Kumar will be **52 years old** in 10 years' time.

Question 4

At first	End (left)
Shirts = 1210	Shirts = 1u
Shorts = 1910	Shorts = 15u
Difference = 700	Difference = 14u

14u = 700
1u = 700 ÷ 14
= 50
Shirts sold = 1210 – 50
= 1160
Total sold = 2 × 1160
= 2320
2320 shirts and pairs of shorts were sold altogether.

Question 5

At first	End (left)
P = 1u	P = 72 ÷ 6
R = 5u	= 12
Difference = 4u	R = 72
	Difference = 60

4u = 60
1u = 60 ÷ 4
= 15
Pens sold =15 – 12
= 3
Amount of money received = (3 × $3) + (3 × $2)
= $15
Mr Kim received **$15** from the sale of the items.

Answers to Unit 1.5 – Difference Unchanged

Question 6

At first	End (left)
J = 200	J = 1u
H = 840	H = 3u
Difference = 640	Difference = 2u

2u = 640

1u = 640 ÷ 2

= 320

(a) Each boy received = 320 – 200

= 120

Ian gave **120** marbles to each boy.

(b) Both boys (received) = 2 × 120

= 240

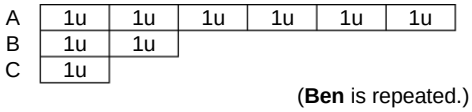
300 – 240 = 60

Ian was left with **60** marbles**.**

Answers to Unit 1.6 – Repeated Items

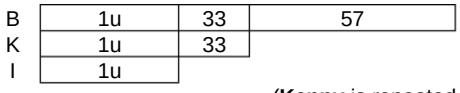
Let's Get Started 1.6

1.



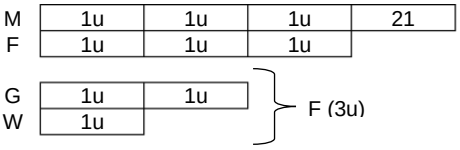
(**Ben** is repeated.)

2.



(**Kenny** is repeated.)

3.



(**Female** is repeated.)

4.

A = $2u^{\times 2}$ (4u)

B + C = $1u^{\times 2}$ (2u)

B = 1u

C = 1u

B + C = 2u

Summary

A = 4u

B = 1u

C = 1u

(**Ben and Cecil** are repeated.)

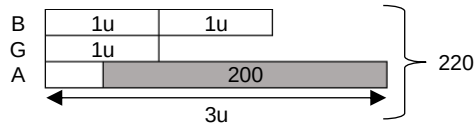
Answers to Unit 1.6 – Repeated Items

Let's Learn 1.6

Ask Yourself

1. The number of children is being repeated as boys and girls.
2. It is repeated as a group (boys and girls).

Think Further



6u = 220 + 200

= 420

1u = 420 ÷ 6

= 70

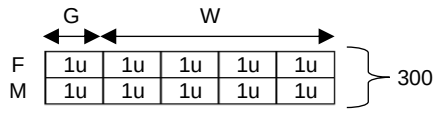
3u – 200 = 3 × 70 – 200

= 10

There were **10** adults at the movie screening event.

Let's Practise 1.6

Question 1



10u = 300

1u = 300 ÷ 10

= 30

5u = 5 × 30

= 150

There were **150** females.

Question 2

Summary

A = 1u

B = 3u

C = 1u

Total = 1u + 3u + 1u

= 5u

Difference between A and B = 3u – 1u

= 2u

2u = 80

1u = 80 ÷ 2

= 40

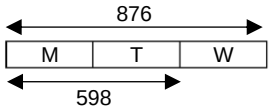
Question 2 (Cont.)

5u = 5 × 40

= 200

The three girls had **$200** altogether.

Question 3



Wed = 876 – 598

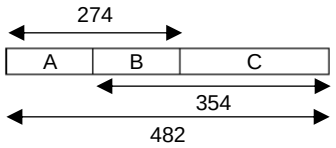
= 278

Mon = 660 – 278

= 382

382 cups of bubble tea were sold on Monday.

Question 4



C = 482 – 274

= 208

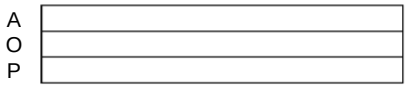
B = 354 – 208

= 146

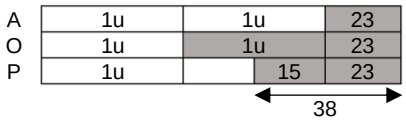
Bonita sold **146** funfair tickets.

Question 5

At first



End



5u = 90 + 15

= 105

1u = 105 ÷ 5

= 21

1u + 23 = 21 + 23

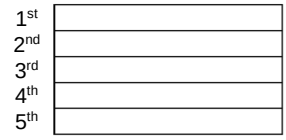
= 44

44 oranges were used.

Answers to Unit 1.6 – Repeated Items

Question 6

At first



End

1st	1u	18
2nd	1u	18
3rd	1u	18
4th	1u	18
5th	1u	18

5u = 2u + 36

3u = 36

1u = 36 ÷ 3

= 12

1u + 18 = 12 + 18

= 30

There were **30** marbles in each tin at first.

Answers to Unit 1.7 – Quantity × Value

Let's Get Started 1.7

Denomination of notes	Quantity of notes	×	Value ($)	Total Value ($)
$50	3	×	50	150
$2	6	×	**2**	12
$5	2	×	5	**10**
$10	11	×	**10**	110
Total	**22**			**282**

Let's Learn 1.7

Ask Yourself

The 'quantity' is represented by the number of birds and hamsters at the pet store, while the 'value' is represented by the number of legs of each animal.

Let's Practise 1.7

Question 1

Items	Quantity of items	×	Value (cents)	Total Value (cents)
20-cent	3u	×	20	60u
50-cent	1u	×	50	50u
Total	4u			110u

Question 1 (Cont.)

$66 = 6600 cents

110u = 6600

1u = 6600 ÷ 110

= 60

3u = 3 × 60

= 180

Joseph has **180** 20-cent coins.

Question 2

Items	Quantity of items	×	Value ($)	Total Value ($)
G	3u	×	150	450u
C	1u	×	50	50u
Total	4u			500u

Difference = 450u – 50u

= 400u

400u = 1200

1u = 1200 ÷ 400

= 3

4u = 4 × 3

= 12

Grandma gave out **12** red packets.

Question 3

1 pair of sport shoes = 2 × $23

= $46

Sl = 3u
Sa = 1u

Sa = 1u
Sp = 1u

Summary
Sl = 3u
Sa = 1u
Sp = 1u

Items	Quantity of items	×	Value ($)	Total Value ($)
Sl	3u	×	16	48u
Sa	1u	×	23	23u
Sp	1u	×	46	46u
Total	5u			117u

117u = 468

1u = 468 ÷ 117

= 4

Answers to Unit 1.7 – Quantity × Value

Question 3 (Cont.)

48u – 23u = 25u

25u = 25 × 4

= 100

Wayne spent **$100** more on the pairs of slippers than on pairs of sandals.

Question 4

NP = 4u
P = 1u

OC = $1u^{\times 2}$ (2u)
NP = $2u^{\times 2}$ (4u)

Summary
NP = 4u
P = 1u
OC = 2u

Items	Quantity of items	×	Value (coupons)	Total Value (coupons)
NP	4u	×	3	12u
P	1u	×	8	8u
OC	2u	×	12	24u
Total	7u			44u

24u – 8u = 16u

16u = 144

1u = 144 ÷ 16

= 9

7u = 7 × 9

= 63

There were **63** people at the swimming meet.

Question 5

7 – 12 years old = 3u
13 – 16 years old = 1u

1 – 6 years old = $2u^{\times 3}$ (6u)
7 – 12 years old = $1u^{\times 3}$ (3u)

Summary
1 – 6 yr old = 6u
7 – 12 yr old = 3u
13 – 16 yr old = 1u

Items	Quantity of items	×	Value ($)	Total Value ($)
1 – 6	6u	×	3	18u
7 – 12	3u	×	6	18u
13 – 16	1u	×	12	12u
Total	10u			48u

Question 5 (Cont.)

48u = 1440

1u = 1440 ÷ 48

= 30

18u = 18 × 30

= 540

$540 was collected from the 1 to 6 years old age category.

Question 6

Items	Quantity of items	×	Value ($)	Total Value ($)
A	1u	×	2	2u
C	5u	×	1	5u
Total	6u			7u

7u = 1470

1u = 1470 ÷ 7

= 210

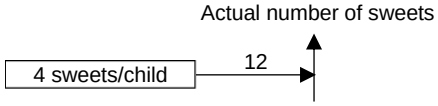
5u = 5 × 210

= 1050

1050 children were at the event.

Let's Get Started 1.8

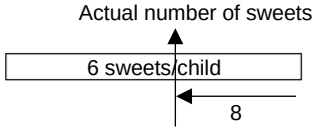
2.



Total number of sweets = 10 × 4 + 12

= **52**

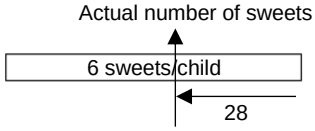
3.



Total number of sweets = 10 × 6 – 8

= **52**

4.



Total number of sweets = 10 × 6 – 28

= **32**

Let's Learn 1.8

Ask Yourself

1. The keywords are 'If-If' with 'short of' or 'left'.
2. The question involves both shortage and excess.

Think Further

Using Case 1:

Number of candies = 6 × 8 + 14

= 62

Check your answer using Case 2:

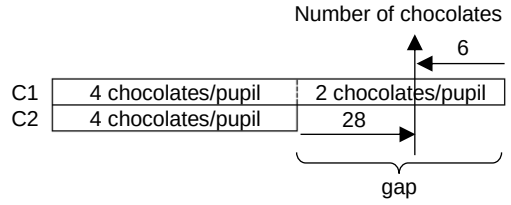
Number of candies = 9 × 8 – 10

= 62

Jovelle has **62** candies.

Let's Practise 1.8

Question 1



Gap = 28 + 6

= 34

Difference = 2 chocolates/pupil

(a) Number of pupils = 34 ÷ 2

= 17

There were **17** pupils in Cynthia's class.

(b) Number of chocolates

C1 = 17 × 6 – 6

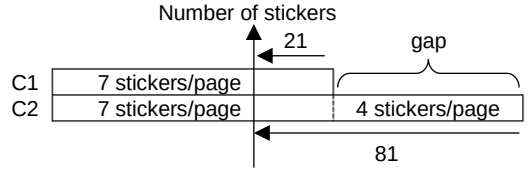
= 96

C2 = 17 × 4 + 28

= 96 (Checked)

Cynthia bought **96** chocolates.

Question 2



Question 2 (Cont.)

Gap = 81 – 21

= 60

Difference = 4 stickers/page

(a) Number of pages = 60 ÷ 4

= 15

There are **15** pages in Suzy's sticker album.

(b) Number of stickers

C1 = 15 × 7 – 21

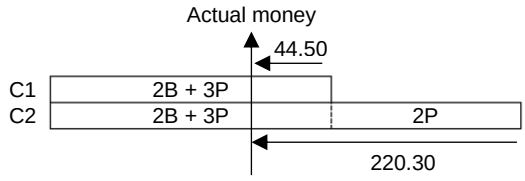
= 84

C2 = 15 × 11 – 81

= 84 (Checked)

Suzy has **84** stickers.

Question 3



2P = 220.30 – 44.50

= 175.80

1P = 175.80 ÷ 2

= 87.90

Madeleine's money

C1 = (2 × $65.40) + (3 × $87.90) – $44.50

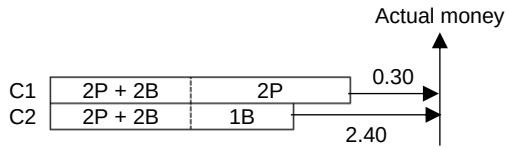
= $350

C2 = (2 × $65.40) + (5 × $87.90) – $220.30

= $350 (Checked)

Madeleine has **$350**.

Question 4



2P = 2 × $2.80

= $5.60

Answers to Unit 1.8 – Gap and Difference

Question 4 (Cont.)

(a) 1B = $5.60 – $2.10

= $3.50

A bag of chips costs **$3.50**.

(b) Geraldine's money

C1 = (4 × $2.80) + (2 × $3.50) + $0.30

= $18.50

C2 = (2 × $2.80) + (3 × $3.50) + $2.40

= $18.50 (Checked)

Geraldine has **$18.50**.

Question 5

C1: $C \xrightarrow{7} P$

C = $3u^{\times 4}$ (12u)

P = $4u^{\times 4}$ (16u)

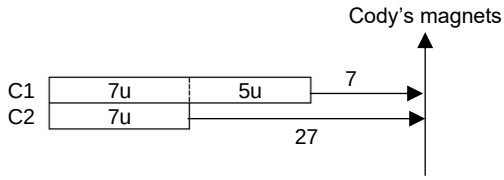
Total = $7u^{\times 4}$ (28u)

C2: $C \xrightarrow{27} P$

C = $1u^{\times 7}$ (7u)

P = $3u^{\times 7}$ (21u)

Total = $4u^{\times 7}$ (28u)



5u = 27 – 7

= 20

1u = 20 ÷ 5

= 4

Cody's magnets

C1 = 12 × 4 + 7

= 55

C2 = 7 × 4 + 27

= 55 (Checked)

Cody had **55** button magnets.

Question 6

C1: $D \xrightarrow{23} S$

D = $3u^{\times 9}$ (27u)

S = $5u^{\times 9}$ (45u)

Total = $8u^{\times 9}$ (72u)

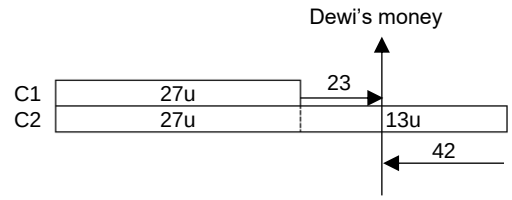
C2: $S \xrightarrow{42} D$

D = $5u^{\times 8}$ (40u)

S = $4u^{\times 8}$ (32u)

Total = $9u^{\times 8}$ (72u)

Question 6 (Cont.)



13u = 23 + 42

= 65

1u = 65 ÷ 13

= 5

Dewi's money

C1 = (27 × $5) + $23

= $158

C2 = (40 × $5) – $42

= $158 (Checked)

Dewi had **$158**.

Question 1

(a) Siti

7 days = $39 – $18

= $21

1 day = $21 ÷ 7

= $3

Siti saved **$3** each day.

(b) Total savings after 15 days = $39 + (15 × $5)

= $114

Difference = $1762 – $114

= $1648

Total savings each day = $3 + $5

= $8

Number of days = 1648 ÷ 8

= 206

Total number of days = 15 + 206

= 221

Tina would have been saving for **221** days.

Question 2

P	1u	13	5		
Q	1u	13	5	9	
R	1u	13			
S	1u	13	5	9	79

Question 2 (Cont.)

S = P + Q + R

1u + 106 = 3u + 18 + 27 + 13

1u + 106 = 3u + 58

2u = 106 – 58

= 48

1u = 48 ÷ 2

= 24

24 sweets were added into each box.

Question 3

Multiples of 3:

60, 63, 66, 69, 72, 75, 78, 81, 84, 87, 90, 93, 96, 99

Add 1:

61, 64, 67, 70, 73, 76, 79, 82, 85, 88, 91, 94, 97, 100

Multiples of 5:

60, 65, 70, 75, 80, 85, 90, 95, 100

Add 1:

61, 66, 71, 76, 81, 86, 91, 96

Common multiples in the two cases:

61, 76, 91

However, only 91 is divisible by 7.

Greta ordered **91** cupcakes.

Question 4

End

M	120	360
A	120	
J	120	

At first

M	1u	20	70	20		360
A	1u	20	70	20	50	
J	1u	20	70			

1u = 120 – 20 – 70

= 30

(a) J (at first) = 30

Jane had **30** erasers at first.

(b) A (at first) = 30 + 20 + 70 + 20 + 50

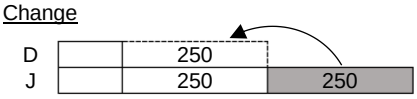
=190

Allen had **190** erasers at first.

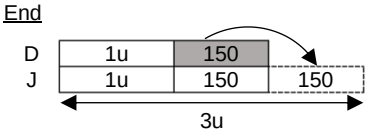
Question 5

At first

Change



End



1u = 150

(a) 1u + 150 – 250 = 150 + 150 – 250
= 50
Dylan had **50** stickers at first.

(b) 50 + 250 + 250 = 550
Jonas had **550** stickers at first.

Question 6

A = 2u$^{\times 7}$ (14u)
C = 1u$^{\times 7}$ (7u)

M = 2u$^{\times 5}$ (10u)
B = 1u$^{\times 5}$ (5u)

M = 5u$^{\times 2}$ (10u)
G = 1u$^{\times 2}$ (2u)

Summary
M = 10u
W = 4u
B = 5u
G = 2u
Total = 21u

Difference between W and G = 4u – 2u
= 2u

2u = 250
1u = 250 ÷ 2
= 125

(a) 21u = 21 × 125
= 2625
There were **2625** people at the carnival.

