This Essential Problem Solving Skills (EPSS) series is designed as an enhanced-learning resource for Primary 3 to 6 students. Based on the MOE syllabus, EPSS adopts a scaffold approach to learning right from the concept stage in each opening chapter.

Key features in EPSS:

- Opening Chapter – introduces basis of concepts covered in the chapter.
- Let’s Get Started – learn the fundamental understanding of the concepts in a scaffold approach through pre-exercises before it is being applied to a full word problem sum.
- Let’s Learn – showcases a problem sum complete with solution while guiding the learner with prompts.
- Let’s Practise – reinforces understanding of the concepts with 6 problem sums which are carefully crafted and developed at increasing levels of difficulty to better expose and prepare students in their learning.
- Review Questions – test competency in application of concepts at the end of each main chapter through problem sums which have been randomly put together in a mixed-question format.

Users of EPSS are encouraged to go through the user guide under the Overview of EPSS to better appreciate the merits of the content to reap optimal benefits from the use of the book. For additional practices and more question types after the completion of each chapter, users may access other Review Questions and also post questions as well as clarify concepts by visiting www.onspunge.com.

An enhanced learning resource by:

thinkingMath@onSponge™

Visit:
www.onspunge.com
A parenting & learning community for family, parents, educators and tutors interested in the nurturing and development of tweens or preteens.

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

www.onspunge.com
P5 Solutions

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

Solutions to Unit 1.1 More than/Less than

Let’s Get Started 1.1

2.  
   \[
   \begin{array}{c|c|c}
   \hline
   A & 48 \\
   \hline 
   B 
   \end{array}
   \]

3.  
   \[
   \begin{array}{c|c|c}
   \hline
   E & 32 \\
   \hline 
   D 
   \end{array}
   \]

4.  
   \[
   \begin{array}{c|c|c|c|c|c|c|c}
   \hline
   F & 1u & 12 & 1u & 12 & 1u & 12 \\
   \hline 
   G & 1u & 12 
   \end{array}
   \]

Ask yourself

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

Let’s Practise 1.1

Question 1

At first

\[
\begin{array}{c|c|c}
\hline
B & 20 \\
\hline 
\end{array}
\]

End

\[
\begin{array}{c|c|c}
\hline
B & 1u & 32 \\
\hline 
R & 1u & 2u 
\end{array}
\]

2u = 32
1u = 32 ÷ 2
= 16
1u + 52 = 16 + 52
= 68

Bernard had $68 at first.

Question 2

At first

\[
\begin{array}{c|c|c}
\hline
B & 60 \\
\hline 
\end{array}
\]

End

\[
\begin{array}{c|c|c|c}
\hline
B & 1u & 90 \\
\hline 
R & 1u & 1u 
\end{array}
\]

1u = 90
4u + 60 = 4 × 90 + 60
= 420

Penny had 420 ribbons a first.

Question 3

At first

\[
\begin{array}{c|c|c|c}
\hline
F & 1u & 240 & 135 \\
\hline 
B & 1u & 240 
\end{array}
\]

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

\[
\begin{array}{c|c|c|c|c|c|c|c}
\hline
S & 1u & 116 \\
\hline 
C & 1u 
\end{array}
\]

2u = 636 – 116
= 520
1u = 520 ÷ 2
= 260
S (at first) = 260 + 116
= 376
C (at first) = 260
End

S = 376 – 226
= 150
C = 150 × 4
= 600
600 – 260 = 340
Andrew bought 340 toy cars.

Question 5

At first

\[
\begin{array}{c|c|c}
\hline
B & 50 \\
\hline 
C 
\end{array}
\]

End

\[
\begin{array}{c|c|c|c}
\hline
B & 1u & 1u & 50 \\
\hline 
C & 1u & 1u 
\end{array}
\]

2u = 50 + 12
= 62
1u = 62 ÷ 2
= 31
Solutions to Unit 1.1 (Cont.)

Question 5 (Cont.)

$2u + 50 = 2 \times 31 + 50$

$= 112$

There were 112 button pins at first.

Question 6

At first

\[
\begin{array}{c|c|c}
S & 1u & 1u \\
M & 1u & \end{array}
\]

End

\[
\begin{array}{c|c|c}
S & 1u & 12 \\
M & 1u & 12 \\
\end{array}
\]

\[2u = 12 + 30 + 12\]

\[= 54\]

\[1u = 54 \div 2\]

\[= 27\]

\[1u + 12 = 27 + 12\]

\[= 39\]

Wendy had 39 stickers at first.

Solutions to Unit 1.2 Internal Transfer and Total Unchanged

Let's Get Started 1.2

1. Draw your 'At first' and 'End' models here.

\[
\begin{array}{c|c|c}
S & 1u & 12 & 30 \\
M & 1u & \end{array}
\]

\[
\begin{array}{c|c|c|c|c}
S & 1u & 12 \\
M & 1u & 12 \\
\end{array}
\]

At first

\[
\begin{array}{c|c|c}
A & 55 \\
B & \end{array}
\]

End

\[
\begin{array}{c|c|c|c}
A & 1u & 25 & 55 \\
B & 1u & 25 & 55 & 25 \\
\end{array}
\]

Answer

25 + 80 = 105

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

2. Draw your 'At first' and 'End' models here.

At first

\[
\begin{array}{c|c|c}
C & \end{array}
\]

\[
\begin{array}{c|c|c}
D & 230 \\
\end{array}
\]

End

\[
\begin{array}{c|c|c|c}
C & 45 \\
D & 45 & 230 & 45 \\
\end{array}
\]

Answer

45 + 230 + 45 = 320

Diana had 320 more beads than Catherine in the end.

Solutions to Unit 1.2 (Cont.)

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

\[
\begin{array}{c|c|c|c|c}
M & 1u & 1p & 80 \\
K & 1u & \end{array}
\]

End

\[
\begin{array}{c|c|c|c|c|c|c|c}
M & 1u & \end{array}
\]

\[
\begin{array}{c|c|c|c|c|c|c|c}
K & 1u & 1u & 1u & 440 \\
\end{array}
\]

\[4u = 440\]

\[1u = 440 \div 4\]

\[= 110\]

\[2p = 440 – 80\]

\[= 360\]

\[1p = 360 \div 2\]

\[= 180\]

\[M \text{ (at first)} = 1p + 80\]

\[= 180 + 80\]

\[= 260\]

\[M \text{ (gave)} = 260 – 110\]

\[= 150\]

Mandy must give $150 to Kurt.

Let’s Practise 1.2

Question 1

At first

\[
\begin{array}{c|c}
A & 23 \\
B & \end{array}
\]

End

\[
\begin{array}{c|c|c|c}
A & 1u & 146 & 23 \\
B & 1u & 146 \\
\end{array}
\]

\[3u = 146 + 23 + 146\]

\[= 315\]

\[1u = 315 \div 3\]

\[= 105\]

\[4u – 146 = 4 \times 105 – 146\]

\[= 274\]

Amos had 274 marbles at first.
Solutions to Unit 1.2 (Cont.)

Question 2
At first

\[
\begin{array}{|c|c|}
\hline
X & 204 \\
\hline
Y & \\
\hline
\end{array}
\]

End

\[
\begin{array}{|c|c|}
\hline
X & 1u 123 204 123 \\
\hline
Y & 1u 123 \\
\hline
\end{array}
\]

\[5u = 123 + 204 + 123 = 450\]
\[1u = 450 \div 5 = 90\]
\[7u = 7 \times 90 = 630\]

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

Question 3
At first

\[
\begin{array}{|c|c|}
\hline
D & \\
\hline
S & 300 \\
\hline
\end{array}
\]

End

\[
\begin{array}{|c|c|}
\hline
D & 46 2u \\
\hline
S & 46 208 46 \\
\hline
\end{array}
\]

\[2u = 208\]
\[1u = 208 \div 2 = 104\]
\[4u = 4 \times 104 = 416\]

There were **416** participants altogether.

Question 4
At first

\[
\begin{array}{|c|c|}
\hline
& $2 \\
\hline
\hline
& $1 \\
\hline
\end{array}
\]

\[1u = 35\]

No. of $2-notes = 35 \times 2 = 70\]
No. of $1-coins = 50 – 15 = 35\]

Amount of money = $70 \times $2 + 35 \times $1 = $175

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

Question 5
At first

\[
\begin{array}{|c|c|}
\hline
A & \\
\hline
B & \\
\hline
\end{array}
\]

End

\[
\begin{array}{|c|c|c|c|c|c|}
\hline
A & 1u & 50 & 1u & 50 & 1u & 50 \\
\hline
B & 1u & 50 & \\
\hline
\end{array}
\]

\[2u = 4 \times 50 = 200\]
\[1u = 200 \div 2 = 100\]
\[5u = 5 \times 100 = 500\]

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

Question 6
At first

\[
\begin{array}{|c|c|}
\hline
A & \\
\hline
B & \\
\hline
\end{array}
\]

End

\[
\begin{array}{|c|c|c|c|c|}
\hline
A & 1u & 30 & 1u & 30 & 1u & 30 \\
\hline
B & 1u & 30 & \\
\hline
\end{array}
\]

\[3u = 5 \times 30 = 150\]
\[1u = 150 \div 3 = 50\]
\[1u + 30 = 50 + 30 = 80\]

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

Solutions to Unit 1.3 Equal Stage

Let’s Get Started 1.3

1.
At first

\[
\begin{array}{|c|c|}
\hline
A & \\
\hline
B & \\
\hline
\end{array}
\]

End

\[
\begin{array}{|c|c|c|c|c|}
\hline
A & 1u & 23 & 1u & 23 & 1u & 55 \\
\hline
B & 1u & 23 & \\
\hline
\end{array}
\]

\[2u = 23 + 55 = 78\]
\[1u = 78 \div 2 = 39\]
Solutions to Unit 1.3 (Cont.)

2. End
   A
   B

At first
   A  
   1u  38
   B  1u  38  20

\[2u = 38 + 20\]
\[= 58\]
\[1u = 58 \div 2\]
\[= 29\]

3. End
   E
   F

At first
   E  
   1u  124
   F  1u  1u

\[3u = 235 - 124\]
\[= 111\]
\[1u = 111 \div 3\]
\[= 37\]

4. At first
   G
   H

End
   G
   1u  10  12
   H  1u  10  12

\[1u = 10\]

Ask Yourself
1. The keywords in this problem sum are 'an equal number of stapler bullets left'.

Think Further
We can solve from the beginning because a comparison between Billy and Anna was provided. It was challenging to solve from the beginning as we do not know where to cut the model for the no. of chicken nuggets eaten by Billy.

Let's Practise 1.3
Question 1
At first
   W
   M

Solutions to Unit 1.3 (Cont.)