(b) Males = 10u + 5u
= 15u
Females = 4u + 2u
= 6u
Difference = 15u – 6u
= 9u

Question 6 (Cont.)

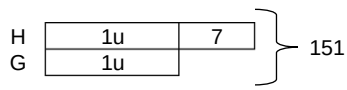
9u = 9 × 125
= 1125
There were **1125** more males than females at the carnival.

Question 7

Number of animals = 720 ÷ 2
= 360

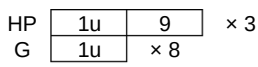
No. of horses	Horses' legs	No. of birds	Birds' legs	Total legs	Check
360	360 × 4 =1440	0	0	1440	×
359	359 × 4 =1436	1	2	1438	×
209	209 × 4 =836	151	302	1138	✓

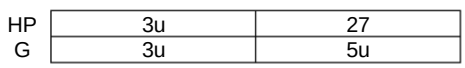
Target difference = 1440 – 1138
= 302
Number of birds = 302 ÷ 2
= 151



2u = 151 – 7
= 144
1u = 144 ÷ 2
= 72
1u + 7 = 72 + 7
= 79
There were **79** hens on the farm.

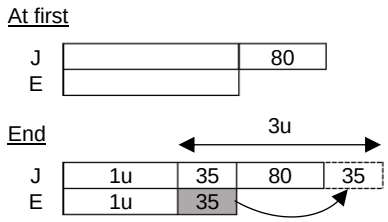
Question 8





5u = 27
1u = 27 ÷ 5
= 5.40
8u = 8 × 5.40
= 43.20
Mrs Tyler had **$43.20**.

Question 9



3u = 35 + 80 + 35
= 150
1u = 150 ÷ 3
= 50
Elaine had **$50** in the end.

Question 10

Fee for a damaged parcel = $12 – $5
= $7

No. of damaged	Fee	No. of good	Fee	Total Fee	Check
690	690 × 7 = 4830	0	0	4830	×
689	689 × 7 = 4823	1	12	4835	×
106	742	584	7008	7750	✓

Target difference = 7750 – 4830
= 2920
Number of parcels in good condition = 2920 ÷ 5
= 584
He delivered **584** parcels in good condition.

Question 11

Total	
6 big boxes	14 small boxes

(a) 3B + 8S = 45
6B + 16S = 90
6B = 14S
14S + 16S = 90
30S = 90
1S = 90 ÷ 30
= 3
6B = 14 × 3
= 42
B = 42 ÷ 6
= 7

Question 11 (Cont.)

(a) There were **3** and **7** cupcakes in each small and big box respectively.

(b) 14S = $189
1S = $189 ÷ 14
= $13.50
She sold each small box for **$13.50**.

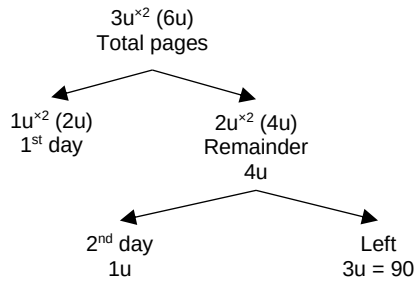
Question 12

3P + 2F = 4.80
2P + 4F = 6.40
1P + 2F = 6.40 ÷ 2
= 3.20
2P = 4.80 – 3.20
= 1.60
1P = 1.60 ÷ 2
= 0.80
Each pen costs **$0.80**.

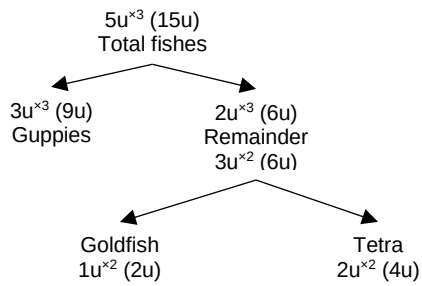
Chapter 2 Fractions

Let's Get Started 2.1

2.



3.



Let's Learn 2.1

Think Further

1. 5u – 2u = 3u

   3u = 168

   1u = 168 ÷ 3

   = 56

   15u = 15 × 56

   = 840

   Anthony had **$840** at first.

2. Money on food and shoes = $\frac{1}{3} + \frac{1}{5}$

   $= \frac{5}{15} + \frac{3}{15}$

   $= \frac{8}{15}$

   Money left = $1 - \frac{8}{15}$

   $= \frac{7}{15}$

   $\frac{7}{15}$ of total = 168

   $\frac{1}{15}$ of total = 168 ÷ 7

   = 24

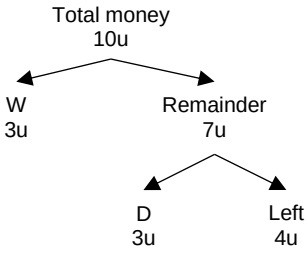
   $\frac{15}{15}$ of total = 15 × 24

   = 360

   Anthony had **$360** at first.

Let's Practise 2.1

Question 1



(a) Fraction spent on dress = $\frac{3}{10}$

Felicity spent $\frac{3}{10}$ of her money on the dress.

(b) 4u = 400

1u = 400 ÷ 4

= 100

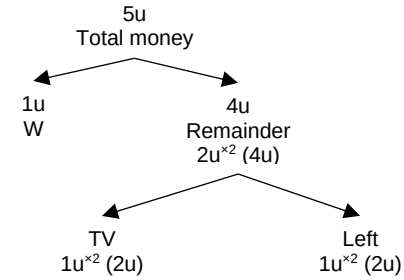
10u = 10 × 100

= 1000

Felicity had **$1000** at first.

Answers to Unit 2.1 – Branching (Direct)

Question 2



(a) Fraction spent on TV set = $\frac{2}{5}$

Caleb spent $\frac{2}{5}$ of his money on the television set.

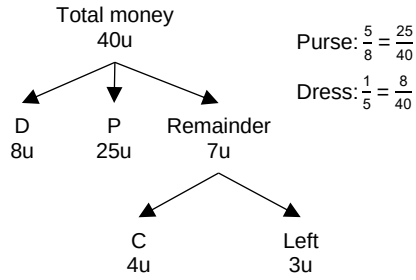
(b) 2u = 1440

1u = 1440 ÷ 2

= 720

The watch cost **$720**.

Question 3



3u = 183

1u = 183 ÷ 3

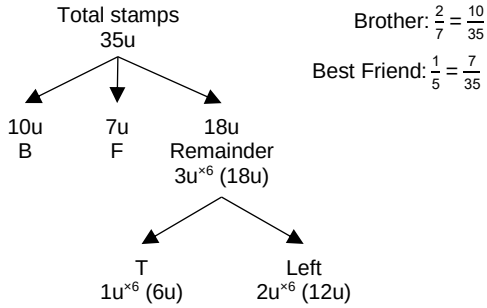
= 61

25u = 25 × 61

= 1525

Rebecca spent **$1525** on the purse.

Question 4



Question 4 (Cont.)

12u = 36

1u = 36 ÷ 12

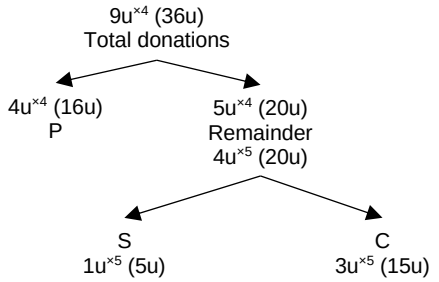
= 3

35u = 35 × 3

= 105

Mabel had **105** stamps at first.

Question 5



15u = 240 000

1u = 240 000 ÷ 15

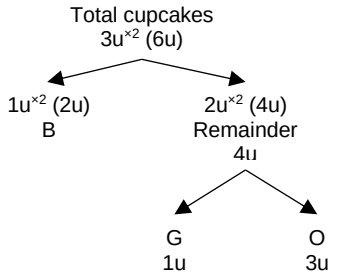
= 16 000

36u = 36 × 16 000

= 576 000

$576 000 was raised during the event.

Question 6



(a) Fraction to orphanage = $\frac{3}{6}$

= $\frac{1}{2}$

$\frac{1}{2}$ of the cupcakes was donated to the orphanage.

(b) 3u = 285

1u = 285 ÷ 3

= 95

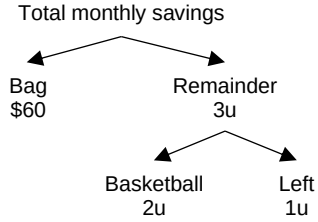
2u = 2 × 95

= 190

190 cupcakes were for the birthday party.

Let's Get Started 2.2

2.



Working backwards:

$\frac{1}{4}$ of total = 1u

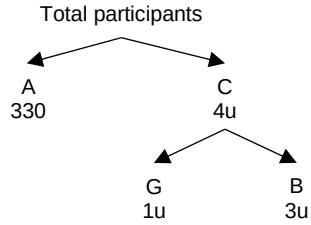
$\frac{4}{4}$ of total = 4 × 1u

= **4u**

Bag = 4u – 3u

= **1u**

3.



Working backwards:

$\frac{1}{5}$ of total = 3u

$\frac{5}{5}$ of total = 5 × 3u

= **15u**

Adults = 15u – 4u

= **11u**

Let's Learn 2.2

Ask Yourself

A value is given at the beginning for one of the branches. This makes it different from that in the previous units where all the fractions representing each branch are given as part of the information in the question.

Think Further

$\frac{1}{3}$ of total = 3u

$\frac{3}{3}$ of total = 3 × 3u

= 9u

Money spent on plates = 9u – 5u

= 4u

4u = 156

1u = 156 ÷ 4

= 39

2u = 2 × 39

= 78

12 saucers = 78

1 saucer = 78 ÷ 12

= 6.5

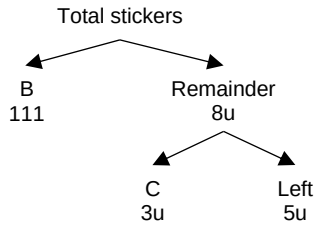
1 plate = 3 × 6.5

= 19.5

Each plate cost **$19.50**.

Let's Practicse 2.2

Question 1



$\frac{1}{9}$ of stickers = 5u

$\frac{9}{9}$ of stickers = 9 × 5u

= 45u

B = 45u − 8u

= 37u

37u = 111

1u = 111 ÷ 37

= 3

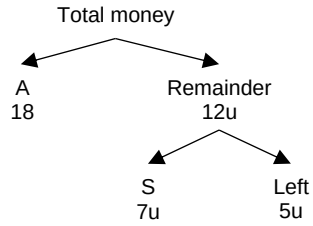
45u = 45 × 3

= 135

Ken had **135** stickers at first.

Answers to Unit 2.2 – Branching (Working Backwards)

Question 2



$\frac{1}{3}$ of total = 5u

$\frac{3}{3}$ of total = 3 × 5

= 15u

E = 15u – 12u

= 3u

3u = 18

1u = 18 ÷ 3

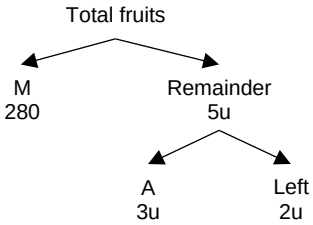
= 6

7u = 7 × 6

= 42

Mes Theva spent **$42** on the story books.

Question 3



$\frac{1}{6}$ of total = 2u

$\frac{6}{6}$ of total = 6 × 2u

= 12u

M = 12u – 5u

= 7u

7u = 280

1u = 280 ÷ 7

= 40

Apples sold in the afternoon = 3u

= 3 × 40

= 120

Number of packs of apples sold = 120 ÷ 6

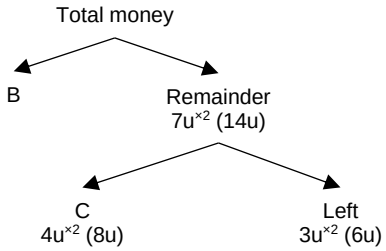
= 20

Amount received = 20 × 2.50

= 50

$50 was collected from sales of apples in the afternoon.

Question 4



$\frac{2}{5}$ of total = $3u^{\times 2}$ (6u)

$\frac{1}{5}$ of total = 6u ÷ 2

= 3u

$\frac{5}{5}$ of total = 5 × 3u

= 15u

B = 15u – 14u

= 1u

Difference between crayons and books = 8u – 1u

= 7u

7u = 28

1u = 28 ÷ 7

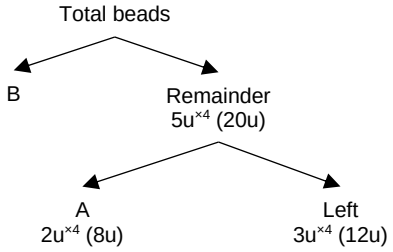
= 4

6u = 6 × 4

= 24

Jazreel was left with **$24** in the end.

Question 5



$\frac{4}{9}$ of total = $3u^{\times 4}$ (12u)

$\frac{1}{9}$ of total = 12u ÷ 4

= 3u

$\frac{9}{9}$ of total = 9 × 3u

= 27u

B = 27u – 20u

= 7u

B + left = 7u + 12u

= 19u

Question 5 (Cont.)

19u = 209

1u = 209 ÷ 19

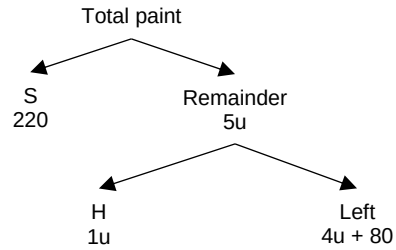
= 11

27u = 27 × 11

= 297

Caitlin had **297** beads at first.

Question 6



$\frac{2}{3}$ of total = 4u + 80

$\frac{1}{3}$ of total = (4u + 80) ÷ 2

= 2u + 40

$\frac{3}{3}$ of total = 3 × (2u + 40)

= 6u + 120

S = 6u + 120 – 5u

= 1u + 120

1u = 220 – 120

= 100

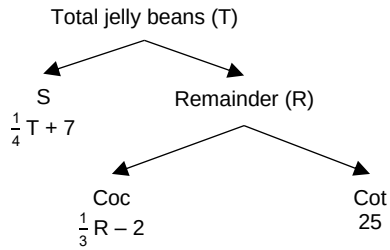
6u + 120 = 6 × 100 + 120

= 720

Darren had **720 mℓ** of paint at first.

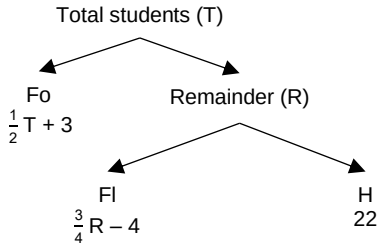
Let's Get Started 2.3

2.



Let's Get Started 2.3 (Cont.)

3.



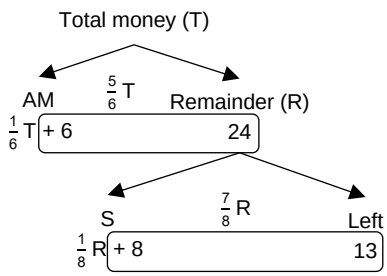
Let's Learn 2.3

Ask Yourself

1. The keywords are 'of the remaining / remainder' which hint at the use of the Branching approach.
2. A fraction and a whole number, either more or less than a certain amount, are given in the problem sum.
3. The sum of all whole numbers and fractions found at a particular branch level must add up to 1 whole. This total should be equal to the value of the branch directly above it.
4. We start solving the problem sum from the last level of the branches and work upwards / backwards.

Let's Practise 2.3

Question 1



$\frac{7}{8}$ of remainder = 8 + 13

= 21

$\frac{1}{8}$ of remainder = 21 ÷ 7

= 3

$\frac{8}{8}$ of remainder = 8 × 3

= 24

Answers to Unit 2.3 – Branching (With Additional Amount)

Question 1 (Cont.)

$\frac{5}{6}$ of total = 6 + 24

= 30

$\frac{1}{6}$ of total = 30 ÷ 5

= 6

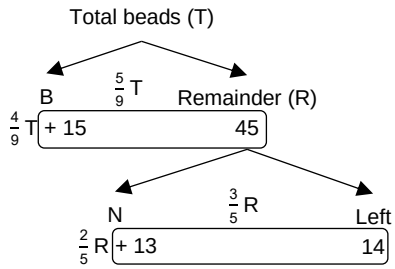
Art materials = $\frac{1}{6}$ T + 6

= 6 + 6

= 12

The art materials cost **$12**.

Question 2



$\frac{3}{5}$ of remainder = 13 + 14

= 27

$\frac{1}{5}$ of remainder = 27 ÷ 3

= 9

$\frac{5}{5}$ of remainder = 5 × 9

= 45

$\frac{5}{9}$ of total = 45 + 15

= 60

$\frac{1}{9}$ of total = 60 ÷ 5

= 12

B = $\frac{4}{9}$ of total + 15

= 12 × 4 + 15

= 63

N = 45 – 14

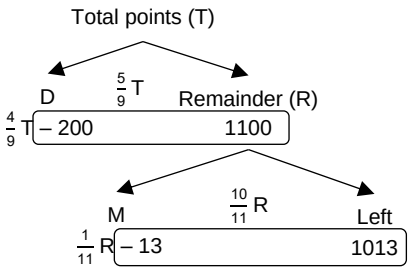
= 31

Total beads used = 63 + 31

= 94

Jane used **94** beads for the bracelet and necklace.

Question 3



$\frac{10}{11}$ of remainder = 1013 – 13

= 1000

$\frac{1}{11}$ of remainder = 1000 ÷ 10

= 100

$\frac{11}{11}$ of remainder = 11 × 100

= 1100

$\frac{5}{9}$ of total = 1100 – 200

= 900

$\frac{1}{9}$ of total = 900 ÷ 5

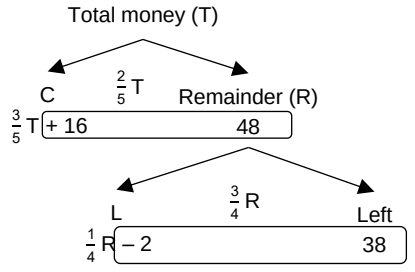
= 180

$\frac{9}{9}$ of total = 9 × 180

= 1620

Mr Davley had **1620** membership points before the redemption.

Question 4



$\frac{3}{4}$ of remainder = 38 – 2

= 36

$\frac{1}{4}$ of remainder = 36 ÷ 3

= 12

$\frac{4}{4}$ of remainder = 4 × 12

= 48

Question 4 (Cont.)

$\frac{2}{5}$ of total = 48 + 16

= 64

$\frac{1}{5}$ of total = 64 ÷ 2

= 32

C = $\frac{3}{5}$ of total + 16

= 3 × 32 + 16

= 112

L = 48 – 38

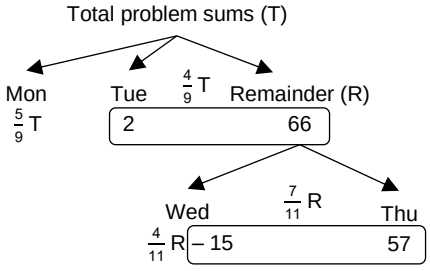
= 10

Difference = 112 – 10

= 102

Doreen spent **$102** more on cosmetic products than on her lunch.

Question 5



$\frac{7}{11}$ of remainder = 57 – 15

= 42

$\frac{1}{11}$ of remainder = 42 ÷ 7

= 6

$\frac{11}{11}$ of remainder = 11 × 6

= 66

$\frac{4}{9}$ of total = 66 + 2

= 68

$\frac{1}{9}$ of total = 68 ÷ 4

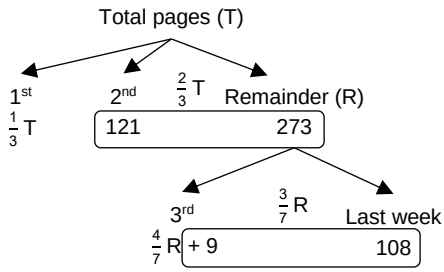
= 17

$\frac{9}{9}$ of total = 9 × 17

= 153

Mike was given **153** questions at first.

Question 6



$\frac{3}{7}$ of remainder = 108 + 9

= 117

$\frac{1}{7}$ of remainder = 117 ÷ 3

= 39

$\frac{7}{7}$ of remainder = 7 × 39

= 273

$\frac{2}{3}$ of total = 121 + 273

= 394

$\frac{1}{3}$ of total = 394 ÷ 2

= 197

$\frac{3}{3}$ of total = 3 × 197

= 591

There were **591** pages in the novel.

Let's Get Started 2.4

S/N	Model-drawing approach	Unitary approach
2.	G D D O **(Repeated Item: Dennis)**	G = $3u^{\times 2}$ (6u) D = $2u^{\times 2}$ (4u) D = 4u O = 3u Summary G = 6u D = 4u O = 3u

Let's Get Started 2.4 (Cont.)

S/N	Model-drawing approach	Unitary approach
3.	A C C B **(Repeated Item: Camp C)**	A = $2u^{\times 2}$ (4u) C = $3u^{\times 2}$ (6u) C = 6u B = 5u Summary A = 4u B = 5u C = 6u
4.	B 2u G 8u B+G 10u A 25u **(Repeated Item: Children)**	B = $1u^{\times 2}$ (2u) G = $4u^{\times 2}$ (8u) B+G = $5u^{\times 2}$ (10u) B+G = $2u^{\times 5}$ (10u) A = $5u^{\times 5}$ (25u) Summary A = 25u B = 2u G = 8u

Let's Learn 2.4

Ask Yourself

The shaded part is the overlapping part between the two figures. Hence, it is the repeated item.

Think Further

X + Y = $1u^{\times 7}$ (7u)
Y + Z = $3u^{\times 7}$ (21u)

Y = $2u^{\times 3}$ (6u)
Y + Z = $7u^{\times 3}$ (21u)

Summary
X = 7u – 6u
= 1u
Y = 6u
Z = 21u – 6u
= 15u
Total = 1u + 6u + 15u
= 22u

Fraction of the figure that is shaded = $\frac{6}{22}$

= $\frac{3}{11}$

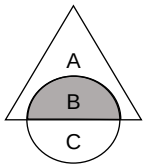
Let's Practise 2.4

Question 1

$A + B = 3u^{\times 5}$ (15u)
$B + C = 4u^{\times 5}$ (20u)

$B = 3u^{\times 4}$ (12u)
$C = 2u^{\times 4}$ (8u)
$B + C = 5u^{\times 4}$ (20u)

Summary
A = 3u
B = 12u
C = 8u



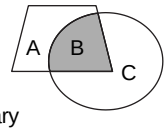
Total = 3u + 12u + 8u
= 23u

Fraction of the figure that is shaded = $\frac{12}{23}$

Question 2

$A + B = 3u^{\times 3}$ (9u)
$B + C = 7u^{\times 3}$ (21u)

$B = 1u^{\times 7}$ (7u)
$C = 2u^{\times 7}$ (14u)
$B + C = 3u^{\times 7}$ (21u)



Summary
A = 2u
B = 7u
C = 14u

Shaded part, B = 7u
= 42
1u = 42 ÷ 7
= 6
Difference in area between the four-sided figure (A + B) and the oval (B + C) = 21u – 9u
= 12u
12u = 12 × 6
= 72
The difference in the area is **72 cm²**.

Question 3

J = 2u
K = 1u

$J = 1u^{\times 2}$ (2u)
$D = 3u^{\times 2}$ (6u)

Summary
J = 2u
D = 6u
K = 1u

D + K = 7u
= 21
1u = 21 ÷ 7
= 3
2u = 2 × 3
= 6
Jason has **6** cousins.

Answers to Unit 2.4 – Repeated Items

Question 4

$T = 2u^{\times 4}$ (8u)
$Sh = 9u^{\times 4}$ (36u)

$So = 3u^{\times 9}$ (27u)
$Sh = 4u^{\times 9}$ (36u)

Summary
T = 8u
Sh = 36u
So = 27u
Total = 8u + 36u + 27u
= 71u

Difference between socks and trousers = 27u – 8u
= 19u
19u = 38
1u = 38 ÷ 19
= 2
71u = 71 × 2
= 142
Mr Osman bought **142** pairs of trousers, shirts and pairs of socks altogether.

Question 5

$50 = 3u^{\times 3}$ (9u)
$10 = 4u^{\times 3}$ (12u)
$10 + $50 = $7u^{\times 3}$ (21u)

$10 + $50 = $3u^{\times 7}$ (21u)
$2 = $1u^{\times 7}$ (7u)

Summary
$50 = 9u
$10 = 12u
$2 = 7u

Difference between number of $2 and $10 notes
= 12u – 7u
= 5u
5u = 15
1u = 15 ÷ 5
= 3
Number of $50 notes = 9u
= 9 × 3
= 27
Number of $10 notes = 12u
= 12 × 3
= 36
Number of $2 notes = 7u
= 7 × 3
= 21
Total amount = (27 × $50) + (36 × $10) + (21 × $2)
= $1350 + $360 + $42
= $1752
There was **$1752** in the safe deposit box.

Answers to Unit 2.4 – Repeated Items

Question 6

A = $1u^{\times 3}$ (3u)
B + C + D = $8u^{\times 3}$ (24u)

B = $1u^{\times 6}$ (6u)
C + D = $3u^{\times 6}$ (18u)
B + C + D = $4u^{\times 6}$ (24u)

C = $5u^{\times 2}$ (10u)
D = $4u^{\times 2}$ (8u)
C + D = $9u^{\times 2}$ (18u)

Summary
A = 3u
B = 6u
C = 10u
D = 8u
Total = 3u + 6u + 10u + 8u
= 27u

A + B = 3u + 6u
= 9u
Difference between (C + D) and (A + B) = 18u – 9u
= 9u
9u = 288
1u = 288 ÷ 9
= 32
27u = 27 × 32
= 864
The girls have **$864**.

Answers to Unit 2.5 – One Item Unchanged

Let's Get Started 2.5

	At first	End	Unchanged	Value of 1 unit
2.	A = $2u^{\times 4}$ (8u)	A = $1u^{\times 3}$ (3u)	The number of marbles that B has.	Change = 8u – 3u = 5u
	B = $3u^{\times 4}$ (12u)	B = $4u^{\times 3}$ (12u)		5u = 40 1u = **8**
3.	A+O = $2u^{\times 3}$ (6u)	A+O = $3u^{\times 2}$ (6u)	The number of apples and oranges.	Change =14u – 9u = 5u
	P = $3u^{\times 3}$ (9u)	P = $7u^{\times 2}$ (14u)		5u = 25 1u = **5**

Answers to Unit 2.5 – One Item Unchanged

Let's Learn 2.5

Ask Yourself

'If' implies that the event did not occur. Hence, the question need not mention 'at first' or 'at the end'.

Think Further

At first
P = $2u^{\times 4}$ (8u)
S + A = $7u^{\times 4}$ (28u)

End
P = $1u^{\times 7}$ (7u)
S + A = $4u^{\times 7}$ (28u)

1u = 12
Total = 8u + 28u
= 36u
36u = 36 × 12
= 432
Mrs Han had **432** fruits.

Let's Practise 2.5

Question 1

At first
P = $1u^{\times 4}$ (4u)
M = $3u^{\times 4}$ (12u)

End
P = $3u^{\times 3}$ (9u)
M = $4u^{\times 3}$ (12u)

Difference = 9u – 4u
= 5u

5u = 10
1u = 10 ÷ 5
= 2
12u = 12 × 2
= 24
The puppy's mother was **24 kg**.

Question 2

At first
B = 1u ×4 (4u)
G = 2u ×4 (8u)

End
B = 4u
G = 5u

Difference = 8u – 5u
= 3u

4u = 40
1u = 40 ÷ 4
= 10
3u = 3 × 10
= 30

30 girls who had left the hall.

Question 3

At first
R = 3u ×4 (12u)
S = 7u ×4 (28u)

End
R = 4u ×3 (12u)
S = 5u ×3 (15u)

Difference = 28u – 15u
= 13u

13u = 39
1u = 39 ÷ 13
= 3
Difference at first = 28u – 12u
= 16u
16u = 16 × 3
= 48

Jen had **48** more sunflowers than roses at first.

Question 4

At first
A = 5u ×3 (15u)
B = 3u ×3 (9u)

End
A = 3u ×5 (15u)
B = 4u ×5 (20u)

Difference = 20u – 9u
= 11u

11u = 33
1u = 33 ÷ 11
= 3

Answers to Unit 2.5 – One Item Unchanged

Question 4 (Cont.)

15u = 15 × 3
= 45

45 customers were in Restaurant A.

Question 5

At first
E = 2u ×3 (6u)
A + S = 3u ×3 (9u)

End
E = 3u ×2 (6u)
A + S = 1u ×2 (2u)

Difference = 9u – 2u
= 7u

7u = 42
1u = 42 ÷ 7
= 6
Total at first = 6u + 9u
= 15u
15u = 15 × 6
= 90

There were **90** toys in the shop.

Question 6

At first
S + M = 4u ×3 (12u)
W = 5u ×3 (15u)

End
S + M = 3u ×4 (12u)
W = 5u ×4 (20u)

Difference = 20u – 15u
= 5u

5u = 300
1u = 300 ÷ 5
= 60
20u = 20 × 60
= 1200

There were **1200 mℓ** of water in the mixture in the end.

Let's Get Started 2.6

Quantity in Units				Value of 1u
Items	Peter	John	Total	25u – 16u = 9u
At first	$5u^{\times 5}$ (25u)	$3u^{\times 5}$ (15u)	$8u^{\times 5}$ (40u)	
What happened?	–36	+36		9u = 36
In the end	$2u^{\times 8}$ (16u)	$3u^{\times 8}$ (24u)	$5u^{\times 8}$ (40u)	1u = **4**

Let's Learn 2.6

Think Further

At first

A = $1u^{\times 3}$ (3u)

C = $3u^{\times 3}$ (9u)

Difference = $2u^{\times 3}$ (6u)

Difference = 10u – 9u

= 1u

End

A = $2u^{\times 2}$ (4u)

C = $5u^{\times 2}$ (10u)

Difference = $3u^{\times 2}$ (6u)

1u = 28

10u = 10 × 28

= 280

There were **280** children on the train in the end.

Let's Practise 2.6

Question 1

At first

O = $1u^{\times 7}$ (7u)

R = $5u^{\times 7}$ (35u)

Total = $6u^{\times 7}$ (42u)

Difference = 18u – 7u

= 11u

End

O = $3u^{\times 6}$ (18u)

R = $4u^{\times 6}$ (24u)

Total = $7u^{\times 6}$ (42u)

11u = 44

1u = 44 ÷ 11

= 4

35u = 35 × 4

= 140

There were **140** pots of roses at first.

Answers to Unit 2.6 – Total Unchanged

Question 2

At first

B = $2u^{\times 9}$ (18u)

G = $3u^{\times 9}$ (27u)

Total = $5u^{\times 9}$ (45u)

Difference = 20u – 18u

= 2u

End

B = $4u^{\times 5}$ (20u)

G = $5u^{\times 5}$ (25u)

Total = $9u^{\times 5}$ (45u)

2u = 12

1u = 12 ÷ 2

= 6

18u = 18 × 6

= 108

There were **108** boys in the gym.

Question 3

At first

P = $3u^{\times 8}$ (24u)

M = $4u^{\times 8}$ (32u)

Total = $7u^{\times 8}$ (56u)

Difference = 35u – 24u

= 11u

End

P = $5u^{\times 7}$ (35u)

M = $3u^{\times 7}$ (21u)

Total = $8u^{\times 7}$ (56u)

11u = 77

1u = 77 ÷ 11

= 7

24u = 24 × 7

= 168

Paul had **168** ants**.**

Question 4

At first

A = $4u^{\times 7}$ (28u)

N = $5u^{\times 7}$ (35u)

Total = $9u^{\times 7}$ (63u)

Difference = 28u – 18u

= 10u

End

A = $2u^{\times 9}$ (18u)

N = $5u^{\times 9}$ (45u)

Total = $7u^{\times 9}$ (63u)

Question 4 (Cont.)

10u = 40

1u = 40 ÷ 10

= 4

28u = 28 × 4

= 112

Alisha had **112** stickers at first.

Question 5

<u>30 min</u>

C = 1u

I = 9u

Total = 10u

Difference = 4u – 1u

= 3u

<u>45 min</u>

C = $2u^{\times 2}$ (4u)

I = $3u^{\times 2}$ (6u)

Total = $5u^{\times 2}$ (10u)

3u = 12

1u = 12 ÷ 3

= 4

10u = 10 × 4

= 40

There were **40** questions in total.

Question 6

<u>At first</u>

P = 5u

U = 9u

Total = 14u

Difference = 6u – 5u

= 1u

<u>End</u>

P = $3u^{\times 2}$ (6u)

U = $4u^{\times 2}$ (8u)

Total = $7u^{\times 2}$ (14u)

1u = 4

14u = 14 × 4

= 56

There were **56** cars in the workshop.

Let's Get Started 2.7

Items	Quantity in Units			Conclusion
	Annie	Mother	Diff	
Now	$1u^{\times 2}$ (2u)	$6u^{\times 2}$ (12u)	$5u^{\times 2}$ (10u)	The age difference between Annie and her mother has not changed.
9 years later	+9	+9		
Future	$1u^{\times 5}$ (5u)	$3u^{\times 5}$ (15u)	$2u^{\times 5}$ (10u)	Their age increased by 3u each after 9 years. Hence, 3u = 9 1u = **3**

Let's Learn 2.7

Ask Yourself

Overlapping figures where an equal area is removed or cut from each of the figures.

Let's Practise 2.7

Question 1

<u>At first</u>

A = $2u^{\times 4}$ (8u)

C = $5u^{\times 4}$ (20u)

Difference = $3u^{\times 4}$ (12u)

Difference = 8u – 3u

= 5u

<u>End</u>

A = $1u^{\times 3}$ (3u)

C = $5u^{\times 3}$ (15u)

Difference = $4u^{\times 3}$ (12u)

5u = 145

1u = 145 ÷ 5

= 29

28u = 28 × 29

= 812

There were **812** people in the conference hall at first.