Question 1 (Cont.)
End
   W
   1u  30
   M  1u  30  12

\[1u = 30 + 12\]
\[= 42\]
\[1u + 30 = 42 + 30\]
\[= 72\]

Total = \[72 \times 2\]
\[= 144\]

144 people were at the opening ceremony at first.

Question 2
Monday
   A
   B

Tuesday
   A  
   1u  16
   B  1u  16

\[3u = 16 + 29\]
\[= 45\]
\[1u = 45 \div 3\]
\[= 15\]

\[1u + 16 = 15 + 16\]
\[= 31\]

Total coins at first = \[31 \times 2\]
\[= 62\]

There were 62 coins in the boxes altogether at first.

Question 3
At first
   A
   B

End
   A
   1u  30
   B  1u  30  6

\[3u = 30\]
\[= 10\]

\[4u + 6 = 4 \times 10 + 6\]
\[= 46\]

There were 46 mattresses in each room.
Solutions to Unit 1.3 (Cont.)

Question 4

End

<table>
<thead>
<tr>
<th></th>
<th>C</th>
<th>1u</th>
<th></th>
<th>T</th>
<th>1u</th>
</tr>
</thead>
</table>

At first

|   | C | 1u | 50 |   | T | 1u | 50 | 50 | 50 |

\[2u = 240 - 4 \times 50\]
\[= 40\]
\[1u = 40 \div 2\]
\[= 20\]
\[1u + 50 = 20 + 50\]
\[= 70\]

Mrs Chin had 70 cabbages at first.

Question 5

End

|   | K |    |   | D |    |

At first

|   | K | 1u | 24 | 60 |
|   | D | 1u | 24 |

\[3u = 24 + 60\]
\[= 84\]
\[1u = 84 \div 3\]
\[= 28\]

Dave (end) = \[1u + 24\]
\[= 28 + 24\]
\[= 52\]

Dave had 52 badges in the end.

Question 6

End

|   | J |    |   | K |    |

At first

|   | J | 1u | 64 | 24 | 64 |
|   | K | 1u | 64 | 24 |

\[4u = 64 + 24 + 64\]
\[= 152\]
\[1u = 152 \div 4\]
\[= 38\]

Kennard had 38 keychains at first.

Solutions to Unit 1.4 One Item Unchanged

Let’s Get Started 1.4

<table>
<thead>
<tr>
<th>S/N</th>
<th>What has changed?</th>
<th>What remains the same?</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>K had 14 marbles left.</td>
<td>M had 90 marbles left.</td>
</tr>
<tr>
<td>2.</td>
<td>M had 112 marbles.</td>
<td>K had 20 marbles.</td>
</tr>
<tr>
<td>3.</td>
<td>K had 2u – 6 of marbles left.</td>
<td>M had 3u marbles.</td>
</tr>
<tr>
<td>4.</td>
<td>M had 3u + 22 marbles left.</td>
<td>K had 2u of marbles.</td>
</tr>
</tbody>
</table>

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

End

|   | P |    |   | M |    |

At first

|   | P |    |    |    |    |
|   | M |    |    |    |    |

End

|   | P |    |    |    |    |
|   | M |    |    |    |    |

11u = 33
\[1u = 33 + 11\]
\[= 3\]
\[9u = 9 \times 3\]
\[= 27\]

Henry had 27 more paper clips than fridge magnets.

Question 2

At first

|   | R |    |   | C |    |

End

|   | R |    |    |    |    |
|   | C |    |    |    |    |

14u = 49
\[1u = 49 \div 14\]
\[= 3.5\]
\[18u = 18 \times 3.5\]
\[= 63\]

There were 63 rulers and crayons at first.

Question 3

At first

|   | B |    |    |   | D |    |

End

|   | B |    |    |    |    |    |
|   | D |    |    |    |    |    |

1u = 34
\[36\]
Dylan had 48 cards.

Question 4

At first

\[
\begin{array}{c|c}
A & 26 \\
\hline
B & 5u \\
\end{array}
\]

End

\[
\begin{array}{c|c}
A & 1u \\
B & 1u \\
\end{array}
\]

\[
\begin{array}{c|c}
1u & 4u \\
\hline
4u & 26 \\
\end{array}
\]

4u = 14 + 26

= 40

1u = 40 ÷ 4

= 10

6u = 6 \times 10

= 60

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

Question 5

At first

\[
\begin{array}{c|c}
P & 38 \\
C & 180 \\
\end{array}
\]

End

\[
\begin{array}{c|c}
P & 3u \\
C & 3u \\
\end{array}
\]

\[
\begin{array}{c|c|c}
1u & 14 & 26 \\
1u & 14 & 4u \\
\end{array}
\]

2u = 38

1u = 38 ÷ 2

= 19

3u = 3 \times 19

= 57

Celine had 57 buttons.

Question 6

At first

\[
\begin{array}{c|c}
P & 240 \\
T & 30 \\
\end{array}
\]

End

\[
\begin{array}{c|c|c}
1u & 30 & 240 \\
1u & 1u & 30 \\
\end{array}
\]

\[
\begin{array}{c|c|c}
K & S & 3u \\
S & 1u & 1u \\
\end{array}
\]

3u = 30 + 270

= 300

Percy brought $300 to shop.
Solutions to Unit 1.5 (Cont.)

Question 4
At first
Shirts = 1210
Shorts = 1910
Difference = 700
14u = 700
1u = 700 ÷ 14
= 50
Shirts sold = 1210 – 50
= 1160
Total sold = 1160 × 2
= 2320

2320 shirts and pairs of shorts were sold altogether.

Question 5
At first
P = 1u
P = 72 ÷ 6
= 12
R = 5u
R = 72
Difference = 4u
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 two items.

Question 6
At first
J = 200
H = 840
Difference = 640
2u = 640
1u = 640 ÷ 2
= 320
(a) Each boy received = 320 – 200
= 120
Ian gave 120 marbles to each boy.
Both boys (received) = 2 × 120
= 240
(b) 300 – 240 = 60
Ian was left with 60 marbles.

Solutions to Unit 1.6 Repeated Items

Let's Get Started 1.6
1. A
   B
   C

   1u  1u  1u  1u  1u
   1u  1u
   1u

   (Ben is repeated.)

2. B
   K
   I

   1u  33
   1u  33
   1u

   (Kenny is repeated.)

Solutions to Unit 1.6 (Cont.)

3.

<table>
<thead>
<tr>
<th></th>
<th>1u</th>
<th>1u</th>
<th>1u</th>
<th>F</th>
</tr>
</thead>
<tbody>
<tr>
<td>M</td>
<td>1u</td>
<td>1u</td>
<td>1u</td>
<td>21</td>
</tr>
<tr>
<td>F</td>
<td>1u</td>
<td>1u</td>
<td>1u</td>
<td></td>
</tr>
<tr>
<td>G</td>
<td>1u</td>
<td>1u</td>
<td></td>
<td></td>
</tr>
<tr>
<td>W</td>
<td>1u</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

(Female is repeated.)

4. A = 2u(4u) (4u)
   B + C = 1u(2u) (2u)
   Summary
   A = 4u
   B = 1u
   C = 1u
   B + C = 2u

(Ben and Cecil are repeated.)

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
= 210 – 200
= 10

There were 10 adults at the open-air movie event.

Let's Practise 1.6

Question 1

<table>
<thead>
<tr>
<th></th>
<th>1u</th>
<th>1u</th>
<th>1u</th>
</tr>
</thead>
<tbody>
<tr>
<td>F</td>
<td>1u</td>
<td>1u</td>
<td></td>
</tr>
<tr>
<td>M</td>
<td>1u</td>
<td>1u</td>
<td></td>
</tr>
<tr>
<td>G</td>
<td>1u</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

300

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

A = 1u(4u)
B = 2u(8u)
A + B = 3u(12u)
Difference = 3u – 1u
= 2u
2u = 80
1u = 80 + 2
= 40
Solutions to Unit 1.6 (Cont.)

Question 2 (Cont.)

$5u = 5 \times 40$

$= 200$

The three girls had $200$ altogether.

Question 3

\[
\begin{array}{c|c|c|c}
M & M & T & W \\
\hline
\end{array}
\]

\[
\begin{array}{c|c|c}
\text{Wed} & \text{M} & \text{T} \\
\hline
876 & 598 & 278 \\
\end{array}
\]

$382$ cups of bubble tea were sold on Monday.

Question 4

\[
\begin{array}{c|c|c|c}
A & B & C \\
\hline
\end{array}
\]

\[
\begin{array}{c|c|c}
C & 482 & 274 \\
\hline
B & 354 & 208 \\
\end{array}
\]

Bonita sold $146$ funfair tickets.

Question 5

At first

\[
\begin{array}{c|c|c|c|c|c}
A & O & P \\
\hline
\end{array}
\]

In the end

\[
\begin{array}{c|c|c}
A & 1u & 1u \\
\hline
O & 1u & 1u \\
P & 1u & 15 \\
\end{array}
\]

$5u = 90 + 15$

$= 105$

$1u = 105 \div 5$

$= 21$

$1u + 23 = 21 + 23$

$= 44$

$44$ oranges were used.

Question 6

At first

\[
\begin{array}{c|c|c|c|c|c}
1^\text{st} & 2^\text{nd} & 3^\text{rd} & 4^\text{th} & 5^\text{th} \\
\hline
\end{array}
\]

In the end

\[
\begin{array}{c|c|c|c|c|c}
1^\text{st} & 2^\text{nd} & 3^\text{rd} & 4^\text{th} & 5^\text{th} \\
\hline
1u & 1u & 1u & 1u & 1u \\
\end{array}
\]

\[
\begin{array}{c|c|c|c|c|c}
1^\text{st} & 2^\text{nd} & 3^\text{rd} & 4^\text{th} & 5^\text{th} \\
\hline
1u & 1u & 1u & 1u & 1u \\
\end{array}
\]

Solutions to Unit 1.7 Quantity x Value

Let’s Get Started 1.7

<table>
<thead>
<tr>
<th>Denomination of notes</th>
<th>Quantity of notes</th>
<th>$\times$</th>
<th>Value ($)</th>
<th>Total Value ($)</th>
</tr>
</thead>
<tbody>
<tr>
<td>$1$</td>
<td>1</td>
<td>$\times$</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td>$2$</td>
<td>6</td>
<td>$\times$</td>
<td>2</td>
<td>12</td>
</tr>
<tr>
<td>$5$</td>
<td>2</td>
<td>$\times$</td>
<td>5</td>
<td>10</td>
</tr>
<tr>
<td>$10$</td>
<td>11</td>
<td>$\times$</td>
<td>10</td>
<td>110</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>22</strong></td>
<td></td>
<td><strong>135</strong></td>
<td></td>
</tr>
</tbody>
</table>

Ask Yourself

1. The ‘quantity’ is represented by the number of birds and hamsters at the pet store. The ‘value’ is represented by the number of legs of each animal at the pet store.