Question 2

At first

Difference = 8 metres

End

L = 13u

S = 8u

Difference = 5u

5u = 8

1u = 8 ÷ 5

= 1.6

Total length at the end = 13u + 8u

= 21u

21u = 21 × 1.6

= 33.6

Total length removed = 34 – 33.6

= 0.4

Length removed from each = 0.4 ÷ 2

= 0.2

0.2 m was cut off from each piece of rope.

Question 3

Now

J = $1u^{\times 3}$ (3u)

F = $3u^{\times 3}$ (9u)

Difference = $2u^{\times 3}$ (6u)

Difference = 4u – 3u

= 1u

5 years later

J = $2u^{\times 2}$ (4u)

F = $5u^{\times 2}$ (10u)

Difference = $3u^{\times 2}$ (6u)

1u = 5

Now

Jasper = 3u

= 3 × 5

= 15

Father = 9u

= 9 × 5

= 45

Jasper's and his father's present ages are **15 years old** and **45 years old** respectively.

Answers to Unit 2.7 – Difference Unchanged

Question 4

? years ago	Now
G = 3u	G = $4u^{\times 4}$ (16u)
N = 7u	N = $5u^{\times 4}$ (20u)
Difference = 4u	Difference = $1u^{\times 4}$ (4u)

Sum of their ages now = 136 – 14 – 14

= 108

16u + 20u = 108

36u = 108

1u = 108 ÷ 36

= 3

Change = 16u – 3u

= 13u

13u = 13 × 3

= 39

George was $\frac{3}{7}$ as old as Nathan **39 years ago**.

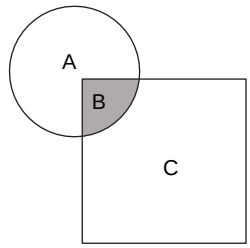
Question 5

At first

A + B = $3u^{\times 2}$ (6u)

C + B = $5u^{\times 2}$ (10u)

Difference = $2u^{\times 2}$ (4u)



End

A = 3u

C = 7u

Difference = 4u

Shaded part (B) = 6u – 3u

= 3u

3u = 36

1u = 36 ÷ 3

= 12

A + B + C = 3u + 3u + 7u

= 13u

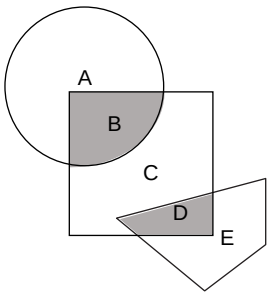
13u = 13 × 12

= 156

The area of the figure is **156 cm^2**.

Answers to Unit 2.7 – Difference Unchanged

Question 6



At first

A + B + C + D = $5u^{\times 2}$ (10u)

B + C + D + E = $7u^{\times 2}$ (14u)

Difference = $2u^{\times 2}$ (4u)

End

A + C = 5u

C + E = 9u

Difference = 4u

Shaded part (B + D) = 14u – 9u

= 5u

5u = 45

1u = 45 ÷ 5

= 9

Unshaded area of square and four-sided figure = C + E

= 9u

9u = 9 × 9

= 81

The area of the unshaded part of the square and quadrilateral is **81 cm²**.

Answers to Unit 2.8 – Numerators the Same

Let's Get Started 2.8

	Model-drawing approach	Unitary approach
3.	J: $4u^{\times 3}$ (12u) | $3u^{\times 3}$ (9u) K: $3u^{\times 4}$ (12u) | $4u^{\times 4}$ (16u) Total units J = 21u K = 28u	$\frac{4}{7}$ J = $\frac{3}{7}$ K $\frac{12}{21}$ J = $\frac{12}{28}$ K Total units J = **21u** K = **28u**
4.	J: $2u^{\times 5}$ (10u) | $9u^{\times 5}$ (45u) K: $5u^{\times 2}$ (10u) | $3u^{\times 2}$ (6u) Total units J = 55u K = 16u	$\frac{2}{11}$ J = $\frac{5}{8}$ K $\frac{10}{55}$ J = $\frac{10}{16}$ K Total units J = **55u** K = **16u**
5.	J: 3u | 4u K: 3u | 1u Total units J = 7u B = 4u	$\frac{3}{7}$ J = $\frac{3}{4}$ K Total units J = **7u** B = **4u**

Answers to Unit 2.8 – Numerators the Same

Let's Learn 2.8

Ask Yourself

There is "an equal number" left but the numbers given are in fractional form.

Think Further

1. 32u + 35u = 201

67u = 201

1u = 201 ÷ 67

= 3

Muffins sold = (32u + 35u) – (20u × 2)

= 27u

27u = 27 × 3

= 81

Mrs Heng sold a total of **81** muffins**.**

2. I will make the denominators the same when the items being compared belong to the same whole unit or group.

Let's Practise 2.8

Question 1

Left

$\frac{5 \times 2}{7 \times 2}$ A = $\frac{2 \times 5}{5 \times 5}$ B

$\frac{10}{14}$ A = $\frac{10}{25}$ B

At first

Shop A = 14u

Shop B = 25u

Difference = 25u – 14u

= 11u

11u = 396

1u = 396 ÷ 11

= 36

25u = 25 × 36

= 900

Shop B had **900** apples in at first.

Question 2

$\frac{3 \times 5}{8 \times 5}$ D = $\frac{5 \times 3}{6 \times 3}$ L

$\frac{15}{40}$ D = $\frac{15}{18}$ L

D = 40u

L = 18u

Difference = 40u – 18u

= 22u

22u = 44

1u = 44 ÷ 22

= 2

Total = 40u + 18u

= 58u

58u = 58 × 2

= 116

Their total allowance is **$116**.

Question 3

Left

$\frac{4}{11}$ J = $\frac{2 \times 2}{7 \times 2}$ D

$\frac{4}{11}$ J = $\frac{4}{14}$ D

At first

J = 11u

D = 14u

Difference = 14u – 11u

= 3u

3u = 36

1u = 36 ÷ 3

= 12

8u = 8 × 12

= 96

They had a total of **96** marbles in the end.

Question 4

Left

$\frac{1 \times 4}{7 \times 4}$ R is twice of $\frac{2}{5}$ W

$\frac{4}{28}$ R is twice of $\frac{2}{5}$ W

At first

R = 28u

W = 5u

Answers to Unit 2.8 – Numerators the Same

Question 4 (Cont.)

Difference = 28u – 5u

= 23u

23u = 46

1u = 46 ÷ 23

= 2

28u = 28 × 2

= 56

Roy had **56** toy cars.

Question 5

Left

K = 1u$^{\times 3}$ (3u)

C = 2u$^{\times 3}$ (6u)

$\frac{3}{5}$ K is half of $\frac{2 \times 3}{3 \times 3}$ C

$\frac{3}{5}$ K is half of $\frac{6}{9}$ C

At first

K = 5u

C = 9u

Total = 5u + 9u

= 14u

14u = 350

1u = 350 ÷ 14

= 25

Difference = 9u – 5u

= 4u

4u = 4 × 25

= 100

Claudia had **100** more stickers than Kim.

Question 6

End

X = 3u$^{\times 6}$ (18u)

Z = 1u$^{\times 6}$ (6u)

$\frac{3 \times 6}{5 \times 6}$ X is 3 times of $\frac{6}{11}$ Z

$\frac{18}{30}$ X is 3 times of $\frac{6}{11}$ Z

Question 6 (Cont.)

At first

X = 30u

Z = 11u

Total = 30u + 11u

= 41u

41u = 656

1u = 656 ÷ 41

= 16

(a) 30u = 30 × 16

= 480

Xavier received **$480** from his father.

(b) Z's deposit amount = 5u

5u = 5 × 16

= 80

Increase by $\frac{1}{4}$ of savings = $80

Savings (in the end) = 5 × $80

= $400

Zane's savings in the bank was **$400** in the end.

Let's Get Started 2.9

Items	Quantity of items	×	Value of items (wheels)	Total value (wheels)
C	5u	×	4	20u
M	3u	×	2	6u
Total	8u = 40			26u = 130

Items	Quantity of items	×	Value of items ($)	Total value ($)
50¢ coin	1u	×	0.5	0.5u
$1 coin	2u	×	1	2u
Total	3u = 15			2.5u = 12.5

Items	Quantity of items	×	Value of items (legs)	Total value (legs)
C	4u	×	4	16u
D	6u	×	2	12u
Total	10u = 120			28u = 336

Let's Learn 2.9

Ask Yourself

In Quantity × Value problems, the quantity or number of units for each item is given, whereas in Guess and Check problems, only the total number of items is given.

Let's Practise 2.9

Question 1

Items	Quantity of items	×	Value of items (wheels)	Total value (wheels)
S	3u	×	2	6u
D	1u	×	3	3u
Total	4u			9u

9u = 225

1u = 225 ÷ 9

= 25

4u = 4 × 25

= 100

There were **100** bicycles altogether.

Question 2

Items	Quantity of items	×	Value of items ($)	Total value ($)
A	5u	×	10	50u
C	12u	×	4	48u
Total	17u			98u

(a) 98u = 9800

1u = 9800 ÷ 98

= 100

12u = 12 × 100

= 1200

There was a total of **1200** children**.**

(b) Difference = 50u – 48u

= 2u

2u = 2 × 100

= 200

The difference in the total amount of money collected from adults and children was **$200**.

Question 3

R = 1u
C = 2u

R = 1u
V = 1u

Summary
R = 1u
C = 2u
V = 1u

Items	Quantity of items	×	Value of items ($)	Total value ($)
R	1u	×	1.1	1.1u
V	1u	×	1.2	1.2u
C	2u	×	1.4	2.8u
Total	4u			5.1u

5.1u = 153
1u = 153 ÷ 5.1
= 30
2u = 2 × 30
= 60

Sarah bakes **30** red velvet muffins, **30** vanilla muffins and **60** chocolate muffins.

Question 4

A = 1u
O = 1u

P = 4u
A = 1u

Summary
A = 1u
O = 1u
P = 4u

Items	Quantity of items	×	Value of items ($)	Total value ($)
A	1u	×	0.4	0.4u
O	1u	×	0.5	0.5u
P	4u	×	0.6	2.4u
Total	6u			3.3u

3.3u = 39.6
1u = 39.6 ÷ 3.3
= 12
Total spent on apples and oranges = 0.4u + 0.5u
= 0.9u
Difference = 2.4u – 0.9u
= 1.5u
1.5u = 1.5 × 12
= 18

Anthony spent **$18** more on pears than apples and oranges combined.

Answers to Unit 2.9 – Quantity × Value

Question 5

B = 4u
R = 3u

S = $3u^{\times 3}$ (9u)
R = $1u^{\times 3}$ (3u)

Summary
R = 3u
B = 4u
S = 9u

Items	Quantity of items	×	Value of items (g)	Total value (g)
R	3u	×	30	90u
B	4u	×	40	160u
S	9u	×	50	450u
Total	16u			700u

(a) 700u = 14 000
1u = 14 000 ÷ 700
= 20
160u = 160 × 20
= 3200
The mass of flour needed is **3200 g**.

(b) Difference = 9u – 3u
= 6u
6u = 6 × 20
= 120
The difference in the number of strawberry muffins and raspberry muffins is **120**.

Question 6

$\frac{2 \times 5}{3 \times 5}$ B = $\frac{5 \times 2}{6 \times 2}$ G
$\frac{10}{15}$ B = $\frac{10}{12}$ D

B = 15u
G = 12u
Total = 15u + 12u
= 27u
A = $\frac{1}{3}$ × 27u
= 9u

Items	Quantity of items	×	Value of items ($)	Total value ($)
B	15u	×	4	60u
G	12u	×	5	60u
A	9u	×	10	90u
Total	36u			210u

Question 6 (Cont.)

Difference = 90u – 60u
= 30u
30u = 3000
1u = 3000 ÷ 30
= 100

(a) 210u = 210 × 100
= 21 000
The total amount collected is **$21 000**.

(b) Total adults and girls = 9u + 12u
= 21u
21u = 21 × 100
= 2100
There is a total of **2100** adults and girls.

Question 1

A + B = $3u^{\times 6}$ (18u)
C = $2u^{\times 6}$ (12u)
Total = $5u^{\times 6}$ (30u)

A + C = $5u^{\times 5}$ (25u)
B = $1u^{\times 5}$ (5u)
Total = $6u^{\times 5}$ (30u)

Summary
A = 13u
B = 5u
C = 12u
Total = 30u

12u = 144
1u = 144 ÷ 12
= 12
30u = 30 × 12
= 360
The pair of earrings cost **$360**.

Question 2

J + E = $3u^{\times 6}$ (18u)
G + R = $4u^{\times 6}$ (24u)
Total = $7u^{\times 6}$ (42u)

J + E + G = $5u^{\times 7}$ (35u)
R = $1u^{\times 7}$ (7u)
Total = $6u^{\times 7}$ (42u)

J = $1u^{\times 3}$ (3u)
E = $5u^{\times 3}$ (15u)
J + E = $6u^{\times 3}$ (18u)

Summary
J = 3u
E = 15u
G = 17u
R = 7u
Total = 42u

Difference between G and E = 17u – 15u
= 2u

Question 2 (Cont.)

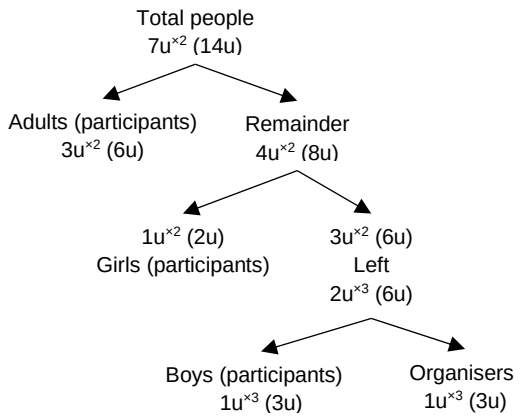
2u = 16
1u = 16 ÷ 2
= 8
42u = 42 × 8
= 336
The four children pooled together **336** marbles.

Question 3

At first	Change	End
R = $2u^{\times 2}$ (4u)	R = 5u	R = 2u
M = $1u^{\times 2}$ (2u)	M = 1u	M = 4u

Difference (end) = 4u – 2u
= 2u
2u = 8
1u = 8 ÷ 2
= 4
R (at first) = 4 × 4
= 16
M (at first) = 2 × 4
= 8
Robert had **16** magnets and Melvin had **8** magnets at first.

Question 4



Items	Quantity of items	×	Value of items ($)	Total value ($)
A	6u	×	2	12u
G	2u	×	5	10u
B	3u	×	6	18u
O	3u	×	0	0u
Total	14u			40u

Question 4 (Cont.)

(a) $40u = 400$

$1u = 400 \div 40$

$= 10$

$18u = 18 \times 10$

$= 180$

The boys spent **$180** on drinks.

(b) $3u = 3 \times 10$

$= 30$

30 people were event organisers.

(c) $14u = 14 \times 10$

$= 140$

There were **140** people at the event.

Question 5

$\frac{2 \times 3}{5 \times 3} A = \frac{3 \times 2}{4 \times 2} B$

$\frac{6}{15} A = \frac{6}{8} B$

$A = 15u^{\times 2}$ (30u)

$B = 8u^{\times 2}$ (16u)

$\frac{3 \times 4}{4 \times 4} B = \frac{4 \times 3}{7 \times 3} C$

$\frac{12}{16} B = \frac{12}{21} C$

$B = 16u$

$C = 21u$

Summary

A = 30u

B = 16u

C = 21u

Difference = 30u – 21u

= 9u

$9u = 45$

$1u = 45 \div 9$

$= 5$

$16u = 16 \times 5$

$= 80$

There are **80** pineapples in Basket B.

Question 6

P = 3u

E + R = 7u

Total = 10u

$E = 1u^{\times 5}$ (5u)

$P + R = 1u^{\times 5}$ (5u)

$Total = 2u^{\times 5}$ (10u)

Summary

P = 3u

E = 5u

R = 2u

Question 6 (Cont.)

Items	Quantity of items	×	Value of items ($)	Total value ($)
P	3u	×	1.95	5.85u
E	5u	×	0.75	3.75u
R	2u	×	2.2	4.4u
Total	10u			14u

$14u = 28$

$1u = 28 \div 14$

$= 2$

$10u = 10 \times 2$

$= 20$

There are **20** items in the bag.

Question 7

Fraction of ducks left $= 1 - \frac{5}{7}$

$= \frac{2}{7}$

Fraction of chickens left $= 1 - \frac{2}{5}$

$= \frac{3}{5}$

$\frac{3 \times 2}{5 \times 2} C = \frac{2 \times 3}{7 \times 3} D$

$\frac{6}{10} C = \frac{6}{21} D$

$C = 10u$

$D = 21u$

Total (at first) = 10u + 21u

= 31u

Remained = 6u + 6u

= 12u

$12u = 840$

$1u = 840 \div 12$

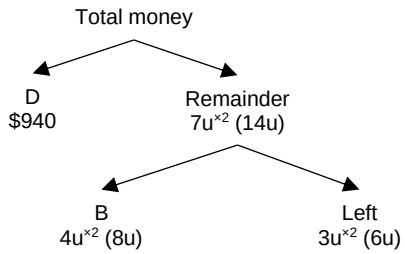
$= 70$

$31u = 31 \times 70$

$= 2170$

There was a total of **2170** animals at Farmer Oei's farm at first.

Question 8



$\frac{2}{9}$ of total = 6u + 180

$\frac{1}{9}$ of total = 3u + 90

$\frac{9}{9}$ of total = 27u + 810

Dress = 27u + 810 – 14u

= 13u + 810

13u = 940 – 810

= 130

1u = 130 ÷ 13

= 10

27u + 810 = 27 × 10 + 810

= 1080

Niki had **$1080** at first.

Question 9

$\frac{3 \times 2}{11 \times 2} N = \frac{2 \times 3}{9 \times 3} E$

$\frac{6}{22} N = \frac{6}{27} E$

N = 22u

E = 27u

Total = 22u + 27u

= 49u

Spent = 6u + 6u

= 12u

Left = 49u – 12u

= 37u

37u = 3700

1u = 3700 ÷ 37

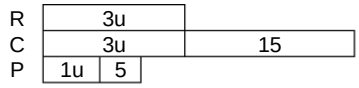
= 100

22u = 22 × 100

= 2200

Norman's savings was **$2200**.

Question 10



Items	Quantity of items	×	Value of items ($)	Total value ($)
C	3u + 15	×	3.5	10.5u + 52.5
R	3u	×	3	9u
P	1u + 5	×	2.9	2.9u + 14.5
Total	7u + 20			22.4u + 67

22.4u = 179 – 67

= 112

1u = 112 ÷ 22.4

= 5

7u + 20 = 7 × 5 + 20

= 55

They sell **55** pieces of tokiwado daily.

Question 11

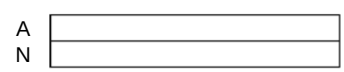
$\frac{2 \times 3}{3 \times 3} A = \frac{3 \times 2}{4 \times 2} N$

$\frac{6}{9} A = \frac{6}{8} N$

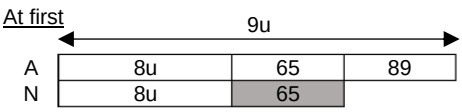
A = 9u

N = 8u

End



At first



1u = 65 + 89

= 154

A = 9 × 154

= 1386

N = 8 × 154

= 1232

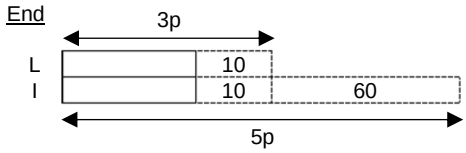
Alyssa and Nerissa had **$1386** and **$1232** respectively.

Question 12

L = 5u

K = 6u

I = 5u



2p = 60

1p = 60 ÷ 2

= 30

3p = 3 × 30

= 90

L (at first) = 90 – 10

= 80

5u = 80

1u = 80 ÷ 5

= 16

6u = 6 × 16

= 96

K (end) = 96 – 10 – 70

= 16

Kevin had **16** cards in the end.

Chapter 3 Rate

Let's Learn 3.1

Ask Yourself

1. 1 hour = 10 × 6 minutes
2. We want the answer to appear on the right-hand side. So, for (a), we will write 6 minutes → 3 buttons. For (c), it will be rewritten as 3 buttons → 6 minutes.

Let's Practise 3.1

Question 1

$\frac{1}{2}$ hour → 2100 toys

1 hour → 4200 toys

2 hours → 8400 toys

It can produce **8400** toys in 2 hours.

Question 2

80 words → 1.5 min

400 words → 5 × 1.5 min

= 7.5 min

She would take **7.5 minutes**.

Question 3

60 min → 960 litres

1 min → 960 litres ÷ 60

= 16 litres

5 min → 5 × 16 litres

= 80 litres

There will be **80 litres** of water in the tank after 5 minutes.

Question 4

(a) 8 hours → 200 000 km

1 hour → 200 000 km ÷ 8

= 25 000 km

The plane travels **25 000 km** in 1 hour.

(b) 25 000 km × 4 = 100 000 km

The plane travels **100 000 km** in 4 hours.

Question 5

(a) 12 donuts → $30

1 donuts → $30 ÷ 12

= $2.50

1 donut costs **$2.50**.

(b) $30 → 12 donuts

$10 → 12 donuts ÷ 3

= 4 donuts

4 donuts can be bought with $10.

Question 6

(a) 5 minutes → 2 pails

1 minute → $\frac{2}{5}$ pail

30 minutes → 30 × $\frac{2}{5}$ pail

= 12 pails

The tap can fill **12** pails of water in $\frac{1}{2}$ hour.

Question 6 (Cont.)

(b) 2 pails → 5 minutes

1 pail → $\frac{5}{2}$ minutes

15 pails → 15 × $\frac{5}{2}$ minutes

= 37.5 minutes

The tap takes **37.5 minutes** to fill 15 pails of water.

Let's Learn 3.2

Ask Yourself

Break down the time using a timeline.

Let's Practise 3.2

Question 1

(a) Maria's parking fee from 1:45pm to 2:45pm is **$2.50**.

(b) 1:45 pm to 2:45 pm → $2.50

2:45 pm to 3:15 pm → $1.00

Total parking fee = $2.50 + $1.00

= $3.50

Maria's parking fee from 1:45pm to 3:15pm is **$3.50**.

(c) 1:45 pm to 2:45 pm → $2.50

2:45 pm to 3:15 pm → $1.00

3:15 pm to 3:30 pm → $1.00

Total parking fee = $2.50 + $1.00 + $1.00

= $4.50

Maria's parking fee from 1:45pm to 3:30pm is **$4.50**.

Question 2

3:40 pm to 4:40 pm → $8.50

4:40 pm to 5:10 pm → $3.50

5:10 pm to 5:40 pm → $3.50

5:40 pm to 6:10 pm → $3.50

6:10 pm to 6:25 pm → $3.50

Total amount paid = $8.50 + (4 × $3.50)

= $22.50

Kyra had to pay **$22.50**.

Question 3

Plan A	Plan B
First 30 min	First 30 min
→ 30 × $0.15 = $4.50	→ 30 × $0.20 = $6
3 h 40 min = 220 min	3 h 40 min = 220 min
Subsequent time	Subsequent time
= 220 min – 30 min	= 220 min – 30 min
= 190 min	= 190 min
Subsequent charges	Subsequent charges
→ 190 × $0.25 = $47.50	→ 190 × $0.15 = $28.50
Total charges	Total charges
= $20 + $4.50 + $47.50	= $25 + $6 + $28.50
= $72	= $59.50

Difference = $72 – $59.50

= $12.50

The price difference between the two plans is **$12.50**.

Question 4

First 1 kg → $4.50

Subsequent 1 kg → $3.50

1 kg → $3.50

750 g → $3.50

Total charges = $4.50 + (3 × $3.50)

= $15

Sam has to pay **$15**.

Question 5

Sets of 400 m = 5.7 ÷ 0.4

≈ 15

Taxi fare = $4.40 + (15 × $0.26)

= $8.30

Pamela's taxi fare was **$8.30**.

Question 6

(a) Lee pays **$1.10**.

(b) Additional 100 g = (250 g – 100 g) ÷ 100

≈ 2

Postage = $1.50 + 2 × $1.20

= $3.90

Jane pays **$3.90**.

Question 1

1.5 h = 90 min

5 min → 3 litres

1 min → $\frac{3}{5}$ litres

90 min → 90 × $\frac{3}{5}$ litres

= 54 litres

54 litres of water would flow from the tap in 1.5 hours.

Question 2

8 lessons → \$300

1 lesson → \$300 ÷ 8

= \$37.50

3 lessons → 3 × \$37.50

= \$112.50

Jaslyn paid **\$112.50** for 3 lessons.

Question 3

Printer A

2 min → 50 copies

1 min → 50 copies ÷ 2

= 25 copies

15 min → 15 × 25 copies

= 375 copies

Printer B

3 min → 30 copies

1 min → 30 copies ÷ 3

= 10 copies

15 min → 15 × 10 copies

= 150 copies

Number more = 375 – 150

= 225

Printer A can print **225** more copies than Printer B.

Question 4

Additional 100 g = (425 g – 100 g) ÷ 100

≈ 4

Postage = \$1.20 + \$1.20 + 4 × \$1.05

= \$6.60

Lenny paid **\$6.60** altogether.

Question 5

Additional pieces = 100 – 15

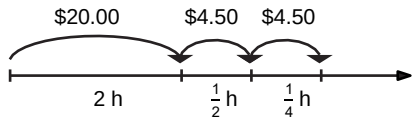
= 85

Cost = 15 × \$6 + 85 × \$4

= \$430

The cost of printing 100 posters is **\$430**.

Question 6



3:15 pm to 6 pm → 2 h 45 min

Additional half hour = 45 min ÷ 30 min

≈ 2

Rental (1 bicycle) = \$20 + 2 × \$4.50

= \$29

Rental (2 bicycles) = 2 × \$29

= \$58

Peggy paid **\$58** altogether.

Question 7

Amount earned (Sat and Sun) = \$9.50 × 8 × 2

= \$152

Amount earned on a weekday = \$8.50 × 5

= \$42.50

Amount earned on weekdays = \$449.50 – \$152

= \$297.50

Number of weekdays = \$297.50 ÷ \$42.50

= 7

Mr Lee worked **7** weekdays in that month.

Chapter 4 Geometry

Let's Get Started 4.1

1. Using the property that the sum of angles on a straight line is 180°,

$\angle y$ + 52° + 60° = 180°

$\angle y$ = 180° – 52° – 60°

= **68°**.

Let's Get Started 4.1 (Cont.)

2. Using the property that vertically opposite angles between straight lines are equal (or the same), $\angle p$ = **46°**, and $\angle q$ = **39°**.

Let's Learn 4.1

Ask Yourself

The sum of angles on a straight line is 180°.

Let's Practise 4.1

Question 1

Using the property that the sum of angles on a straight line is 180°,

$\angle a + \angle b + 120° = 180°$

$\angle a + \angle b = 180° - 120°$

$= 60°$

$3u = 60°$

$1u = 60° \div 3$

$= 20°$

$\angle a = 2u$

$= 2 \times 10°$

$=$ **40°**

$\angle b = 1u$

$=$ **20°**

Question 2

Using the property that the sum of angles on a straight line is 180°,

$\angle m + \angle n + 90° = 180°$

$\angle m + \angle n = 180° - 90°$

$= 90°$

$5u = 90°$

$1u = 90° \div 5$

$= 18°$

$\angle m = 2u$

$= 2 \times 18°$

$=$ **36°**

$\angle n = 3u$

$= 3 \times 18°$

$=$ **54°**

Answers to Unit 4.1 – Finding Unknown Angles

Question 3

Using the property of vertically opposite angles,

$\angle a + \angle b = 126°$

$3u = 126°$

$1u = 126° \div 3$

$= 42°$

$\angle a = 2u$

$= 2 \times 42°$

$=$ **84°**

$\angle b = 1u$

$=$ **42°**

Question 4

Using the property of vertically opposite angles,

$\angle m + \angle n + 40° = 135°$

$\angle m + \angle n = 135° - 40°$

$= 95°$

$5u = 95°$

$1u = 95° \div 5$

$= 19°$

$\angle m = 3 \times 19°$

$=$ **57°**

$\angle n = 2 \times 19°$

$=$ **38°**

Question 5

Using the property of vertically opposite angles,

$\angle a =$ **88°**

$\angle b = 88° \div 2$ (given: half that of $\angle a$)

$=$ **44°**

$\angle a + \angle b = 88° + 44°$

$= 132°$

Using the property that the sum of angles on a straight line is 180°,

$\angle a + \angle b + \angle c = 180°$

$\angle c = 180° - 132°$

$=$ **48°**

Question 6

$\angle XNY = 115°$ (Vertically opposite angles)

$\angle a = 180° - 115° - 42.5°$ (sum of angles in a triangle)

$= \mathbf{22.5°}$

$\angle KXN = 22.5°$ (given: same as $\angle a$)

$\angle b = 115° - 22.5°$ (exterior angles)

$= \mathbf{92.5°}$

$\angle MKY = 180° - 45° - 92.5°$ (angles on a straight line)

$= 42.5°$

$\angle c = 115° + 42.5°$ (exterior Angles)

$= \mathbf{157.5°}$

Let's Get Started 4.2

1. (a) **2** pairs (AB // DC and AD // BC)
   (b) $\angle ADC = \angle ABC$ and $\angle BAD = \angle BCD$
   (c) $\angle BAD + \angle ADC$, $\angle ABC + \angle BCD$, $\angle DAB + \angle ABC$ and $\angle BCD + \angle CDA$

2. (a) **2** pairs (AB // DC and AD // BC)
   (b) $\angle ABC = \angle ADC$ and $\angle BAD = \angle BCD$
   (c) $\angle BAD + \angle ABC$, $\angle ABC + \angle BCD$, $\angle BCD + \angle ADC$ and $\angle CDA + \angle DAB$

3. (a) **1** pair (CD // BA)
   (b) No angles that are the same
   (c) $\angle ADC + \angle BAD$ and $\angle DCB + \angle ABC$

4. Using the property that the sum of interior angles between a pair of parallel lines add up to 180°,

   $\angle SRU + 37° = 180°$

   $\angle SRU = 180° - 37°$

   $= 143°$

   Using the property of the sum of angles at a point is 360°,

   $\angle QRS + 143° + 68° = 360°$

   $\angle QRS = 360° - 143° - 68°$

   $= 149°$

   Using the property that the sum of interior angles between a pair of parallel lines add up to 180°,

   $\angle k + \angle QRS = 180°$

   $\angle k + 149° = 180°$

   $\angle k = 180° - 149°$

   $= \mathbf{31°}$

Let's Get Started 4.2 (Cont.)

5. Using the property that the sum of angles on a straight line is 180°,

   $\angle a + 52° + 55° = 180°$

   $\angle a = 180° - 52° - 55°$

   $= \mathbf{73°}$

   Method 1

   Using the property of internal angles,

   $\angle a + 52° + \angle c = 180°$

   $73° + 52° + \angle c = 180°$

   $\angle c = 180° - 73° - 52°$

   $= \mathbf{55°}$

   Method 2

   Using the property of corresponding angles,

   $\angle c = \mathbf{55°}$

   Using the property that the sum of angles in a triangle is 180°,

   $\angle a + \angle b + \angle c = 180°$

   $73° + \angle b + 55° = 180°$

   $\angle b = 180° - 73° - 55°$

   $= \mathbf{52°}$

6. $\angle n = \mathbf{107°}$ (given: ABCD and CDEF are identical)

   Using the property that the sum of angles on a straight line is 180°,

   $\angle n + \angle m = 180°$

   $107° + \angle m = 180°$

   $\angle m = 180° - 107°$

   $= \mathbf{73°}$

Let's Learn 4.2

Ask Yourself

1. Sum of angles on a straight line. Yes, we can find the angle directly.
2. Sum of angles in a triangle.
3. The base angles in an isosceles triangle are the same.

Let's Practise 4.2

Question 1

Using the property that the line BD is diagonal to Square ABCD, it cuts the angles at the corners in half.

$\angle CBD = 90° \div 2$

$= \mathbf{45°}$

Question 2

Using the property that the sum of angles on a straight line is 180°,

$\angle BED + 65° = 180°$

$\angle BED = 180° - 65°$

$= 115°$

Using the property that Triangle BED is an isosceles triangle and that the sum of angles in a triangle is 180°,

$\angle DBE = \angle EDB$

$= (180° - 115°) \div 2$

$= \mathbf{32.5°}$

Question 3

Since ABCD is a rhombus, the line BD cuts the rhombus into half such that Triangle BCD and Triangle ABD becomes isosceles triangles where BC = CD and AB = AD respectively.

$\angle CBD = \angle CDB = \angle ABD = \angle ADB = (180° - 45°) \div 2$

$= 67.5°$

$\angle EDB = 67.5° - 30°$

$= \mathbf{37.5°}$

Question 4

$\angle BEC = 180° - 100° - 10°$ (sum of angles in a triangle)

$= 70°$

$\angle AFD = \angle BEC$ (corresponding angles)

$= \mathbf{70°}$

Question 5

(a) Using the property that opposite angles in a parallelogram are equal,

$\angle AEC = 75°$

$\angle AED = 180° - 75°$ (sum of angles on a straight line)

$= \mathbf{105°}$

Answers to Unit 4.2 – Finding Angles in Plane Figures

Question 5 (Cont.)

(b) $\angle AEF = 35°$ (alternate angles)

$\angle FEC = 75° - 35°$

$= \mathbf{40°}$

Question 6

$\angle EFC = 180° - 50°$ (interior angles)

$= 130°$

$\angle GFA = 130°$ (vertically opposite angles)

Using the property that Triangle AFG is an isosceles triangle and that the sum of angles in a triangle is 180°,

$\angle AGF = (180° - 130°) \div 2$

$= 25°$

$\angle GHB = 180° - 25° - 78°$ (sum of angles in a triangle)

$= \mathbf{77°}$

Answers to Review Questions on Chapter 4

Question 1

Using the property that the sum of angles in a triangle is 180°,

$\angle ECH + 70° + 90° = 180°$

$\angle ECH = 180° - 70° - 90°$

$= 20°$

Using the property that the line AC is diagonal to Square ABCD, it cuts the angles at the corners in half.