Let’s Practise 1.7

Question 1

<table>
<thead>
<tr>
<th>Items</th>
<th>Quantity of items</th>
<th>$\times$</th>
<th>Value of items (Cents)</th>
<th>Total value (Cents)</th>
</tr>
</thead>
<tbody>
<tr>
<td>20-cent</td>
<td>3u</td>
<td>$\times$</td>
<td>20</td>
<td>60u</td>
</tr>
<tr>
<td>50-cent</td>
<td>1u</td>
<td>$\times$</td>
<td>50</td>
<td>50u</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td>4u</td>
<td></td>
<td><strong>500u</strong></td>
<td></td>
</tr>
</tbody>
</table>

$110u = 6600$

$1u = 6600 \div 110$

$= 60$

$3u = 3 \times 60$

$= 180$

Joseph has $180$ 20-cent coins.

Question 2

<table>
<thead>
<tr>
<th>Items</th>
<th>Quantity of items</th>
<th>$\times$</th>
<th>Value of items ($)</th>
<th>Total Value ($)</th>
</tr>
</thead>
<tbody>
<tr>
<td>G</td>
<td>3u</td>
<td>$\times$</td>
<td>150</td>
<td>450u</td>
</tr>
<tr>
<td>C</td>
<td>1u</td>
<td>$\times$</td>
<td>50</td>
<td>50u</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td>4u</td>
<td></td>
<td><strong>500u</strong></td>
<td></td>
</tr>
</tbody>
</table>

Difference = $450u - 50u$

$= 400u$

$400u = 1200$

$1u = 1200 \div 400$

$= 3$

$4u = 4 \times 3$

$= 12$

$12$ people will be receiving the red packets.
Solutions to Unit 1.7 (Cont.)

Question 3
1 pair of sport shoes = 2 \times 23
= 46

\begin{align*}
&\text{Sl = 3u} \\
&\text{Sa = 1u} \\
&\text{Sp = 1u}
\end{align*}

\text{Summary}

\begin{align*}
&\text{Sl = 3u} \\
&\text{Sa = 1u} \\
&\text{Sp = 1u}
\end{align*}

\begin{array}{|c|c|c|c|}
\hline
\text{Items} & \text{Quantity of items} & \times & \text{Value of items ($)} \\
\hline
\text{Sa} & 1u & \times & 23 \\
\text{Sl} & 3u & \times & 16 \\
\text{Sp} & 1u & \times & 46 \\
\hline
\text{Total} & 5u & \times & 117 \\
\hline
\end{array}

117u = 468
1u = 468 \div 117
= 4
48u - 23u = 25u
25u = 25 \times 4
= 100

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

Question 4
\begin{align*}
\text{NP = 4u} \\
\text{P = 1u} \\
\text{OC = 1u}^2 (2u) \\
\text{NP = 2u}^2 (4u)
\end{align*}

\text{Summary}

\begin{array}{|c|c|c|c|}
\hline
\text{Items} & \text{Quantity of items} & \times & \text{Value of items ($)} \\
\hline
\text{A} & 1u & \times & 2 \\
\text{B} & 3u & \times & 1 \\
\text{G} & 2u & \times & 1 \\
\hline
\text{Total} & 6u & \times & 7u \\
\hline
\end{array}

7u = 1470
1u = 1470 \div 7
= 210
5u = 5 \times 210
= 1050
1050 children were at the event.

Solutions to Unit 1.8 Gap & Difference

Let’s Get Started 1.8

2. Actual no. of sweets

\begin{align*}
&4 \text{ sweets per child} \\
&\text{Total no. of sweets} = 10 \times 4 + 12 \\
&\text{Actual no. of sweets} = 52
\end{align*}

3. Actual no. of sweets

\begin{align*}
&6 \text{ sweets per child} \\
&\text{Total no. of sweets} = 10 \times 6 - 8 \\
&\text{Actual no. of sweets} = 52
\end{align*}
Solutions to Unit 1.8 (Cont.)

4. 6 sweets per child

Total no. of sweets = 10 × 6 – 28
= 32

Ask Yourself
1. The keywords are ‘If-If’ with ‘short of’ or ‘left’.
2. It involves both shortage and excess.

Think Further
Using Case 1:
No. of coconut candies = 8 × 6 + 14
= 62
Check your answer using Case 2:
No. of coconut candies = 8 × 9 – 10
= 62

Let’s Practise 1.8

Question 1
C1 4 chocolates each
C2 4 chocolates each

Gap = 6 + 28
= 34
Difference = 2 chocolates each

(a) No. of pupils = 34 ÷ 2
= 17
There were 17 pupils in Cynthia’s class.

(b) No. of chocolates
C1 = 17 × 6 – 6
= 96
C2 = 17 × 4 + 28
= 96 (Checked)

Cynthia bought 96 chocolates.

Question 2
C1 7 stickers each
C2 7 stickers each

Gap = 81 – 21
= 60
Difference = 4 stickers each

(a) No. of pages = 60 ÷ 4
= 15
There were 15 pages in Suzy’s sticker album.

(b) No. of stickers
C1 = 15 × 7 – 21
= 84
C2 = 15 × 11 – 81
= 84 (Checked)

Suzy has 84 stickers.

Question 3
C1 2B + 3P
C2 2B + 5P

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
C1 2P + 2B
C2 2P + 2B

(a) 1B = $5.60 – $2.10
= $3.50
A bag of chips cost $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 → P
C2: C → P

C = 3u² (12u)
P = 4u³ (16u)

Total = 7u⁴ (28u)

Cody’s magnets
C1 7u 5u 7
C2 7u 27

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.
Solutions to Unit 1.8 (Cont.)

Question 6

C1: $D \rightarrow S$

$D = 3u^3 \times (27u)$

$S = 5u^3 \times (45u)$

Total $= 8u^3 \times (72u)$

Dewi’s money

C1 $= (27 \times 5) + 23$

$= 136$

C2 $= (40 \times 5) - 42$

$= 198$

Dewi had $158$. (Checked)

Solutions to Review Questions on Chapter 1

Question 1

(a) Siti

7 days $= 39 - 18$

$= 21$

1 day $= 21 \div 7$

$= 3$

Siti saved $3$ each day.

(b) Difference $= 1762 - 114$

$= 1648$

No. of days $= 1648 \div 8$

$= 206$

Total no. of days $= 2 + 6 + 7 + 206$

$= 221$

Tina would have saved for 221 days.

Question 2

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

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

Summary

M = 10u

W = 4u

B = 5u

G = 2u

Total = 21u

M = 5u^2 \times (10u)

G = 1u^2 \times (2u)

Difference $= 4u - 2u$

$= 2u$

2u = 250

1u = 250 \div 2$

= 125

Question 4

(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

M  
1u  20  70  20
A  
1u  20  70
J  
1u  20

$1u = 120 - 20 - 70$

$= 30$

(a) J (at first) $= 30$

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

= 190

Allen had 190 erasers at first.

Question 6

A $= 2u^2 \times (14u)$

C $= 1u^2 \times (7u)$

$M = 10u$

$W = 4u$

$B = 5u$

$G = 2u$

Total = 21u

Summary

M $= 5u^2 \times (10u)$

G $= 1u^2 \times (2u)$

Difference $= 4u - 2u$

$= 2u$

2u = 250

1u = 250 \div 2$

= 125
Solutions to Review Questions on Chapter 1 (Cont.)

Question 6 (Cont.)
(a) \(21u = 21 \times 125\)
\[= 2625\]
There were \(2625\) people at the carnival.

(b) Males = \(10u + 5u\)
\[= 15u\]
Females = \(4u + 2u\)
\[= 6u\]
Difference = \(15u - 6u\)
\[= 9u\]
\(9u = 9 \times 125\)
\[= 1125\]
There were \(1125\) more males than females at the carnival.

Question 7
No. of animals = \(720 ÷ 2\)
\[= 360\]

<table>
<thead>
<tr>
<th>No. of animals</th>
<th>Horses' legs</th>
<th>No. of birds</th>
<th>Birds' legs</th>
<th>Total legs</th>
<th>Check</th>
</tr>
</thead>
<tbody>
<tr>
<td>360</td>
<td>360 × 4</td>
<td>0</td>
<td>0</td>
<td>1440</td>
<td>x</td>
</tr>
<tr>
<td>359</td>
<td>359 × 4</td>
<td>1</td>
<td>2</td>
<td>1438</td>
<td>x</td>
</tr>
<tr>
<td>209</td>
<td>209 × 4</td>
<td>151</td>
<td>302</td>
<td>1138</td>
<td>✓</td>
</tr>
</tbody>
</table>

Target difference = \(1440 - 1138\)
\[= 302\]

No. of birds = \(302 ÷ 2\)
\[= 151\]

No. of hens = \((151 + 7) ÷ 2\)
\[= 79\]
There were \(79\) hens on the farm.

Question 8

<table>
<thead>
<tr>
<th>HP</th>
<th>1u</th>
<th>9</th>
<th>(\times 3)</th>
</tr>
</thead>
<tbody>
<tr>
<td>PH</td>
<td>1u</td>
<td></td>
<td>(\times 8)</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>3u</th>
<th>27</th>
</tr>
</thead>
<tbody>
<tr>
<td>3u</td>
<td>5u</td>
</tr>
</tbody>
</table>

\(5u = 27\)
\(1u = 27 ÷ 5\)
\[= 5.40\]
\(8u = 8 \times 5.40\)
\[= 43.20\]

Mrs Tyler had \(43.20\).

Question 9
At first
\[J \quad 80\]
\[E\]
End
\[J \quad 35 \quad 80 \quad 35\]
\[E \quad 35\]

\(5u = 35 + 80 + 35\)
\[= 150\]

Question 9 (Cont.)
\(1u = 150 ÷ 3\)
\[= 50\]
Elaine had \(50\) in the end.

<table>
<thead>
<tr>
<th>No. of damaged</th>
<th>Fee</th>
<th>No. of good</th>
<th>Fee</th>
<th>Total fee</th>
<th>Check</th>
</tr>
</thead>
<tbody>
<tr>
<td>690</td>
<td>4830</td>
<td>0</td>
<td>0</td>
<td>4830</td>
<td>x</td>
</tr>
<tr>
<td>689</td>
<td>4823</td>
<td>1</td>
<td>12</td>
<td>4835</td>
<td>x</td>
</tr>
<tr>
<td>106</td>
<td>742</td>
<td>584</td>
<td>7008</td>
<td>7750</td>
<td>✓</td>
</tr>
</tbody>
</table>

Target difference = \(7750 - 4830\)
\[= 2920\]

No. of parcels in good condition = \(2920 ÷ 5\)
\[= 584\]
He delivered \(584\) parcels in good condition.