$\angle ACB = 90° \div 2$

$= 45°$

$\angle ACE = 45° - 20°$

$= \mathbf{25°}$

Question 2

Using the property that the sum of angles on a straight line is 180°,

$\angle HED = 180° - 60°$

$= 120°$

Using the property that the line DH is diagonal to Square CDGH, it cuts the angles at the corners in half.

$\angle HDE = \angle CHD = 45°$

Question 2 (Cont.)

Using the property that the sum of angles in a triangle is 180°,

∠DHE = 180° – 120° – 45°

= 15°

Using the property that the sum of angles on a straight line is 180°,

∠BHC = 180° – 90° – 45° – 15°

= 30°

Since ABHI and CDGH are identical squares, BH = CH. Thus, Triangle BCH is an isosceles triangle.

Using the property that Triangle BCH is an isosceles triangle and that the sum of angles in a triangle is 180°,

∠HBC = (180° – 30°) ÷ 2

= **75°**

Question 3

Using the property that Triangle BDF is an isosceles triangle and that the sum of angles in a triangle is 180°,

∠BDF = (180° – 30°) ÷ 2

= 75°

Using the property that the sum of angles in a triangle is 180°,

∠ADE = 180° – 40° – 90°

= 50°

Using the property that the sum of angles on a straight line is 180°,

∠BDC = 180° – 50° – 75°

= 55°

Using the property that the sum of angles in a triangle is 180°,

∠DBC = 180° – 55° – 90°

= **35°**

Question 4

Using the property that the sum of angles in a triangle is 180°,

∠CFD = 180° – 65° – 90°

= 25°

Using the property that the line BF is diagonal to Square ABEF, it cuts the angles at the corners in half.

∠BFE = 45°

Answers to Review Questions on Chapter 4

Question 4 (Cont.)

∠BFC = 45° – 25°

= **20°**

Question 5

Using the property that opposite angles in a parallelogram are equal,

∠EDB = 118°

Using the property that Triangle BDE is an isosceles triangle and that the sum of angles in a triangle is 180°,

∠EBD = (180° – 118°) ÷ 2

= 31°

Using the property that the sum of angles on a straight line is 180°,

∠BDC = 180° – 118°

= 62°

Using the property that Triangle BCD is an isosceles triangle and that the sum of angles in a triangle is 180°,

∠DBC = 180° – 62° – 62°

= 56°

∠EBC = 31° + 56°

= **87°**

Question 6

(a) Since BCDE is a rhombus, the line BD cuts the rhombus into half such that Triangle BCD and Triangle BED becomes isosceles triangles where BC = CD and BE = DE respectively.

Since Triangle BCD is an equilateral triangle,

∠CDB = **60°**

(b) Since AF = AE, ABEF and BCDE are identical rhombuses,

∠BAE = 60°

∠EAK = 60° – 50°

= **10°**

Question 7

Using the property that the sum of angles in a triangle is 180° and Triangle ABC is an isosceles triangle,

$\angle ACB = 180° - 30° - 30°$

$= 120°$

Using the property of vertically opposite angles,

$\angle DCE = 120°$

Using the property that the sum of angles in a triangle is 180° and Triangle CDE is an isosceles triangle,

$\angle CED = (180° - 120°) \div 2$

$= 30°$

Using the property of vertically opposite angles,

$\angle FEK = 30°$

$\angle GEK = 30° - 18°$

$= 12°$

Using the property that the sum of angles on a straight line is 180°,

$\angle EGK = 180° - 105°$

$= 75°$

Using the property that the sum of angles in a triangle is 180°,

$\angle GKE = 180° - 12° - 75°$

$= 93°$

Using the property that the sum of angles on a straight line is 180°,

$\angle GKJ = 180° - 93°$

$= \mathbf{87°}$

Using the property that the sum of angles in a triangle is 180°,

$\angle EFK = 180° - 30° - 93°$

$= \mathbf{57°}$

Question 8

$\angle ACD = 180° - 47°$ (interior angles)

$= 133°$

$\angle ADC = 180° - 133° - 13°$ (sum of angles in a triangle)

$= \mathbf{34°}$

$\angle GAC = 47°$ (opposite angles in a parallelogram)

$\angle GAD = 47° - 13°$

$= \mathbf{34°}$

Answers to Review Questions on Chapter 4

Question 9

$\angle BFG = (180° - 24°) \div 2$ (angles in an isosceles triangle)

$= 78°$

$\angle CFD = 180° - 78° - 39° - 49°$ (angles on a straight line)

$= \mathbf{14°}$

$\angle CDE = 63°$ (opposite angles in a parallelogram)

$\angle DCF = 180° - 63°$ (interior angles)

$= \mathbf{117°}$

Chapter 5 Area of Triangle

1. Height: **AB**

2. Base: AB = **7 cm**;
   Height: CD = **35 cm**

3. Base: AB = **31 cm**;
   Height: GF = 15 cm – 6 cm
   $= \mathbf{9\ cm}$

4. Area of A $= \frac{1}{2} \times 4\ cm \times 3\ cm$
   $= \mathbf{6\ cm^2}$
   Area of B $= \frac{1}{2} \times 6\ cm \times 1\ cm$
   $= \mathbf{3\ cm^2}$
   Area of C $= \frac{1}{2} \times 2\ cm \times 4\ cm$
   $= \mathbf{4\ cm^2}$

5. (a) Area $= \frac{1}{2} \times 6\ cm \times 5\ cm$
   $= \mathbf{15\ cm^2}$

   (b) Area $= \frac{1}{2} \times 5\ cm \times 6\ cm$
   $= \mathbf{15\ cm^2}$

Let's Get Started 5.1

1. (a) Method 1

Area of Triangle A = $\frac{1}{2}$ × 22 cm × 20 cm
= 220 cm^2

Area of Triangle B = $\frac{1}{2}$ × 22 cm × 30 cm
= 330 cm^2

Total area of Triangles A and B
= 220 cm^2 + 330 cm^2
= **550 cm^2**

Method 2

Total area = $\frac{1}{2}$ × 22 cm × (20 + 30) cm
= **550 cm^2**

(b) No. The area of the shaded parts in both rectangles is the same since they have the same base and height.

2. Area of the shaded part
= $\frac{1}{2}$ × common base × difference in heights
= $\frac{1}{2}$ × 10 cm × (10 – 5) cm
= **25 cm^2**
OR
= $\frac{1}{2}$ × common base × combined height
= $\frac{1}{2}$ × 5 cm × (5 + 5) cm
= **25 cm^2**

3. Height of Triangle ABC = 25 cm – 12 cm
= 13 cm
Total area = $\frac{1}{2}$ × 20 cm × (25 + 13) cm
= **380 cm^2**

4. Total shaded area
= $\frac{1}{2}$ × 12 cm × (14 – 5) cm + $\frac{1}{2}$ × 12 cm × (10 – 5) cm
= **84 cm^2**

Let's Learn 5.1

Ask Yourself

The heights of both triangles are the same.

Answers to Unit 5.1 – Triangles with Common Base or Height

Let's Practise 5.1

Question 1

Total area of the unshaded triangles = $\frac{1}{2}$ × 20 cm × 10 cm
= **100 cm^2**

Question 2

Total area of the unshaded triangles = $\frac{1}{2}$ × 24 cm × 18 cm
= **216 cm^2**

Question 3

Total area of the shaded triangles
= $\frac{1}{2}$ × (9 + 7 + 3) cm × 6 cm
= **57 cm^2**

Question 4

Total area of the 3 shaded triangles
= $\frac{1}{2}$ × (15 + 2) cm × 18 cm
= **153 cm^2**

Question 5

Total area of the shaded triangles
= $\frac{1}{2}$ × 20 cm × (10 + 5) cm
= **150 cm^2**

Question 6

Total area of the shaded triangles = $\frac{1}{2}$ × 32 cm × 28 cm
= **448 cm^2**

Let's Get Started 5.2

1. Area of the square = 2 × $\frac{1}{2}$ × 48 cm × (48 ÷ 2) cm
= **1152 cm^2**

2. Height of each identical triangle = 20 cm ÷ 2
= 10 cm
Area of figure = 8 × $\frac{1}{2}$ × 9 cm × 10 cm
= **360 cm^2**

Let's Get Started 5.2 (Cont.)

3. Area of figure = $5 \times \frac{1}{2} \times 18\text{ cm} \times 10\text{ cm}$
= **450 cm²**

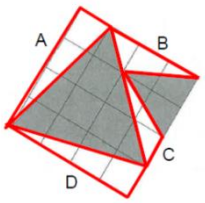
Let's Learn 5.2

Ask Yourself

1. No
2. Yes

Let's Practise 5.2

Question 1



Side of figure = $\sqrt{576}$ cm
= 24 cm

Length of one small square = 24 cm ÷ 4
= 6 cm

Area of Triangle A = $\frac{1}{2} \times 24\text{ cm} \times 6\text{ cm}$
= 72 cm²

Area of Triangle B = $\frac{1}{2} \times 18\text{ cm} \times 6\text{ cm}$
= 54 cm²

Area of Triangle C = $\frac{1}{2} \times 12\text{ cm} \times 6\text{ cm}$
= 36 cm²

Area of Triangle D is the same as Area of Triangle A
= 72 cm²

Area of shaded area
= 576 cm² – 72 cm² – 54 cm² – 36 cm² – 72 cm²
= **342 cm²**

Question 2

Area of shaded Triangle UXY = $\frac{1}{2} \times 6\text{ cm} \times (12 - 5)\text{ cm}$
= 21 cm²

Area of shaded Triangle UWR = $\frac{1}{2} \times (15 - 4)\text{ cm} \times 20\text{ cm}$
= 110 cm²

Question 2 (Cont.)

Total area = 21 cm² + 110 cm²
= **131 cm²**

Question 3

HG = 3u
AH = 4u

AH = $2u^{\times 2}$ (4u)
GF = $1u^{\times 2}$ (2u)

Summary
HG = 3u
AH = 4u
GF = 2u

Total = 3u + 4u + 2u
= 9u

9u = 36 cm
1u = 36 cm ÷ 9
= 4 cm
AH = 4 × 4 cm
= 16 cm
HG = 3 × 4 cm
= 12 cm
GF = 2 × 4 cm
= 8 cm

Total area of Triangle ABH = $\frac{1}{2} \times 16\text{ cm} \times 10\text{ cm}$
= 80 cm²

Area of Triangle BCH and Triangle DCE
= $\frac{1}{2} \times (BC + CE) \times 10\text{ cm}$
= $\frac{1}{2} \times 12\text{ cm} \times 10\text{ cm}$
= 60 cm²

Area of Triangle EGF = $\frac{1}{2} \times 8\text{ cm} \times 10\text{ cm}$
= 40 cm²

Area of the figure = 80 cm² + 60 cm² + 40 cm² + 110 cm²
= **290 cm²**

Question 4

AB = $1u^{\times 3}$ (3u)
EF = $2u^{\times 3}$ (6u)

CD = 2u
AB = 3u

Summary
AB = 3u
EF = 6u
CD = 2u

Difference between EF and CD = 6u – 2u
= 4u

4u = 12 cm
1u = 12 cm ÷ 4
= 3 cm

Question 4 (Cont.)

AB = 3 × 3 cm
= 9 cm

Area of Triangle AHG = $\frac{1}{2}$ × 10 cm × 9 cm
= 45 cm^2

Area of Triangle EGC = $\frac{1}{2}$ × 10 cm × (EF – CD)
= $\frac{1}{2}$ × 10 cm × 12 cm
= 60 cm^2

Area of figure = 45 cm^2 + 60 cm^2
= **105 cm^2**

Question 5

(a) AB = $\frac{3}{8}$ × 200 m
= 75 m

Cost of building the picnic area
= 75 × 75 × $20
= **$112 500**

(b) Cost of fencing the fountain
= (250 + 150 + 200) × $12
= **$7200**

Question 6

Area of square = 20 m × 20 m
= 400 m^2

Area of B = $\frac{1}{2}$ × 20 m × (20 – 7) m
= 130 m^2

Area of A = 400 m^2 – 130 m^2
= 270 m^2

Area of C = $\frac{1}{2}$ × 20 m × (15 – 13) m
= 20 m^2

Difference between A and C = 270 m^2 – 20 m^2
= **250 m^2**

Question 1

Total area of the shaded triangles
= $\frac{1}{2}$ × (10 + 15) cm × 20 cm
= **250 cm^2**

Question 2

Total area of the unshaded triangles = $\frac{1}{2}$ × 15 cm × 48 cm
= **360 cm^2**

Question 3

Total area of the shaded triangles
= $\frac{1}{2}$ × (10 + 8) cm × 20 cm
= **180 cm^2**

Question 4

Area of rectangle = (11 + 20) cm × 18 cm
= 558 cm^2

Total area of shaded triangles = $\frac{1}{2}$ × 20 cm × 18 cm
= 180 cm^2

Total area of the unshaded parts of the figure
= 558 cm^2 – 180 cm^2
= **378 cm^2**

Question 5

Total area of the shaded parts = $\frac{1}{2}$ × (26 + 26) cm × 26 cm
= **676 cm^2**

Question 6

Area of A = Area of B + C

Area of A = $\frac{1}{2}$ × 18 cm × 18 cm
= 162 cm^2

Area of D + E = $\frac{1}{2}$ × (18 + 18) cm × 18 cm
= 324 cm^2

Total area of the shaded parts (A + B + C + D + E)
= 162 cm^2 + 162 cm^2 + 324 cm^2
= **648 cm^2**

Question 7

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

PX = XQ = PY = YS = 8 cm ÷ 2
= 4 cm

Question 7 (Cont.)

Area of Triangle PXY = $\frac{1}{2}$ × 4 cm × 4 cm

= 8 cm^2

Area of Triangle RSY = Area of Triangle QRX

= $\frac{1}{2}$ × 8 cm × 4 cm

= 16 cm^2

Area of shaded triangle

= 64 cm^2 – 8 cm^2 – 16 cm^2 – 16 cm^2

= **24 cm^2**

Question 8

Height of Triangle B = Height of Triangle C

= 28 m – 21 m

= 7 m

Base length of Triangle (B + C)

= 70 m^2 × 2 ÷ 7 m

= 20 m

Area of A = 28 m × 20 m – 70 m^2

= 490 m^2

Area of D = $\frac{1}{2}$ × 7 m × 8 m

= 28 m^2

Sum of areas of A and D = 490 m^2 + 28 m^2

= **518 m^2**

Question 9

Area of Rectangle FBCD = 2 × 52 cm^2

= 104 cm^2

Area of Triangle ABF = $\frac{1}{2}$ × 52 cm^2

= 26 cm^2

Area of Triangle FDE = 52 cm^2

Area of entire figure = 104 cm^2 + 26 cm^2 + 52 cm^2

= **182 cm^2**

Question 10

Area of the entire figure = 3 × 100 cm^2

= **300 cm^2**

Question 11

Side of small square = $\sqrt{144}$ cm

= 12 cm

Answers to Review Questions on Chapter 5

Question 11 (Cont.)

Height of shaded triangles is the same as the length of each side of the small square.

Length of big square = 12 cm + 12 cm

= 24 cm

Area of big square = 24 cm × 24 cm

= 576 cm^2

Area of 2 unshaded triangles = $\frac{1}{2}$ × 24 cm × 24 cm

= 288 cm^2

Area of shaded triangles = 576 cm^2 – 288 cm^2 – 144 cm^2

= 144 cm^2

Fraction = $\frac{144}{576}$

= $\frac{1}{4}$

The shaded triangles made up $\frac{1}{4}$ of the figure.

Question 12

Area of Triangle BCJ = Area of Triangle CDE

= $\frac{1}{2}$ × 20 cm × 10 cm

= 100 cm^2

Area of Triangle GJE = $\frac{1}{2}$ × (20 + 10) cm × 10 cm

= 150 cm^2

Area of Triangle ABG = $\frac{1}{2}$ × 20 cm × 20 cm

= 200 cm^2

Area of two big squares = 2 × 20 cm × 20 cm

= 800 cm^2

Total area of shaded parts

= 800 cm^2 – (100 cm^2 + 100 cm^2 + 150 cm^2 + 200 cm^2)

= **250 cm^2**

Question 13

Area of Triangle ABE that is unshaded

= $\frac{1}{2}$ × 36 cm × (18 – 5) cm – 125 cm^2

= **109 cm^2**

Question 14

Area of A + B + D = Area of C + F + E

Area of A + B + D = 22 cm^2 + 24 cm^2 + 16 cm^2

= 62 cm^2

Area of F = 62 cm^2 – 21 cm^2 – 18 cm^2

= **23 cm^2**

Chapter 6 Percentage

Answers to Unit 6.1 – GST, Discount & Annual Interest

Let's Learn 6.1

Ask Yourself

The price of the oven including GST is **higher** than \$800.

Let's Practise 6.1

Question 1

GST = $\frac{9}{100}$ × \$950

= \$85.50

Price after GST = \$950 + \$85.50

= \$1035.50

The price of the handphone including GST is **\$1035.50**.

Question 2

GST = $\frac{9}{100}$ × \$650

= \$58.50

Price after GST = \$650 + \$58.50

= \$708.50

The price of the washing machine including GST was **\$708.50**.