Question 11

<table>
<thead>
<tr>
<th>No. of parcels in good condition</th>
<th>6 big boxes</th>
<th>14 small boxes</th>
</tr>
</thead>
</table>

(a) \(3B + 8S = 45\)
\(6B + 16S = 90\)
\(6B = 14S\)
\(14S + 16S = 90\)
\(1S = 90 + 30\)
\[= 3\]
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

<table>
<thead>
<tr>
<th>S/N</th>
<th>Branch Diagram</th>
</tr>
</thead>
<tbody>
<tr>
<td>2.</td>
<td>(3u^{10} (6u))</td>
</tr>
<tr>
<td></td>
<td>Total pages</td>
</tr>
<tr>
<td></td>
<td>(1u^{10} (2u))</td>
</tr>
<tr>
<td></td>
<td>1st day</td>
</tr>
<tr>
<td></td>
<td>Remainder</td>
</tr>
<tr>
<td></td>
<td>(4u)</td>
</tr>
<tr>
<td></td>
<td>2nd day</td>
</tr>
<tr>
<td></td>
<td>Left</td>
</tr>
<tr>
<td></td>
<td>(3u = 90)</td>
</tr>
</tbody>
</table>

Solutions to Unit 2.1 Branching (Direct)
Let’s Get Started 2.1

<table>
<thead>
<tr>
<th>S/N</th>
<th>Branch Diagram</th>
</tr>
</thead>
<tbody>
<tr>
<td>2.</td>
<td>(3u^{10} (6u))</td>
</tr>
<tr>
<td></td>
<td>Total pages</td>
</tr>
<tr>
<td></td>
<td>(1u^{10} (2u))</td>
</tr>
<tr>
<td></td>
<td>1st day</td>
</tr>
<tr>
<td></td>
<td>Remainder</td>
</tr>
<tr>
<td></td>
<td>(4u)</td>
</tr>
<tr>
<td></td>
<td>2nd day</td>
</tr>
<tr>
<td></td>
<td>Left</td>
</tr>
<tr>
<td></td>
<td>(3u = 90)</td>
</tr>
</tbody>
</table>
Solutions to Unit 2.1 (Cont.)

3. 

<table>
<thead>
<tr>
<th>Total fishes</th>
<th>5u³ (15u)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Guppies</td>
<td>3u³ (9u)</td>
</tr>
<tr>
<td>Goldfish</td>
<td>1u² (2u)</td>
</tr>
<tr>
<td>Tetras</td>
<td>2u³ (4u)</td>
</tr>
</tbody>
</table>

**Total fish**

- 3u x 3 (15u)
- 2u x 3 (6u)
- 3u x 2 (6u)
- 2u x 3 (4u)

**Remainder**

- 3u x 2 (6u)
- 1u x 2 (2u)

**Guppies**

- 3u x 3 (9u)

**Goldfish**

- 1u x 2 (2u)

**Tetras**

- 2u x 3 (4u)

**Think Further**

1. \(5u - 2u = 3u\)
   
   \(3u = 72\)
   
   \(1u = 72 ÷ 3\)
   
   \(= 24\)
   
   \(15u = 15 × 24\)
   
   \(= 360\)

   Anthony had **$360** at first.

2. Money on food and shoes = \(\frac{3}{5} + \frac{1}{5}\)
   
   \(\frac{5}{5} + \frac{3}{5}\)
   
   \(\frac{8}{5}\)

   Money left = \(1 - \frac{8}{15}\)
   
   \(= \frac{7}{15}\)

   **\(\frac{7}{15}\) of total = 70**
   
   **\(\frac{1}{15}\) of total = 10**
   
   **\(\frac{15}{15}\) of total = 10 × 15**
   
   \(= 150\)

   Anthony had **$150** at first.

**Let’s Practise 2.1**

**Question 1**

- **Total money**
  
  \(10u\)
  
  \(W\)
  
  **Remainder**
  
  \(3u\)
  
  **7u**
  
  \(D\)
  
  **Left**
  
  \(3u\)
  
  **4u**

(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.

**Question 2**

- **Total money**
  
  \(5u\)
  
  \(W\)
  
  **Remainder**
  
  \(1u\)
  
  **4u**
  
  \(TV\)
  
  **Left**
  
  \(1u\)
  
  **3u**

(a) Fraction spent on TV set = \(\frac{2}{3}\)

Caleb spent \(\frac{2}{3}\) his money on the television set.

(b) \(2u = 1440\)

- \(1u = 1440 ÷ 2\)
  
  \(= 720\)

The watch cost **$720**.

**Question 3**

- **Total money**
  
  \(40u\)
  
  \(D\)
  
  **P**
  
  **Remainder**
  
  \(8u\)
  
  **25u**
  
  \(7u\)
  
  \(C\)
  
  **Left**
  
  \(4u\)
  
  **3u**

- \(3u = 183\)

- \(1u = 183 ÷ 3\)
  
  \(= 61\)
  
  \(25u = 25 × 61\)
  
  \(= 1525\)

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

**Question 4**

- **Total stamps**
  
  \(35u\)
  
  \(B\)
  
  \(F\)
  
  **Remainder**
  
  \(10u\)
  
  **7u**
  
  **18u**
  
  \(D\)
  
  **Left**
  
  \(1u\)
  
  **6u**
  
  **12u**

- \(12u = 36\)

- \(1u = 36 ÷ 12\)
  
  \(= 3\)
  
  \(35u = 35 × 3\)
  
  \(= 105\)

Mabel had **105** stamps at first.
Solutions to Unit 2.1 (Cont.)

Question 5

9u\text{th} (36u)

Total donations

4u\text{th} (16u)  

P

5u\text{th} (20u)  

Remainder

4u\text{th} (20u)

S

1u\text{st} (5u)

C

3u\text{rd} (15u)

15u = 240 000

1u = 240 000 \div 15

= 16 000

36u = 36 \times 16 000

= 576 000

$576 000$ was raised during the event.

Question 6

Total cupcakes

3u\text{rd} (6u)

S

1u\text{st} (2u)

Remainder

2u\text{nd} (4u)

A

1u

Left

3u

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

= \frac{1}{2}

(b) 3u = 285

1u = 285 \div 3

= 95

2u = 2 \times 95

= 190

190 cupcakes were for Sally’s birthday party.

Solutions to Unit 2.2 Branching (Working Backwards)

Let’s Get Started 2.2

<table>
<thead>
<tr>
<th>S/N</th>
<th>Branch Diagram</th>
</tr>
</thead>
<tbody>
<tr>
<td>2.</td>
<td>Total monthly savings</td>
</tr>
<tr>
<td></td>
<td>Bag $60</td>
</tr>
<tr>
<td></td>
<td>Remainder 3u</td>
</tr>
<tr>
<td></td>
<td>Basketball 2u</td>
</tr>
<tr>
<td></td>
<td>Left 1u</td>
</tr>
</tbody>
</table>

Working backwards:

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

\frac{4}{9} of total = 4u

Bag = 4u - 3u

= 1u

Let’s Practise 2.2

Question 1

Total stickers

B 111

Remainder 8u

C 3u

Left 5u

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

\frac{9}{9} of stickers = 9 \times 5u

= 45u

B = 45u - 8u

= 37u

37u = 111

3. Total participants

\begin{array}{c|c|c}
\text{A} & \text{C} & \text{Remainder} \\
\hline
\text{330} & \text{4u} & \text{G} \quad \text{B} \\
\text{1u} & \text{3u} & \\
\end{array}

Working backwards:

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

\frac{3}{5} of total = 15u

Adults = 15u - 4u

= 11u

Ask Yourself

1. 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 money = 3u

\frac{3}{9} of money = 9u

Money spent on plates = 9u - 5u

= 4u

3S = 1P

12S = 4P

2u of money = 4P

4u of money = 8P

8P = 156

1P = 156 \div 8

= 19.50

Each plate cost $19.50.

For more review questions, please visit www.onsponge.com. 190429
Solutions to Unit 2.2 (Cont.)

Question 1 (Cont.)

1u = 111 ÷ 37
= 3
45u = 45 × 3
= 135

Ken had 135 stickers at first.

Question 2

Total money

<table>
<thead>
<tr>
<th>E</th>
<th>Remainder</th>
</tr>
</thead>
<tbody>
<tr>
<td>$18</td>
<td>12u</td>
</tr>
</tbody>
</table>

\[
\frac{1}{3} \text{ of total} = 5u \\
\frac{2}{3} \text{ of total} = 3 \times 5 = 15u \\
E = 15u - 12u = 3u \\
3u = 18 \\
1u = 18 ÷ 3 = 6 \\
7u = 7 \times 6 = 42
\]

Jack's mother spent $42 on the Chinese story books.

Question 3

Total fruits

<table>
<thead>
<tr>
<th>M</th>
<th>Remainder</th>
</tr>
</thead>
<tbody>
<tr>
<td>280</td>
<td>5u</td>
</tr>
</tbody>
</table>

\[
\frac{1}{6} \text{ of total} = 2u \\
\frac{5}{6} \text{ of total} = 6 \times 2u = 12u \\
M = 12u - 5u = 7u \\
7u = 280 \\
1u = 280 ÷ 7 = 40 \\
\text{Apples sold in afternoon} = 3u = 3 \times 40 = 120 \\
\text{Number of packs of apples sold} = 120 ÷ 6 = 20 \\
\text{Amount received} = 20 \times 2.50 = 50
\]

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

Question 4

Total money

<table>
<thead>
<tr>
<th>B</th>
<th>Remainder</th>
</tr>
</thead>
<tbody>
<tr>
<td>7u ( \equiv ) (14u)</td>
<td></td>
</tr>
</tbody>
</table>

\[
\frac{2}{5} \text{ of total} = 3u \equiv (6u) \\
\frac{1}{5} \text{ of total} = 6u ÷ 2 = 3u \\
\frac{5}{5} \text{ of total} = 5 \times 3u = 15u \\
B = 15u - 14u = 1u \\
\text{Difference between crayons and books} = 8u - 1u = 7u \\
7u = 28 \\
1u = 28 ÷ 7 = 4 \\
6u = 6 \times 4 = 24 \\
\text{Jazreel was left with $24 in the end.}
\]

Question 5

Total beads

<table>
<thead>
<tr>
<th>B</th>
<th>Remainder</th>
</tr>
</thead>
<tbody>
<tr>
<td>5u ( \equiv ) (20u)</td>
<td></td>
</tr>
</tbody>
</table>

\[
\frac{4}{9} \text{ of total} = 3u \equiv (12u) \\
\frac{1}{9} \text{ of total} = 12u ÷ 4 = 3u \\
\frac{9}{9} \text{ of total} = 9 \times 3u = 27u \\
B = 27u - 20u = 7u \\
B + \text{left} = 7u + 12u = 19u \\
19u = 209 \\
1u = 209 ÷ 19 = 11 \\
27u = 27 \times 11 = 297 \\
\text{Caitlin had 297 beads at first.}
\]
For more review questions, please visit www.onsponge.com.
Solutions to Unit 2.3 (Cont.)

Question 2 (Cont.)

B = \frac{4}{9} \text{ of total } + 15
= \frac{4}{9} \times 4 + 15
= 63

N = 45 - 14
= 31

Total beads used = 63 + 31
= 94

Jane used 94 beads for the bracelet and necklace.

Question 3

Total no. of points (T)

\[\begin{array}{c|c|c}
D & \frac{5}{9} & T \\
\hline
\frac{4}{9} & 200 & 1100 \\
\hline
M & \frac{10}{11} R & \text{Left} \\
\hline
\frac{1}{11} R & -13 & 1013 \\
\end{array}\]

\[\frac{10}{11} \text{ of remainder} = 1013 - 13 = 1000\]
\[\frac{1}{11} \text{ of remainder} = 1000 \div 10 = 100\]
\[\frac{11}{11} \text{ of remainder} = 11 \times 100 = 1100\]

\[\frac{5}{9} \text{ of total} = 1100 - 200 = 900\]
\[\frac{1}{9} \text{ of total} = 900 \div 5 = 180\]
\[\frac{1}{9} \text{ of total} = 9 \times 180 = 1620\]

Mr Davley had 1620 membership points before the redemption.

Question 4

Total amount of money (T)

\[\begin{array}{c|c|c}
C & \frac{2}{5} & T \\
\hline
\frac{3}{5} & 16 & 48 \\
\hline
L & \frac{3}{4} R & \text{Left} \\
\hline
\frac{1}{4} R & -2 & 38 \\
\end{array}\]

\[\frac{3}{4} \text{ of remainder} = 38 - 2 = 36\]
\[\frac{1}{4} \text{ of remainder} = 36 + 3 = 12\]

\[\frac{4}{5} \text{ of total} = 4 \times 12 = 48\]
\[\frac{2}{5} \text{ of total} = 48 + 16 = 64\]
\[\frac{1}{5} \text{ of total} = 64 \div 2 = 32\]

\[C = \frac{3}{5} \text{ of total} + 16 = 3 \times 32 + 16 = 112\]

\[L = 48 - 38 = 10\]

Difference = 112 - 10 = 102

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

Question 5

Total no. of problem sums (T)

\[\begin{array}{c|c|c}
\text{Mon} & \frac{5}{9} & T \\
\hline
\frac{2}{9} & 66 \\
\hline
\text{Wed} & \frac{7}{11} R & \text{Thurs} \\
\hline
\frac{4}{11} R & -15 & 57 \\
\end{array}\]

\[\frac{7}{11} \text{ of remainder} = 57 - 15 = 42\]
\[\frac{1}{11} \text{ of remainder} = 42 \div 7 = 6\]

\[\frac{11}{11} \text{ of remainder} = 11 \times 6 = 66\]

\[\frac{4}{9} \text{ of total} = 66 + 2 = 68\]
\[\frac{1}{9} \text{ of total} = 68 \div 4 = 17\]

\[\frac{9}{9} \text{ of total} = 9 \times 17 = 153\]

Mike was given 153 questions at first.
Solutions to Unit 2.3 (Cont.)

Question 6

<table>
<thead>
<tr>
<th>Total no. of pages (T)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1st</td>
</tr>
<tr>
<td>2nd</td>
</tr>
<tr>
<td>Remainder (R)</td>
</tr>
<tr>
<td>121</td>
</tr>
<tr>
<td>273</td>
</tr>
<tr>
<td>3rd</td>
</tr>
<tr>
<td>( \frac{3}{7} ) R</td>
</tr>
<tr>
<td>Last week</td>
</tr>
<tr>
<td>( \frac{4}{7} R + 9 )</td>
</tr>
<tr>
<td>108</td>
</tr>
</tbody>
</table>

\( \frac{3}{7} \) of remainder = 108 + 9 = 117
\( \frac{1}{7} \) of remainder = 117 ÷ 73 = 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.

Solutions to Unit 2.4 Repeated Items

Let's Get Started 2.4

<table>
<thead>
<tr>
<th>S/N</th>
<th>Model-drawing approach</th>
<th>Unitary approach</th>
</tr>
</thead>
<tbody>
<tr>
<td>2.</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>G</td>
<td>G = 3u² (6u)</td>
</tr>
<tr>
<td></td>
<td>D</td>
<td>D = 2u² (4u)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>D = 4u</td>
</tr>
<tr>
<td></td>
<td></td>
<td>O = 3u</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Summary</td>
</tr>
<tr>
<td></td>
<td>G + B</td>
<td>G + B = 5u² (10u)</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
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<td></td>
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<tr>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>3.</td>
<td>A</td>
<td>A = 2u² (4u)</td>
</tr>
<tr>
<td></td>
<td>C</td>
<td>C = 3u² (6u)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>C = 6u</td>
</tr>
<tr>
<td></td>
<td></td>
<td>B = 5u</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Summary</td>
</tr>
<tr>
<td></td>
<td>A + B</td>
<td>A + B = 3u³ (15u)</td>
</tr>
<tr>
<td></td>
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</table>

Solutions to Unit 2.4 (Cont.)

<table>
<thead>
<tr>
<th>S/N</th>
<th>Model-drawing approach</th>
<th>Unitary approach</th>
</tr>
</thead>
<tbody>
<tr>
<td>4.</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>B</td>
<td>B = 1u² (2u)</td>
</tr>
<tr>
<td></td>
<td>G</td>
<td>G = 4u² (8u)</td>
</tr>
<tr>
<td></td>
<td>B + G</td>
<td>B + G = 5u² (10u)</td>
</tr>
<tr>
<td></td>
<td>A</td>
<td>A = 5u³ (25u)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Summary</td>
</tr>
<tr>
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<td></td>
<td></td>
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<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Ask Yourself

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

Think Further

1. \( X + Y = 1u² (7u) \)
   \( Y + Z = 2u² (14u) \)
   \( X : 7u - 4u = 3u \)
   \( Y : 4u \)
   \( Y + Z = 7u² (14u) \)
   \( Total = 3u + 4u + 10u = 17u \)

Fraction of the figure that is shaded = \( \frac{4}{17} \)

Let's Practise 2.4

Question 1

<table>
<thead>
<tr>
<th>S/N</th>
<th>Model-drawing approach</th>
<th>Unitary approach</th>
</tr>
</thead>
<tbody>
<tr>
<td>3.</td>
<td>A</td>
<td>A = 4u</td>
</tr>
<tr>
<td></td>
<td>C</td>
<td>B = 5u</td>
</tr>
<tr>
<td></td>
<td></td>
<td>C = 6u</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Summary</td>
</tr>
<tr>
<td></td>
<td>A + B</td>
<td>A + B = 3u³ (9u)</td>
</tr>
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</tbody>
</table>

Question 2

<table>
<thead>
<tr>
<th>S/N</th>
<th>Model-drawing approach</th>
<th>Unitary approach</th>
</tr>
</thead>
<tbody>
<tr>
<td>3.</td>
<td>A</td>
<td>A = 2u</td>
</tr>
<tr>
<td></td>
<td>B</td>
<td>B = 7u</td>
</tr>
<tr>
<td></td>
<td>C</td>
<td>C = 14u</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Summary</td>
</tr>
<tr>
<td></td>
<td>A + B</td>
<td>A + B = 7u³ (21u)</td>
</tr>
<tr>
<td></td>
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<td></td>
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<td></td>
</tr>
</tbody>
</table>
Solutions to Unit 2.4 (Cont.)

Question 2 (Cont.)

\[ B + C = 3u \times (21u) \]
\[ 1u = 42 + 7 \]
\[ = 6 \]

Difference in area between the four-sided figure \((A+B)\) and the oval \((B+C)\)

\[ = 21u - 9u \]
\[ = 12u \]
\[ 12u = 12 \times 6 \]
\[ = 72 \]

The difference in the area is 72 cm².

Question 3

\[ J = 2u \]
\[ K = 1u \]
\[ J = 1u \times 2 \]
\[ D = 6u \]

Summary

\[ J = 2u \]
\[ K = 1u \]

\[ 7u = 21 \]
\[ 1u = 21 \div 7 \]
\[ = 3 \]
\[ 2u = 2 \times 3 \]
\[ = 6 \]

Jason had 6 cousins.

Question 4

\[ T = 2u \times (8u) \]
\[ Sh = 9u \times (36u) \]
\[ So = 3u \times (27u) \]
\[ Sh = 4u \times (36u) \]

Difference between socks and trousers = 27u – 8u

\[ = 19u \]

\[ 19u = 38 \]
\[ 1u = 38 \div 19 \]
\[ = 2 \]
\[ 71u = 71 \times 2 \]
\[ = 142 \]

Mr Osman bought 142 trousers, shirts and pairs of socks.

Question 5

\[ \$50 = 3u \times (9u) \]
\[ \$10 = 4u \times (12u) \]
\[ \$10 + \$50 = 7u \times (21u) \]
\[ \$10 + \$50 = 3u \times (21u) \]
\[ \$2 = 1u \times (7u) \]

\[ 12u - 7u = 5u \]
\[ 5u = 15 \]
\[ 1u = 15 \div 5 \]
\[ = 3 \]

Solutions to Unit 2.4 (Cont.)

Question 5 (Cont.)

\[ \text{Number of $50-notes} = 9u = 9 \times 3 \]
\[ = 27 \]

\[ \text{Total value of $50-notes} = 27 \times 50 \]
\[ = 1350 \]

\[ \text{Number of $10-notes} = 12u \]
\[ = 12 \times 3 \]
\[ = 36 \]

\[ \text{Total value of $10-notes} = 36 \times 10 \]
\[ = 360 \]

\[ \text{Number of $2-notes} = 7u \]
\[ = 7 \times 3 \]
\[ = 21 \]

\[ \text{Total value of $2-notes} = 21 \times 2 \]
\[ = 42 \]

\[ \text{Money in the end} = 1350 + 360 + 42 \]
\[ = 1752 \]

There was $1752 in the safe deposit box.

Question 6

\[ A = 1u \times 3 \]
\[ B + C + D = 8u \times 2 \]
\[ \text{Summary} \]
\[ A = 3u \]
\[ B = 6u \]
\[ C + D = 3u \times 6 \]
\[ D = 8u \]

\[ \text{Total} = 3u + 6u + 10u + 8u \]
\[ = 27u \]

\[ C = 5u \times 2 \]
\[ D = 4u \times 2 \]
\[ C + D = 9u \times 2 \]

\[ C + D = 10u + 8u \]
\[ = 18u \]

\[ A + B = 3u + 6u \]
\[ = 9u \]

\[ \text{Difference} = 18u - 9u \]
\[ = 9u \]

\[ 9u = 288 \]
\[ 1u = 288 \div 9 \]
\[ = 32 \]

\[ 27u = 27 \times 32 \]
\[ = 864 \]

The girls have $864.
Let's Get Started 2.5

At first	What happened? End (As a result) What remained unchanged? Find the value of 1 unit.