Question 3

Price of ring after discount = $\frac{85}{100}$ × \$2400

= \$2040

GST = $\frac{9}{100}$ × \$2040

= \$183.60

Price after GST = \$2040 + \$183.60

= \$2223.60

The price of the ring after GST was **\$2223.60**.

Question 4

(a) Interest = $\frac{3.2}{100}$ × \$75 000

= \$2400

Mr Poh had to pay an interest of **\$2400** in a year.

(b) Amount owed = \$75 000 + \$2400

= \$77 400

Mr Poh owed the bank **\$77 400** at the end of 1 year.

Answers to Unit 6.1 – GST, Discount & Annual Interest

Question 5

Discount = $\frac{12}{100}$ × \$136

= \$16.32

Amount Jerry paid = \$136 – \$16.32 – \$5

= \$114.68

Jerry paid **\$114.68** for the game set.

Question 6

(a) Discount = $\frac{11}{100}$ × \$1200

= \$132

Amount paid = \$1200 – \$132

= \$1068

Henry paid **\$1068** for the laptop.

(b) Amount Kelly paid = \$1200 – \$110

= \$1090

Difference = \$1090 – \$1068

= \$22

Kelly paid **\$22** more.

Answers to Unit 6.2 – Branching

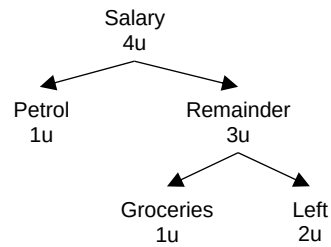
Let's Learn 6.2

Ask Yourself

1. Yes. The keywords are "of the remaining".
2. Units are used.

Let's Practise 6.2

Question 1



(a) Percentage of salary on grocery = $\frac{1}{4}$ × 100%

= 25%

Kelly spent **25%** of her salary on groceries.

(b) 2u = 560

1u = 560 ÷ 2

= 280

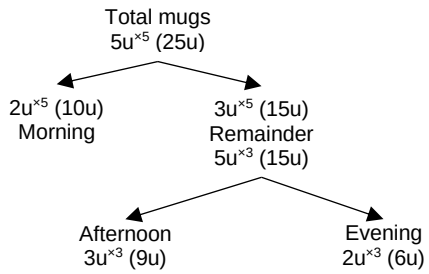
Question 1 (Cont.)

$4u = 4 \times 280$

$= 1120$

Her monthly salary was **$1120**.

Question 2



Difference = 10u – 6u

$= 4u$

$4u = 40$

$1u = 40 \div 4$

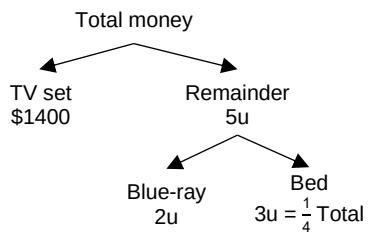
$= 10$

$25u = 25 \times 10$

$= 250$

Royce sold **250** mugs altogether at the flea market.

Question 3



$\frac{1}{4}$ of total = 3u

$\frac{4}{4}$ of total = $4 \times 3u$

$= 12u$

TV set = 12u – 5u

$= 7u$

$7u = 1400$

$1u = 1400 \div 7$

$= 200$

Difference between TV and bed = 7u – 3u

$= 4u$

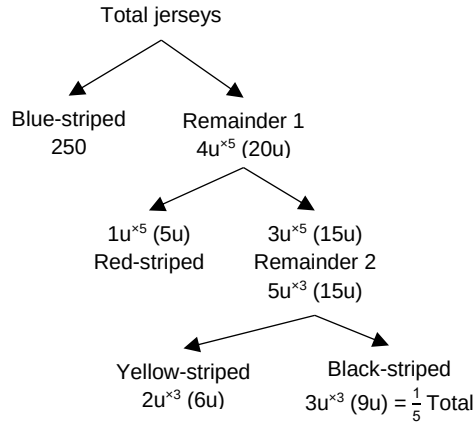
$4u = 4 \times 200$

$= 800$

The difference between the cost of the television set and the bed is **$800**.

Answers to Unit 6.2 – Branching

Question 4



$\frac{1}{5}$ of total = 9u

$\frac{5}{5}$ of total = $5 \times 9u$

$= 45u$

Blue-striped = 45u – 20u

$= 25u$

$25u = 250$

$1u = 250 \div 25$

$= 10$

Red-striped and blue-striped = 5u + 25u

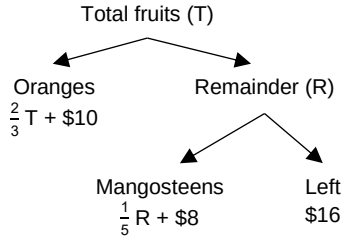
$= 30u$

$30u = 30 \times 10$

$= 300$

300 red-striped jerseys and blue-striped jerseys were sold altogether.

Question 5



(a) $\frac{4}{5}$ of remainder = $8 + $16

$= $24

$\frac{1}{5}$ of remainder = $24 ÷ 4

$= $6

$\frac{5}{5}$ of remainder = $5 \times $6

$= $30

Question 5 (Cont.)

$\frac{1}{3}$ of total = \$10 + \$30

= \$40

$\frac{3}{3}$ of total = 3 × \$40

= \$120

Rachel had **\$120** at first.

(b) Amount spent (mangosteens) = $\frac{1}{5}$R + \$8

= \$6 + \$8

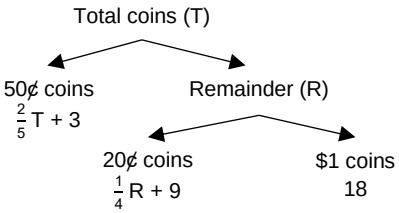
= \$14

Number of kg = \$14 ÷ \$2

= 7

She bought **7 kg** of mangosteens.

Question 6



Number of \$1 coins = \$18 ÷ \$1

= 18

$\frac{3}{4}$ of remainer = 18 + 9

= 27

$\frac{1}{4}$ of remainder = 27 ÷ 3

= 9

$\frac{4}{4}$ of remainder = 4 × 9

= 36

$\frac{3}{5}$ of total = 36 + 3

= 39

$\frac{1}{5}$ of total = 39 ÷ 3

= 13

Number of 20¢ coins = $\frac{1}{4}$R + 9

= 9 + 9

= 18

Number of 50¢ coins = $\frac{2}{5}$T + 3

= 2 × 13 + 3

= 29

Total amount = 18 × \$0.20 + 29 × \$0.50 + 18 × \$1

= \$36.10

The total value of all the coins in the purse is **\$36.10**.

Let's Learn 6.3

Ask Yourself

The number of units of each item and the total value of the items are provided, whereas in Guess and Check, the number of units representing each item is not given.

Let's Practise 6.3

Question 1

Items	Quantity of items	×	Value of items (\$)	Total value (\$)
B	2u	×	8	16u
G	3u	×	6	18u
Total	5u			34u

34u = 5440

1u = 5440 ÷ 34

= 160

5u = 5 × 160

= 800

800 students were at the party.

Question 2

Cost of 1 peach = 1.5 × \$1.20

= \$1.80

Items	Quantity of items	×	Value of items (\$)	Total value (\$)
A	7u	×	1.2	8.4u
P	13u	×	1.8	23.4u
Total	20u			31.8u

(a) 31.8u = 636

1u = 636 ÷ 31.8

= 20

8.4u = 8.4 × 20

= 168

The apricots cost **\$168**.

(b) 13u = 13 × 20

= 260

He ordered **260** peaches.

Question 3

3u = $12
1u = $12 ÷ 3
= $4
5u = 5 × $4
= $20

Summary (Value of items)
Toy = $12
Book = $12 – $2
= $10
Sweater = $20

T = $2u^{\times 5}$ (10u)
B = $3u^{\times 5}$ (15u)

T = $5u^{\times 2}$ (10u)
S = $6u^{\times 2}$ (12u)

Summary (Quantity of items)
T = 10u
S = 12u
B = 15u

Items	Quantity of items	×	Value of items ($)	Total value ($)
T	10u	×	12	120u
B	15u	×	10	150u
S	12u	×	20	240u
Total	37u			510u

510u = 19 380
1u = 19 380 ÷ 510
= 38
Number of sweaters, 12u = 12 × 38
= 456
Number of toys, 10u = 10 × 38
= 380
Number of books, 15u = 15 × 38
= 570
Mrs Poon bought **456** sweaters, **380** toys and **570** books**.**

Question 4

Value of items
Pin = $2.50
Band = 1.5 × $2.50
= $3.75
Necklace = 2 × $2.50
= $5

Items	Quantity of items	×	Value of items ($)	Total value ($)
P	5u	×	2.5	12.5u
B	4u	×	3.75	15u
N	1u	×	5	5u
Total	10u			32.5u

Question 4 (Cont.)

Difference in total value between hairbands and hairpins
= 15u – 12.5u
= 2.5u
2.5u = 105
1u = 105 ÷ 2.5
= 42
Total items sold, 10u = 10 × 42
= 420
Gillian sold a total of **420** items.

Question 5

Items	Quantity of items	×	Value of items ($)	Total value ($)
20¢	1u	×	0.2	0.2u
50¢	2u	×	0.5	1u
$1	2u	×	1	2u
Total	5u			3.2u

Difference in total value of 50-cent coins and 20-cent coins
= 1u – 0.2u
= 0.8u
0.8u =16
1u = 16 ÷ 0.8
= 20
5u = 5 × 20
= 100
Wayne had **100** coins altogether.

Question 6

Items	Quantity of items	×	Value of items ($)	Total value ($)
A	13u	×	0.5	6.5u
P	7u	×	0.4	2.8u
Total	20u			9.3u

(a) 9.3u = 195.3
1u = 195.3 ÷ 9.3
= 21
13u = 13 × 21
= 273
273 apples were sold.

(b) 2.8u = 2.8 × 21
= 58.8
$58.80 was collected from the sale of pears only.

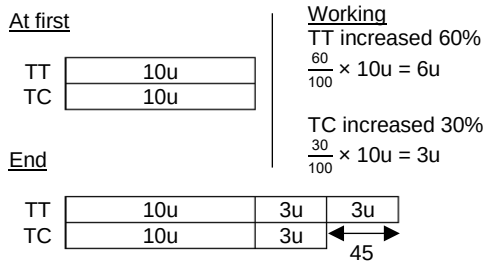
Let's Learn 6.4

Ask Yourself

The keywords 'same number of stamps at first' hint that we have to solve the problem sum from the beginning.

Let's Practise 6.4

Question 1



3u = 45

1u = 45 ÷ 3

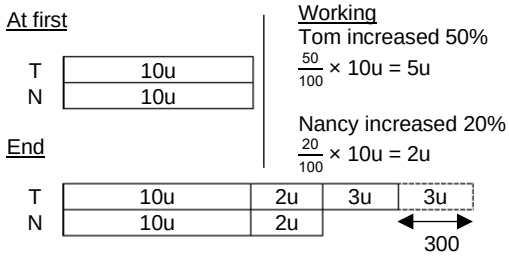
= 15

16u = 16 × 15

= 240

There were **240** toy trains in the end.

Question 2



Tom increased 20% (if received $300 more from father)

= $\frac{20}{100}$ × 15u

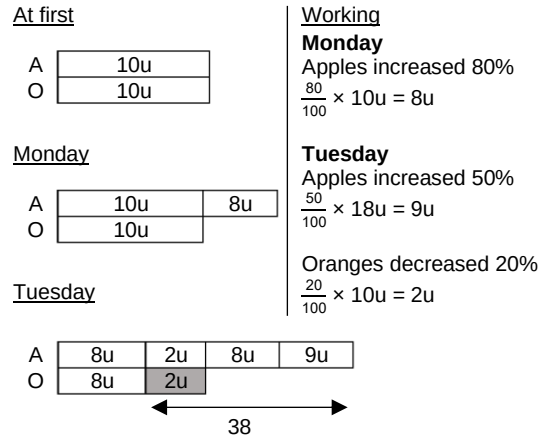
= 3u

3u = 300

The difference between their monthly allowances is **$300**.

Answers to Unit 6.4 – Equal Stage (Beginning / End)

Question 3



19u = 38

1u = 38 ÷ 19

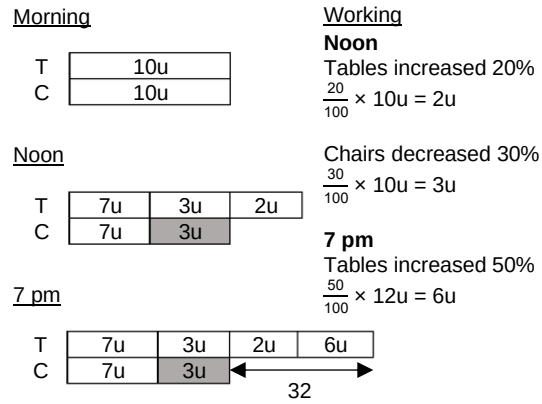
= 2

20u = 20 × 2

= 40

There were **40** apples and oranges at first.

Question 4



8u = 32

1u = 32 ÷ 8

= 4

More tables than chairs = 18u – 7u

= 11u

11u = 11 × 4

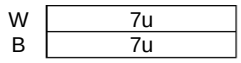
= 44

There were **44** more tables than chairs in the storeroom in the end.

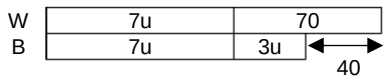
Answers to Unit 6.4 – Equal Stage (Beginning / End)

Question 5

End



At first



3u = 70 – 40

= 30

1u = 30 ÷ 3

= 10

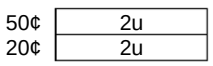
7u + 70 = 7 × 10 + 70

= 140

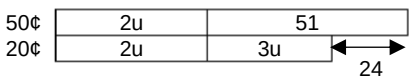
There were **140** white sneakers in the shop at first.

Question 6

End



At first



3u = 51 – 24

= 27

Value of 20¢ used = 27 × \$0.20

= \$5.40

Value of 50¢ used = 51 × \$0.50

= \$25.50

Cost of the present = \$25.50 + \$5.40

= \$30.90

The present cost **\$30.90**.

Answers to Review Questions on Chapter 6

Question 1

Cost of 1 kg before discount = \$280 ÷ 8

= \$35

Discount = $\frac{15}{100}$ × \$35

= \$5.25

Cost after discount = \$35 – \$5.25

= \$29.75

1 kg of cherries cost **\$29.75** after a discount of 15%.

Answers to Review Questions on Chapter 6

Question 2

(a) Cost of 2 dresses before discount = 2 × \$85

= \$170

Discount = $\frac{35}{100}$ × \$170

= \$59.50

Celine got **\$59.50** discount for both dresses.

(b) Usual price of skirt = $\frac{3}{5}$ × \$85

= \$51

Discount on skirt = $\frac{35}{100}$ × \$51

= \$17.85

Cost of skirt after discount = \$51 – \$17.85

= \$33.15

The skirt cost **\$33.15** after discount.

Question 3

Discount (1st item) = $\frac{10}{100}$ × \$15

= \$1.50

Discount (2nd item) = $\frac{20}{100}$ × \$7

= \$1.40

Total paid = \$15 + \$7 – \$1.50 – \$1.40

= \$19.10

Melvin paid **\$19.10** for both items.

Question 4

(a) Discount = $\frac{8}{100}$ × \$25

= \$2

Cost after discount = \$25 – \$2

= \$23

Audrey paid **\$23**.

(b) Cost of tickets before discount = 5 × \$25

= \$125

Discount = $\frac{15}{100}$ × \$125

= \$18.75

Least amount paid = \$125 – \$18.75

= \$106.25

The least amount Mr Lim paid was **\$106.25**.

Question 5

(a) Amount before discount = (200 – 35) × $1160
= $191 400

Discount = $\frac{20}{100}$ × $191 400
= $38 280

Amount collected = $191 400 – $38 280
= $153 120

The total amount collected was **$153 120**.

(b) Discount on 1 drone = $\frac{40}{100}$ × $1160
= $464

Amount collected from remaining drones
= 35 × ($1160 – $464)
= $24 360

The total amount collected was **$24 360**.

Question 6

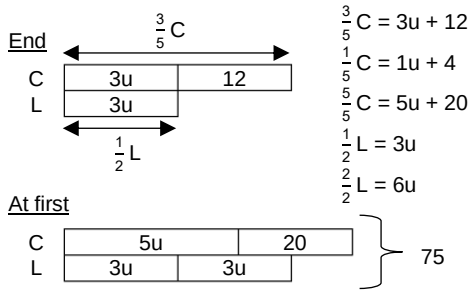
	L	M	N	Working
At first	5u$^{\times 5}$ (25u)	2u$^{\times 5}$ (10u)	6u$^{\times 5}$ (30u)	N gave = 30% of 30u = 9u
Change	+3u	+6u	– 9u	M received = 60% of 10u = 6u
End	28u	16u	21u	

Difference in the end = 28u – 21u
= 7u

7u = 210
1u = 210 ÷ 7
= 30
30u = 30 × 30
= 900

Nina had **900** buttons at first.

Question 7



Question 7 (Cont.)