2. A has \( \frac{2}{3} \) as many marbles as B
   - A loses 40 marbles
   - B has 4 times as many marbles as A.
   - The number of marbles that B has.
   
\[
\begin{align*}
A &= 2u^4 \text{ (8u)} \\
B &= 3u^4 \text{ (12u)} \\
A &= 1u^3 \text{ (3u)} \\
B &= 4u^3 \text{ (12u)} \\
\text{Diff} &= 8u - 3u \\
 &= 5u \\
5u &= 40 \\
1u &= 8
\end{align*}
\]

3. \( \frac{2}{5} \) of the fruits at a stall are apples (A) and oranges (O). The rest were pears.
   - 25 pears are added to the stall
   - \( \frac{7}{10} \) of the 10 fruits are pears. The rest are apples and oranges.
   - The number of apples and oranges.

\[
\begin{align*}
A &= 2u^3 \text{ (6u)} \\
P &= 3u^3 \text{ (9u)} \\
A + O &= 3u^2 \text{ (6u)} \\
P &= 7u^2 \text{ (14u)} \\
\text{Diff} &= 14u - 9u \\
 &= 5u \\
5u &= 25 \\
1u &= 5
\end{align*}
\]

Ask Yourself
1. ‘If’ implies that the event did not occur hence the question need not mention ‘at first’ or ‘at the end’.

Think Further

At first
\[
\begin{align*}
P &= 2u^4 \text{ (8u)} \\
S + A &= 7u^4 \text{ (28)} \\
\text{End} \\
P &= 1u^4 \text{ (7u)} \\
S + A &= 4u^4 \text{ (28u)} \\
1u &= 12 \\
\text{Total} &= 8u + 28u \\
 &= 36u \\
36u &= 36 \times 12 \\
 &= 432 \\
\text{Mrs Han had 432 fruits.}
\end{align*}
\]

Let's Practise 2.5

Question 1
At first
\[
\begin{align*}
P &= 1u^4 \text{ (4u)} \\
M &= 3u^4 \text{ (12u)} \\
\text{End} \\
P &= 3u^3 \text{ (9u)} \\
M &= 4u^3 \text{ (12u)} \\
\text{Difference} &= 9u - 4u \\
 &= 5u
\end{align*}
\]

Solutions to Unit 2.5 One Item Unchanged

Question 1

1. ‘If’ implies that the event did not occur hence the question need not mention ‘at first’ or ‘at the end’.

Think Further

At first
\[
\begin{align*}
P &= 2u^4 \text{ (8u)} \\
S + A &= 7u^4 \text{ (28)} \\
\text{End} \\
P &= 1u^4 \text{ (7u)} \\
S + A &= 4u^4 \text{ (28u)} \\
1u &= 12 \\
\text{Total} &= 8u + 28u \\
 &= 36u \\
36u &= 36 \times 12 \\
 &= 432 \\
\text{Mrs Han had 432 fruits.}
\end{align*}
\]

Question 2

At first
\[
\begin{align*}
P &= 2u^4 \text{ (4u)} \\
G &= 2u^4 \text{ (8u)} \\
\text{End} \\
P &= 4u \\
G &= 5u \\
\text{Diff} &= 8u - 5u \\
 &= 3u \\
4u &= 40 \\
1u &= 40 \div 4 \\
 &= 10 \\
3u &= 3 \times 10 \\
 &= 30 \\
30 \text{ girls who had left the hall.}
\end{align*}
\]

Question 3

At first
\[
\begin{align*}
R &= 3u^4 \text{ (12u)} \\
S &= 7u^4 \text{ (28u)} \\
\text{End} \\
R &= 4u^3 \text{ (12u)} \\
S &= 5u^3 \text{ (15u)} \\
13u &= 39 \\
1u &= 39 \div 13 \\
 &= 3 \\
\text{Difference at first} &= 28u - 12u \\
 &= 16u \\
16u &= 16 \times 3 \\
 &= 48 \\
\text{Jen had 48 more sunflowers than roses at first.}
\end{align*}
\]

Question 4

At first
\[
\begin{align*}
A &= 5u^3 \text{ (15u)} \\
B &= 3u^3 \text{ (9u)} \\
\text{End} \\
A &= 3u^3 \text{ (15u)} \\
B &= 4u^3 \text{ (20u)} \\
11u &= 33 \\
1u &= 33 \div 11 \\
 &= 3 \\
15u &= 15 \times 3 \\
 &= 45 \\
\text{45 customers were in Restaurant A.}
\end{align*}
\]

Solutions to Unit 2.5 (Cont.)

Question 1 (Cont.)

\[
\begin{align*}
1u &= 10 \div 5 \\
 &= 2 \\
12u &= 12 \times 2 \\
 &= 24 \\
\text{The puppy's mother was 24 kg.}
\end{align*}
\]

Question 2

At first
\[
\begin{align*}
B &= 1u^4 \text{ (4u)} \\
G &= 2u^4 \text{ (8u)} \\
\text{End} \\
P &= 3u \\
G &= 5u \\
\text{Diff} &= 8u - 5u \\
 &= 3u \\
4u &= 40 \\
1u &= 40 \div 4 \\
 &= 10 \\
3u &= 3 \times 10 \\
 &= 30 \\
30 \text{ girls who had left the hall.}
\end{align*}
\]

Question 3

At first
\[
\begin{align*}
R &= 3u^4 \text{ (12u)} \\
S &= 7u^4 \text{ (28u)} \\
\text{End} \\
R &= 4u^3 \text{ (12u)} \\
S &= 5u^3 \text{ (15u)} \\
13u &= 39 \\
1u &= 39 \div 13 \\
 &= 3 \\
\text{Difference at first} &= 28u - 12u \\
 &= 16u \\
16u &= 16 \times 3 \\
 &= 48 \\
\text{Jen had 48 more sunflowers than roses at first.}
\end{align*}
\]

Question 4

At first
\[
\begin{align*}
A &= 5u^3 \text{ (15u)} \\
B &= 3u^3 \text{ (9u)} \\
\text{End} \\
A &= 3u^3 \text{ (15u)} \\
B &= 4u^3 \text{ (20u)} \\
11u &= 33 \\
1u &= 33 \div 11 \\
 &= 3 \\
15u &= 15 \times 3 \\
 &= 45 \\
\text{45 customers were in Restaurant A.}
\end{align*}
\]

190429
For more review questions, please visit www.onsponge.com.
Solutions to Unit 2.5 (Cont.)

Question 5

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

End
E = 3u^2 (6u)
A+S = 1u^2 (2u)

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
Difference = 20u − 15u
S+M = 3u^4 (12u)
W = 5u^4 (20u)

5u = 300
1u = 300 ÷ 5
= 60

20u = 20 × 60
= 1200

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

Solutions to Unit 2.6 Total Unchanged

Let's Get Started 2.6

<table>
<thead>
<tr>
<th>Quantity in units</th>
<th>Value of 1u</th>
</tr>
</thead>
<tbody>
<tr>
<td>Items</td>
<td>Value</td>
</tr>
<tr>
<td></td>
<td>Peter</td>
</tr>
<tr>
<td>At first</td>
<td>5u^16</td>
</tr>
<tr>
<td></td>
<td>(25u)</td>
</tr>
<tr>
<td>What happened?</td>
<td>−36</td>
</tr>
<tr>
<td>In the end</td>
<td>2u^18</td>
</tr>
<tr>
<td></td>
<td>(16u)</td>
</tr>
</tbody>
</table>

Think Further

1.

At first
A = 1u^3 (3u)
C = 3u^3 (9u)
Difference = 2u^3 (6u)

End
A = 2u^2 (4u)
C = 5u^2 (10u)
Difference = 3u^2 (6u)

Solutions to Unit 2.6 (Cont.)

1u = 28
10u = 10 × 28
= 280

There were 280 children in the train at the end.

Let's Practise 2.6

Question 1
At first
O = 1u^3 (7u)
R = 5u^3 (35u)
Total = 6u^3 (42u)

End
O = 3u^6 (18u)
R = 4u^6 (24u)
Total = 7u^6 (42u)

11u = 44
1u = 44 ÷ 11
= 4

35u = 35 × 4
= 140

There were 140 pots of roses at first.

Question 2
At first
B = 2u^3 (18u)
G = 3u^3 (27u)
Total = 5u^3 (45u)

End
B = 4u^6 (20u)
G = 5u^6 (25u)
Total = 9u^6 (45u)

2u = 12
1u = 12 ÷ 2
= 6

18u = 18 × 6
= 108

There were 108 boys in the gym.

Question 3
At first
P = 3u^8 (24u)
M = 4u^6 (32u)
Total = 7u^8 (56u)

End
P = 5u^7 (35u)
M = 3u^7 (21u)
Total = 8u^7 (56u)

11u = 77
1u = 77 ÷ 11
= 7

24u = 24 × 7
= 168

Paul had 168 ants.
Solutions to Unit 2.6 (Cont.)

Question 4

At first
A = 4u² (28u)
N = 5u³ (35u)
Total = 9u² (63u)

Difference = 28u − 18u = 10u

At first
A = 2u³ (18u)
N = 5u³ (45u)
Total = 7u³ (63u)

10u = 40
1u = 40 ÷ 10
= 4
28u = 28 × 4
= 112

Alisha had 112 stickers at first.

Question 5

30 min
C = 1u
I = 9u
Total = 10u

Difference = 4u − 1u = 3u

45 min
C = 2u² (4u)
I = 3u² (6u)
Total = 5u² (10u)

3u = 12
1u = 12 ÷ 3
= 4
10u = 10 × 4
= 40

There were 40 questions.

Question 6

At first
U = 9u
P = 5u
Total = 14u

Difference = 9u − 8u = 1u

45 min
U = 4u² (8u)
P = 3u² (6u)
Total = 7u² (14u)
1u = 4
14u = 14 × 4
= 56

There were 56 cars in the workshop.

Solutions to Unit 2.7 Difference Unchanged

Let’s Get Started 2.7

<table>
<thead>
<tr>
<th>Items</th>
<th>Quantity in units</th>
<th>Conclusion</th>
</tr>
</thead>
<tbody>
<tr>
<td>Annie</td>
<td>1u² (2u)</td>
<td></td>
</tr>
<tr>
<td>Mother</td>
<td>6u² (12u)</td>
<td>5u² (10u)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>What has not changed?</td>
</tr>
<tr>
<td>Future</td>
<td>1u⁵ (5u)</td>
<td>3u⁵ (15u)</td>
</tr>
<tr>
<td></td>
<td>2u⁵ (10u)</td>
<td>Their age increased by 3u each after 9 years. Hence, 3u = 9 1u = 3</td>
</tr>
</tbody>
</table>

Ask Yourself

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

Let’s Practise 2.7

Question 1

At first
A = 2u⁴ (8u)
C = 5u⁴ (20u)
Difference = 3u⁴ (12u)

End
A = 1u³ (3u)
C = 5u³ (15u)
Difference = 4u³ (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
21u = 1.6 × 21
= 33.6
Total length removed = 34 − 33.6 = 0.4
Solutions to Unit 2.7 (Cont.)

Question 2 (Cont.)

Length removed from each = 0.4 ÷ 2
= 0.2

0.2 m was cut off from each piece of rope.

Question 3

Now

\[ J = 1u^3 \times 3 \text{u} \]

\[ F = 3u^3 \times 9 \text{u} \]

Difference = 2u^3 (6u)

5 years later

\[ J = 2u^2 \times 4 \text{u} \]

\[ F = 5u^2 \times 10 \text{u} \]

Difference = 3u^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.

Question 4

7 years ago

\[ G = 3u \]

\[ N = 7u \]

Difference = 4u

Now

\[ G = 4u^4 \times 16 \text{u} \]

\[ N = 5u^4 \times 20 \text{u} \]

Difference = 1u^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 \( \frac{3}{7} \) of Nathan age 39 years ago.

Question 5

At first

\[ A + B = 3u^2 \times 6 \text{u} \]

\[ C + B = 5u^2 \times 10 \text{u} \]

Difference = 2u^2 (4u)

End

\[ A = 3u \]

\[ C = 7u \]

Difference = 4u

\[ 4 \frac{5}{7} J = \frac{3}{7} K \]

\[ 12 \frac{12}{21} J = \frac{12}{22} K \]

Total units

J = 21u
K = 28u

\[ 4 \frac{5}{7} \]

\[ 12 \frac{12}{21} \]

\[ 22 \]

\[ 28 \]

Total units

J = 21u
K = 28u

Solutions to Unit 2.8 Numerators the Same

Let’s Get Started 2.8

<table>
<thead>
<tr>
<th>S/N</th>
<th>Model drawing</th>
<th>Numerators the Same</th>
</tr>
</thead>
<tbody>
<tr>
<td>3.</td>
<td>[ J \quad 4u^3 \times (12u) \quad 3u^3 \times (9u) ]</td>
<td>[ 4 \frac{5}{7} J = \frac{3}{7} K ]</td>
</tr>
<tr>
<td></td>
<td>[ K \quad 3u^4 \times (12u) \quad 4u^4 \times (16u) ]</td>
<td>[ 12 \frac{12}{21} J = \frac{12}{22} K ]</td>
</tr>
</tbody>
</table>

Total units

J = 21u
K = 28u

The area of the unshaded part of the square and quadrilateral is 81 cm^2.
**Solutions to Unit 2.8 (Cont.)**

<table>
<thead>
<tr>
<th>S/N</th>
<th>Model drawing</th>
<th>Numerators the Same</th>
</tr>
</thead>
<tbody>
<tr>
<td>4.</td>
<td>J</td>
<td>2u² (10u)</td>
</tr>
<tr>
<td></td>
<td>K</td>
<td>5u² (10u)</td>
</tr>
<tr>
<td>Total units</td>
<td>J = 55u</td>
<td>K = 16u</td>
</tr>
</tbody>
</table>

**Ask Yourself**
1. When phrase “is equal to” is between two given fractions.

**Think Further**
1. \[32u + 35u = 201\]
2. \[67u = 201\]
3. \[1u = 201 \div 67\] = 3
4. Muffins sold = (32u + 35u) – (20u \times 2) = 27u
5. \[27u = 27 \times 3\] = 81
6. Mrs Heng sold a total of 81 muffins.

**Let’s Practise 2.8**

**Question 1**

**Left**

\[
\frac{5 \times 2}{7 \times 2} = \frac{2 \times 5}{5 \times 5} = \frac{10}{14} = \frac{5}{7} = \frac{B}{B}
\]

**At first**

Shop A = 14u
Shop B = 25u

Difference = 25u – 14u
= 11u

11u = 396
1u = 396 \div 11
= 36

25u = 25 \times 36
= 900

Shop B had 900 apples in at first.

**Question 2**

\[
\frac{3 \times 5}{8 \times 5} = \frac{5 \times 3}{6 \times 3} = \frac{15}{40} = \frac{15}{18} = \frac{L}{L}
\]

**At first**

D = 40u
L = 18u

Difference = 40u – 18u
= 22u

22u = 44
1u = 44 \div 22
= 2

Total = 40u + 18u
= 58u

58u = 58 \times 2
= 116

Their total allowance is $116.

**Question 3**

**Left**

\[
\frac{4}{11} = \frac{2 \times 2}{7 \times 2} = \frac{D}{D}
\]

**At first**

J = 11u
D = 14u

Difference = 14u – 11u
= 3u

3u = 36
1u = 36 \div 3
= 12

8u = 8 \times 12
= 96

They had a total of 96 marbles in the end.

**Question 4**

**Left**

\[
\frac{1 \times 4}{7 \times 4} = \frac{R}{W} = \frac{2}{5}
\]

**At first**

R = 28u
W = 5u

Difference = 28u – 5u
= 23u

23u = 46
1u = 46 \div 23
= 2

28u = 2 \times 28
= 56

Roy had 56 toy cars.
Solutions to Unit 2.8 (Cont.)

Question 5

Left

\[ K = 1u^3 \] (3u) \hspace{1cm} C = 2u^3 \] (6u)

\[ \frac{3}{5} K \text{ is half of } \frac{2 \times 3}{3 \times 3} C \]

\[ \frac{3}{5} K \text{ is half of } \frac{6}{9} C \]

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

\[ X = 3u^6 \] (18u) \hspace{1cm} Z = 1u^6 \] (6u)

\[ \frac{3 \times 6}{5 \times 6} X \text{ is thrice of } \frac{6}{11} Z \]

\[ \frac{18}{30} X \text{ is thrice of } \frac{6}{11} Z \]

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

\[ = 5 \times 16 \]

\[ = 80 \]

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

Savings (in the end) = $80 × 5

\[ = $400 \]

Zane’s savings in the bank was $400 in the end.

Solutions to Unit 2.9 Quantity x Value

Let’s Get Started 2.9

<table>
<thead>
<tr>
<th>Items</th>
<th>Quantity of items ( \times )</th>
<th>Value of items (wheels)</th>
<th>Total value (wheels)</th>
</tr>
</thead>
<tbody>
<tr>
<td>C</td>
<td>5u \times 4</td>
<td>20u</td>
<td></td>
</tr>
<tr>
<td>M</td>
<td>3u \times 2</td>
<td>6u</td>
<td></td>
</tr>
<tr>
<td>Total</td>
<td>8u \times 2</td>
<td>26u</td>
<td>130</td>
</tr>
</tbody>
</table>

Solutions to Unit 2.9 (Cont.)

<table>
<thead>
<tr>
<th>Items</th>
<th>Quantity of items ( \times )</th>
<th>Value of items (legs)</th>
<th>Total value (legs)</th>
</tr>
</thead>
<tbody>
<tr>
<td>C</td>
<td>4u \times 4</td>
<td>16u</td>
<td></td>
</tr>
<tr>
<td>D</td>
<td>6u \times 2</td>
<td>12u</td>
<td></td>
</tr>
<tr>
<td>Total</td>
<td>10u \times 2</td>
<td>28u</td>
<td>336</td>
</tr>
</tbody>
</table>

Ask Yourself

1. In Quantity \( \times \) Value, the quantity/number of units of each item is given but in Guess and Check, only the total number of items are given.

Let’s Practise 2.9

Question 1

<table>
<thead>
<tr>
<th>Items</th>
<th>Quantity of items ( \times )</th>
<th>Value of items ($)</th>
<th>Total value ($)</th>
</tr>
</thead>
<tbody>
<tr>
<td>S</td>
<td>3u \times 2</td>
<td>6u</td>
<td></td>
</tr>
<tr>
<td>D</td>
<td>1u \times 3</td>
<td>3u</td>
<td></td>
</tr>
<tr>
<td>Total</td>
<td>4u</td>
<td></td>
<td>9u</td>
</tr>
</tbody>
</table>

9u = 225

1u = 225 ÷ 9

\[ = 25 \]

4u = 4 × 25

\[ = 100 \]

There were 100 bicycles altogether.

Question 2

<table>
<thead>
<tr>
<th>Items</th>
<th>Quantity of items ( \times )</th>
<th>Value of items ($)</th>
<th>Total value ($)</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>5u \times 10</td>
<td>50u</td>
<td></td>
</tr>
<tr>
<td>C</td>
<td>12u \times 4</td>
<td>48u</td>
<td></td>
</tr>
<tr>
<td>Total</td>
<td>17u</td>
<td></td>
<td>98u</td>
</tr>
</tbody>
</table>

(a)

\[ 98u = 9800 \]

1u = 9800 ÷ 98

\[ = 100 \]

12u = 12 × 100

\[ = 1200 \]

There were a total of 1200 children.

(b)

\[ \text{Difference} = 50u – 48u \]

\[ = 2u \]

2u = 2 × 100

\[ = 200 \]

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

Question 3

R = 1u \hspace{1cm} \text{Summary}

C = 2u \hspace{1cm} V = 1u

R = 1u

V = 1u
Solutions to Unit 2.9 (Cont.)

Question 3 (Cont.)

<table>
<thead>
<tr>
<th>Items</th>
<th>Quantity of items</th>
<th>×</th>
<th>Value of items ($)</th>
<th>Total value ($)</th>
</tr>
</thead>
<tbody>
<tr>
<td>R</td>
<td>1u</td>
<td>×</td>
<td>1.1</td>
<td>1.1u</td>
</tr>
<tr>
<td>V</td>
<td>1u</td>
<td>×</td>
<td>1.2</td>
<td>1.2u</td>
</tr>
<tr>
<td>C</td>
<td>2u</td>
<td>×</td>
<td>1.4</td>
<td>2.8u</td>
</tr>
<tr>
<td>Total</td>
<td>4u</td>
<td></td>
<td></td>
<td>5.1u</td>
</tr>
</tbody>
</table>

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

<table>
<thead>
<tr>
<th>Items</th>
<th>Quantity of items</th>
<th>×</th>
<th>Value of items ($)</th>
<th>Total value ($)</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>1u</td>
<td>×</td>
<td>0.4</td>
<td>0.4u</td>
</tr>
<tr>
<td>O</td>
<td>1u</td>
<td>×</td>
<td>0.5</td>
<td>0.5u</td>
</tr>
<tr>
<td>P</td>
<td>4u</td>
<td>×</td>
<td>0.6</td>
<td>2.4u</td>
</tr>
<tr>
<td>Total</td>
<td>6u</td>
<td></td>
<td></td>
<td>3.3u</td>
</tr>
</tbody>
</table>

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 = 1.5u × 12
= 18
He spent $18 more on the pears than apples and oranges.