11u = 75 – 20
= 55
1u = 55 ÷ 11
= 5
L (given away) = 3 × 5
= 15
C (given away) = 2 × 5 + 8
= 18
Difference = 18 – 15
= 3

3 more boxes of chamomile tea bags were given away than lavender tea bags.

Question 8

Items	Quantity of items	×	Value of items ($)	Total value ($)	
RB	3u	×	1p	3up	(28.8)
D	2u	×	1p + 1.5	2up + 3u	(43.2)
Total	5u			5up + 3u	(72)

(a) 3up = 28.8
1up = 28.8 ÷ 3
= 9.6
2up = 2 × 9.6
= 19.2
3u = 43.2 – 19.2
= 24
1u = 24 ÷ 3
= 8
2u = 2 × 8
= 16

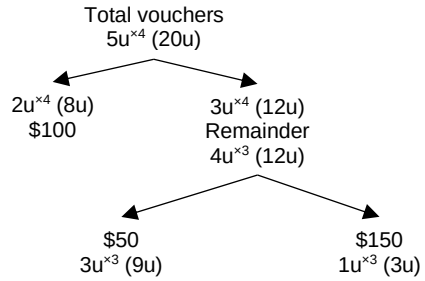
Sherilyn bought **16** durian puffs.

(b) Cost of 1 durian puff = $43.20 ÷ 16
= $2.70

Cost of 1 red bean cream puff = $2.70 – $1.50
= $1.20

Each red bean cream puff cost **$1.20**.

Question 9



Items	Quantity of items	×	Value of items ($)	Total value ($)
$50	9u	×	50	450u
$100	8u	×	100	800u
$150	3u	×	150	450u
Total	20u			1700u

1700u = 20 400

1u = 20 400 ÷ 1700

= 12

3u = 3 × 12

= 36

There were **36** $150 dining vouchers.

Question 10

C = 4u^×4 (16u)

A = 1u^×4 (4u)

W = 3u

M = 1u

A = 4u

Summary

W = 3u

M = 1u

C = 16u

At first	End
M = 1u^×9 (9u)	
C = 16u^×9 (144u)	
W = 3u^×9 (27u)	W = 1u^×17 (17u)
M + C = 17u^×9 (153u)	M + C = 9u^×17 (153u)

Difference (at first) = 27u – 9u

= 18u

18u = 72

1u = 72 ÷ 18

= 4

W (left) = 27u – 17u

= 10u

10u = 10 × 4

= 40

40 women left the room.

Question 11

$\frac{3 \times 2}{5 \times 2}$ J is 3 times of $\frac{2}{7}$ G

$\frac{6}{10}$ J is 3 times of $\frac{2}{7}$ G

J = 10u^×3 (30u)

G = 7u^×3 (21u)

J = 3u^×10 (30u)

M = 5u^×10 (50u)

Summary

J = 30u

G = 21u

M = 50u

Total = 30u + 21u + 50u

= 101u

101u = 202

1u = 202 ÷ 101

= 2

J (30u) = 30 × 2

= 60

G (21u) = 21 × 2

= 42

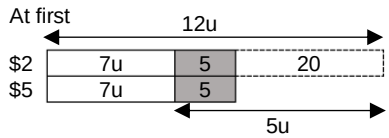
M (50u) = 50 × 2

= 100

Jonas, Maddox and Gordon had **60**, **42** and **100** cards respectively.

Question 12

	$2	$5
Case 1	12u	7u
Change	−20	+5
Case 2	1p	1p



5u = 5 + 20

= 25

1u = 25 ÷ 5

= 5

Number of $2-notes (at first) = 12u

= 12 × 5

= 60

Number of $5-notes (at first) = 7u

= 7 × 5

= 35

Total value = 60 × $2 + 35 × $5

= $295

Michelle had **$295** at first.

Chapter 7 Volume

Answers to Unit 7.1 – Volume of Cubes and Cuboids

Let's Practise 7.1

Question 1

Volume = 6 m × 6 m × 6 m
= 216 m^3
The volume of the cube is **216 m^3.**

Question 2

Volume = 32 cm × 32 cm × 40 cm
= 40 960 cm^3
The volume of the cuboid is **40 960 cm^3.**

Question 3

Height of cuboid = $\frac{4}{5}$ × 19 cm
= 15.2 cm
Volume = 19 cm × 19 cm × 15.2 cm
= 5487.2 cm^3
The volume of cuboid is **5487.2 cm^3**.

Question 4

(a) Volume of 1 cube = 7 cm × 7 cm × 7 cm
= 343 cm^3
Number of cubes that make up the solid = 6
Volume of solid = 6 × 343 cm^3
= 2058 cm^3
The volume of the solid figure is **2058 cm^3**.

(b) Area of 1 face = 7 cm × 7 cm
= 49 cm^2
Number of faces on the surface = 6 + 6 + 12
= 24
Total surface area solid = 24 × 49 cm^2
= 1176 cm^2
The total surface area of the solid figure is **1176 cm^2**.

Question 5

Height = 39 cm
Breadth = $\frac{10}{13}$ × 39 cm
= 30 cm

Question 5 (Cont.)

Length = $\frac{5}{6}$ × 39 cm
= 32.5 cm
Volume = 32.5 cm × 30 cm × 39 cm
= 38 025 cm^3
The volume of the cuboid is **38 025 cm^3**.

Question 6

Total number of edges = 20
Length of one edge = 120 cm ÷ 20
= 6 cm
Volume of one cube = 6 cm × 6 cm × 6 cm
= 216 cm^3
Volume of solid = 3 × 216 cm^3
= 648 cm^3
The volume of the solid is **648 cm^3**.

Answers to Unit 7.2 – Volume of Liquids

Let's Get Started 7.2

(a) Volume of water = 42 cm × 22 cm × 8 cm
= **7392 cm^3**
Capacity of tank = 42 cm × 22 cm × 15 cm
= 13 860 cm^3
= **13.86 ℓ**

(b) Height of water = $\frac{4}{5}$ × 24 cm
= 19.2 cm
Volume of water = 35 cm × 10 cm × 19.2 cm
= **6720 cm^3**
Capacity of tank = 35 cm × 10 cm × 24 cm
= 8400 cm^3
= **8.4 ℓ**

(c) Volume of water = 17 cm × 17 cm × 5 cm
= **1445 cm^3**
Capacity of tank = 17 cm × 17 cm × 17 cm
= 4913 cm^3
= **4.913 ℓ**

(d) 3u = 3 cm
1u = 3 cm ÷ 3
= 1 cm

Let's Get Started 7.2 (Cont.)

Depth of water = 7u
= 7 × 1 cm
= 7 cm
Length of tank = 10u
= 10 cm
Volume of water = 10 cm × 10 cm × 7 cm
= **700 cm³**
Capacity of tank = 10 cm × 10 cm × 10 cm
= 1000 cm³
= **1 ℓ**

Let's Learn 7.2

Ask Yourself

1. Yes. Both refer to the height of salt water in the container. '20% filled with salt water' refers to the amount of salt water in the container 'at first' and '$\frac{1}{2}$ full' refers to the amount of salt water in the container 'in the end'.
2. The fraction '$\frac{1}{2}$' refers to half of the height of the rectangular container.

Let's Practise 7.2

Question 1

Change in height of cooking oil $= \frac{2}{3} - \frac{3}{8}$
$= \frac{16}{24} - \frac{9}{24}$
$= \frac{7}{24}$

$\frac{7}{24}$ of total = 2.1 ℓ

$\frac{1}{24}$ of total = 2.1 ℓ ÷ 7
= 0.3 ℓ

Unfilled = $1 - \frac{2}{3}$
$= \frac{1}{3}$
$= \frac{8}{24}$

$\frac{8}{24}$ of total = 8 × 0.3 ℓ
= 2.4 ℓ

2.4 litres more cooking oil is needed to completely fill the container.

Answers to Unit 7.2 – Volume of Liquids

Question 2

Amount of water in fish tank
$= \frac{4}{7}$ × 80 cm × 50 cm × 28 cm
= 64 000 cm³
= 64 ℓ
Amount of water left in cylindrical container
= 68.02 ℓ – 64 ℓ
= 4.02 ℓ
= 4 ℓ 20 mℓ
4 ℓ 20 mℓ of water is left in the cylindrical container.

Question 3

(a) Capacity = 45 cm × 32 cm × 50 cm
= 72 000 cm³
= 72 ℓ
The capacity of the tank is **72 ℓ**.

(b) Amount to fill tank = 72 ℓ – 6.3 ℓ
= 65.7 ℓ
Time taken = 65.7 ℓ ÷ 3 ℓ / min
= 21.9 min
It took **21.9 minutes** to fill the tank completely.

Question 4

Volume of water in container at first $= \frac{3}{4}$ × 700 cm³
= 525 cm³
Volume of water poured into tank = 525 cm³ ÷ 2
= 262.5 cm³
Volume of water in tank at first = 5 cm × 5 cm × 9 cm
= 225 cm³
Total volume of water in tank in the end
= 225 cm³ + 262.5 cm³
= 487.5 cm³
There was **487.5 cm³** of water in the tank in the end.

Question 5

(a) Volume = 45 cm × 40 cm × 15 cm
= 27 000 cm³
The volume of water was **27 000 cm³**.

Question 5 (Cont.)

(b) Volume in 3 bottles = 45 cm × 40 cm × (15 – 8) cm
= 12 600 cm^3
Capacity of each bottle = 12 600 cm^3 ÷ 3
= 4200 cm^3
= 4.2 ℓ
The capacity of each bottle was **4.2 ℓ**.

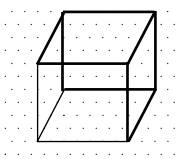
Question 6

(a) Height (end) = $\frac{2}{5}$ × 60 cm
= 24 cm
Change in water level = 24 cm – 4 cm
= 20 cm
Volume poured in = 42 cm × 28 cm × 20 cm
= 23 520 cm^3
23 520 cm^3 of water was poured into the tank.

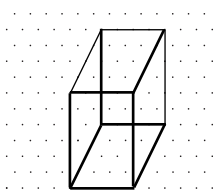
(b) Height to be filled = $\frac{3}{5}$ × 60 cm
= 36 cm
Volume of water needed to fill the tank
= 42 cm × 28 cm × 36 cm
= 42 336 cm^3
= 42.336 ℓ
Time taken = 42.336 ℓ ÷ 1.6 ℓ / min
= 26.46 min
It took **26.46 min** to completely fill the tank.

Let's Get Started 7.3

1.



2.



3. (a) **6** cubes (b) **11** cubes
(c) **11** cubes (d) **27** cubes

Answers to Unit 7.3 – Drawing of Cubes and Cuboids on Isometric Grids

Let's Learn 7.3

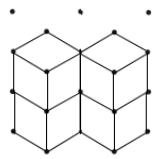
Ask Yourself

1 cube is hidden.

Let's Practise 7.3

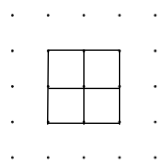
Question 1

(a)



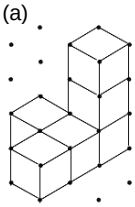
(b) **4** cubes are used to form the solid.

(c)



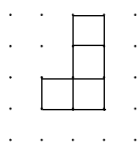
Question 2

(a)



(b) **6** cubes are used to form the solid.

(c)



Question 3

(a) **5 cubes** are used to form the solid.

(b) Volume of 1 cube = 2 cm × 2 cm × 2 cm
= 8 cm^3
Volume of solid = 5 × 8 cm^3
= 40 cm^3
The volume of the solid is **40 cm^3**.

Question 4

(a) **6** cubes are used to form the solid.

(b) Volume of 1 cube = 2 cm × 2 cm × 2 cm
= 8 cm^3
Volume of solid = 6 × 8 cm^3
= 48 cm^3
The volume of the solid is **48 cm^3**.

Question 5

(a) Volume of 1 cube = 3 cm × 3 cm × 3 cm
= 27 cm^3
Volume of solid = 7 × 27 cm^3
= 189 cm^3
The volume of the solid is **189 cm^3.**

(b) Area of 1 face = 3 cm × 3 cm
= 9 cm^2
Total faces = 5 + 5 + 10 + 6
= 26
Total area = 26 × 9 cm^2
= 234 cm^2
The total area covered in paint is **234 cm^2**.

Question 6

(a) Volume of 1 cube = 1 cm × 1 cm × 1 cm
= 1 cm^3
Volume of solid = 10 × 1 cm^3
= 10 cm^3
The volume of the solid is **10 cm^3**.

(b) Volume of cuboid = 3 cm × 3 cm × 4 cm
= 36 cm^3
Cubes added = 36 – 10
= 26
The least number of cubes Madeleine added is **26**.

Question 1

(a) Number of cubes that make up the solid = 30
Volume of 1 cube = 3 cm × 3 cm × 3 cm
= 27 cm^3
Volume of figure = 30 × 27 cm^3
= 810 cm^3
The volume of the solid figure is **810 cm^3**.

(b) Since the solid is placed on the floor when the paint is poured onto it, the faces at the bottom of the solid will not be coated with paint. So, only **10** cubes will have only 2 of their faces covered in paint.

Question 2

Length = 18 cm ÷ 2
= 9 cm
Breadth = 9 cm – 2 cm
= 7 cm
Volume = 9 cm × 7 cm × 18 cm
= 1134 cm^3
The volume of the cuboid is **1134 cm^3.**

Question 3

(a) Total painted area
= 2 × (12 cm × 8 cm + 12 cm × 5 cm + 8 cm × 5 cm)
= 392 cm^2
The total painted area was **392 cm^2.**

(b) Number of cubes = 10 × 3 × 6
= 180
There were **180** cubes with no painted faces.

Question 4

(a) Number of cubes = 1 + 3 + 9
= 13
There are **13** cubes in the box.

(b) Volume = 6 cm × 3 cm × 3 cm
= 54 cm^3
The volume of the rectangular box is **54 cm^3**.

Question 5

(a) Volume = 5 cm × 4 cm × 4 cm
= 80 cm^3
The volume of the rectangular box is **80 cm^3.**

(b) Cubes needed = 80 – 15
= 65
65 cubes are needed to fill the box completely.

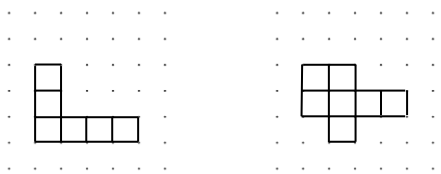
Question 6

(a) Number of cubes = 30 × 15 × 20
= 9000
There are **9000** cubes.

(b) Number not touching the inside = 28 × 13 × 19
= 6916
Number touching the inside = 9000 – 6916
= 2084
2084 cubes touch the inside of the box.

Question 7

(a)

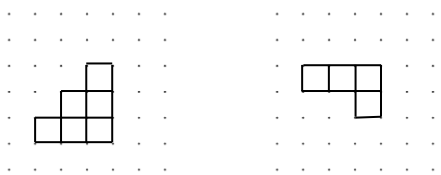


Front View Top View

(b) **3** cubes have exactly 3 of their faces painted yellow.

Question 8

(a)



Front View Top View

(b) **5** cubes were added.

Question 9

Base length = 24 cm ÷ 3
= 8 cm
Height = (46 cm – 8 cm – 8 cm) ÷ 2
= 15 cm
Volume = 8 cm × 8 cm × 15 cm
= 960 cm^3
The volume of cuboid is **960 cm^3.**

Question 10

(a) Volume in B = 0.6 ℓ × 5
= 3 ℓ
= 3000 cm^3
There was **3000 cm^3** of water in Tank B after 5 min.

(b) Volume in A = 40 cm × 40 cm × 40 cm
= 64 000 cm^3
Volume of B = 78 cm × 31 cm × 36 cm
= 87 048 cm^3
Volume needed to fill B
= 87 048 cm^3 – 64 000 cm^3 – 3000 cm^3
= 20 048 cm^3
= 20.048 ℓ
20.048 ℓ of water is needed to fill Tank B completely.

Question 11

(a) 2 units = 6
1 unit = 6 ÷ 2
= 3
3 units = 3 × 3
= 9
Volume needed = 40 cm × 15 cm × 9 cm
= 5400 cm^3
= 5.4 ℓ
5.4 ℓ of water was needed to fill the tank completely.

(b) Volume of water in the tank = 40 cm × 15 cm × 6 cm
= 3600 cm^3
= 3600 mℓ
Bottles needed = 3600 ÷ 350
≈ 11
At least **11** bottles were needed to hold all the water in the tank.

Question 12

(a) $\frac{1}{2} - \frac{3}{8} = \frac{4}{8} - \frac{3}{8}$

$= \frac{1}{8}$

8 units = 48

1 unit = 48 ÷ 8

= 6

Volume (5 pails) = 54 cm × 50 cm × 6 cm

= 16 200 cm^3

Volume (1 pail) = 16 200 cm^3 ÷ 5

= 3240 cm^3

Each pail contained **3240 cm^3** of water.

(b) Volume in tank = $\frac{1}{2}$ × 54 cm × 50 cm × 48 cm

= 64 800 cm^3

Volume (cubical container)

= 10 cm × 10 cm × 10 cm

= 1000 cm^3

Number that is completely filled

= 64 800 cm^3 ÷ 1000 cm^3

= 64.8

≈ 64

The water filled **64** cubical containers completely.