Question 5

<table>
<thead>
<tr>
<th>Items</th>
<th>Quantity of items</th>
<th>×</th>
<th>Value of items ($)</th>
<th>Total value ($)</th>
</tr>
</thead>
<tbody>
<tr>
<td>B</td>
<td>4u</td>
<td>×</td>
<td>30</td>
<td>90u</td>
</tr>
<tr>
<td>R</td>
<td>3u</td>
<td>×</td>
<td>40</td>
<td>140u</td>
</tr>
<tr>
<td>S</td>
<td>9u</td>
<td>×</td>
<td>50</td>
<td>500u</td>
</tr>
<tr>
<td>Total</td>
<td>16u</td>
<td></td>
<td></td>
<td>700u</td>
</tr>
</tbody>
</table>

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

Solutions to Unit 2.9 (Cont.)

Question 5 (Cont.)

<table>
<thead>
<tr>
<th>Items</th>
<th>Quantity of items</th>
<th>×</th>
<th>Value of items ($)</th>
<th>Total value ($)</th>
</tr>
</thead>
<tbody>
<tr>
<td>B</td>
<td>15u</td>
<td>×</td>
<td>4</td>
<td>60u</td>
</tr>
<tr>
<td>G</td>
<td>12u</td>
<td>×</td>
<td>5</td>
<td>60u</td>
</tr>
<tr>
<td>A</td>
<td>9u</td>
<td>×</td>
<td>10</td>
<td>90u</td>
</tr>
<tr>
<td>Total</td>
<td>36u</td>
<td></td>
<td></td>
<td>210u</td>
</tr>
</tbody>
</table>

Difference = 90u − 60u
= 30u
30u = 3000
1u = 3000 ÷ 30
= 100
(a) 210u = 210 × 100
= 21 000
The total amount collected from the donations is $21 000.
(b) Total adults and girls = 9u + 12u
= 21u
21u = 21 × 100
= 2100
There is a total of 2100 adults and girls.

Solutions to Review Questions on Chapter 2

Question 1

<table>
<thead>
<tr>
<th>Items</th>
<th>Quantity of items</th>
<th>×</th>
<th>Value of items ($)</th>
<th>Total value ($)</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>3u</td>
<td>×</td>
<td>30</td>
<td>90u</td>
</tr>
<tr>
<td>B</td>
<td>4u</td>
<td>×</td>
<td>40</td>
<td>160u</td>
</tr>
<tr>
<td>S</td>
<td>9u</td>
<td>×</td>
<td>50</td>
<td>450u</td>
</tr>
<tr>
<td>Total</td>
<td>16u</td>
<td></td>
<td></td>
<td>700u</td>
</tr>
</tbody>
</table>

700u = 14 000
1u = 14 000 ÷ 700
= 20
160u = 160 × 20
= 3200
(a) The mass of flour needed is 3200 g.
Solutions to Review Questions on Chapter 2
(Cont.)

Question 2

\[
J + E = 3u + 6 (18u) \\
G + R = 4u^2 + (24u) \\
Total = 7u^2 + (42u)
\]

\[
J + E + G = 5u^2 + (35u) \\
R = 1u^2 + (7u) \\
Total = 6u^2 + (42u)
\]

J = 1u^3 + 3u \\
E = 5u^3 + 15u \\
J+E = 6u^3 + 18u

The four children managed to pool 336 marbles together.

Question 3

At first

\[
R = 2u + 2 (4u) \\
M = 1u + 1 (2u)
\]

The boys spent $180 on drinks.

Question 4

People

7u^2 (14u)

Adults (Participants)

3u^2 (6u)

Remaining

4u^2 (8u)

Girls (Participants)

1u^2 (2u)

Boys (Participants)

Left

2u^3 (6u)

Organisers

1u^3 (3u)

Summary

A = 30u \\
B = 16u \\
C = 21u \\

Difference = 30u – 21u = 9u \\
9u = 45 \\
1u = 45 ÷ 9 = 5 \\
16u = 16 × 5 = 80 \\
There are 80 pineapples in Basket B.

Question 6

Summary

P = 3u \\
E+R = 7u \\
Total = 10u

E = 1u^3 + 5u \\
P+R = 1u^3 + 2u \\
Total = 2u^3 + 10u

Items

Quantity of items

Value of items ($) 

Total value ($)

P

3u

x

1.95

5.85u

E

5u

x

0.75

3.75u

R

2u

x

2.2

4.4u

Total

10u

14u

14u = 28 \\
1u = 28 ÷ 14 = 2 \\
10u = 10 × 2 = 20 \\
There are 20 items in the bag.

Question 7

Fraction of ducks left = 1 − \( \frac{3}{7} \) \\
= \( \frac{2}{7} \) \\
Fraction of chickens left = 1 − \( \frac{2}{5} \) \\
= \( \frac{3}{5} \) \\
\[
C = 10u \\
D = 21u
\]
Solutions to Review Questions on Chapter 2 (Cont.)

Question 7 (Cont.)

Total (at first) = 10u + 21u
= 31u
Remained = 6u + 6u
= 12u
12u = 840
1u = 840 ÷ 12
= 70
31u = 31 × 70
= 2170

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

Question 8

Total amount of money

\[ \text{D} \quad \text{Remainder} \quad 7u^{2} (14u) \]

\[ \frac{2}{9} \text{ of total} = 6u + 180 \]
\[ \frac{1}{9} \text{ of total} = 3u + 90 \]
\[ \frac{2}{9} \text{ of total} = 27u + 810 \]

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

\[ N = \frac{2}{9} E \]
\[ \frac{5}{22} N = \frac{5}{9} E \]
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

<table>
<thead>
<tr>
<th>Items</th>
<th>Quantity of items</th>
<th>Value of items ($)</th>
<th>Total value ($)</th>
</tr>
</thead>
<tbody>
<tr>
<td>C</td>
<td>3u + 15</td>
<td>3.5</td>
<td>10.5u + 52.5</td>
</tr>
<tr>
<td>R</td>
<td>3u</td>
<td>x</td>
<td>3u</td>
</tr>
<tr>
<td>P</td>
<td>1u + 5</td>
<td>x</td>
<td>2.9u + 14.5</td>
</tr>
<tr>
<td>Total</td>
<td>7u + 20</td>
<td></td>
<td>22.4u + 67</td>
</tr>
</tbody>
</table>

Solutions to Review Questions on Chapter 2 (Cont.)

Question 10 (Cont.)

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

End

<table>
<thead>
<tr>
<th>A</th>
<th>8u</th>
<th>65</th>
<th>89</th>
</tr>
</thead>
<tbody>
<tr>
<td>N</td>
<td>8u</td>
<td>65</td>
<td></td>
</tr>
</tbody>
</table>

1u = 65 + 89
= 154
A = 9 × 154
= 1386
N = 8 × 154
= 1232

Alyssa and Nerissa had $1386 and $1232 respectively.

Question 12

\[ \text{L} = 5u \]
\[ \text{K} = 6u \]
\[ \text{I} = 5u \]

In the end

\[ 2p = 60 \]
\[ 1p = 60 ÷ 2 \]
\[ = 30 \]
\[ 3p = 3 × 30 \]
\[ = 90 \]
\[ \text{L (at first)} = 90 – 10 \]
\[ = 80 \]
\[ 5u = 80 \]
\[ 1u = 80 ÷ 5 \]
\[ = 16 \]
\[ 6u = 6 × 16 \]
\[ = 96 \]
\[ \text{K (end)} = 96 – 10 – 70 \]
\[ = 16 \]

Kevin had 16 cards in the end.

Solutions to Unit 3.1 Repeated Items

Let's Get Started 3.1

<table>
<thead>
<tr>
<th>Step 1</th>
<th>What item(s) is/are repeated?</th>
<th>Step 2</th>
</tr>
</thead>
<tbody>
<tr>
<td>S : H</td>
<td>P : S 1\textsuperscript{st} : 6\textsuperscript{th} 4 : 24</td>
<td>S : H : P 4 : 24 : 9</td>
</tr>
<tr>
<td>C : D</td>
<td>A : C + D 5 : 9 2\textsuperscript{nd} : 7\textsuperscript{th} 4 : 14</td>
<td>C + D A : C : D 4 : 5 : 9</td>
</tr>
</tbody>
</table>
### Solutions to Unit 3.1 (Cont.)

<table>
<thead>
<tr>
<th>Step 1</th>
<th>What item(s) is/are repeated?</th>
<th>Step 2</th>
</tr>
</thead>
<tbody>
<tr>
<td>$X : Y : Z$</td>
<td></td>
<td>$X : Y : Z$</td>
</tr>
<tr>
<td>$9^{12} : 2^{12} : 4^{12}$</td>
<td></td>
<td>$18 : 4 : 8$</td>
</tr>
<tr>
<td>$18 : 4 : 8$</td>
<td></td>
<td></td>
</tr>
<tr>
<td>$W : X+Y$</td>
<td></td>
<td>$W : X+Y$</td>
</tr>
<tr>
<td>$5^{11} : 2^{11}$</td>
<td></td>
<td>$18 : 4 : 8$</td>
</tr>
<tr>
<td>$55 : 22$</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

#### Ask Yourself

1. The girls shared a number of biscuits together and the quantity by each girl is given in sets of ratio amongst them.
2. Since Hannah is the Repeated Item, the number of units representing Hannah in both sets of ratio must be made the same using the principle of the First Common Multiple (FCM) of 5 and 4 which is 20.

#### Let’s Practise 3.1

**Question 1**

<table>
<thead>
<tr>
<th>J : D</th>
<th>J : K</th>
</tr>
</thead>
<tbody>
<tr>
<td>$1^{13}$ : $8^{13}$</td>
<td>$3 : 1$</td>
</tr>
<tr>
<td>3 : 24</td>
<td></td>
</tr>
</tbody>
</table>

**Summary**

- **J : D : K**
  - $3 : 24 : 1$
- **Total**
  - $= 3u + 24u + 1u$
  - $= 28u$
  - **28u** = 280
  - **1u** = 280 ÷ 28
  - = 10
- **Difference**
  - $= 24u – 1u$
  - $= 23u$
  - **23u** = 23 × 10
  - = 230

Duncan had **230** more coins than Keith.

**Question 2**

<table>
<thead>
<tr>
<th>B : A</th>
<th>A : C</th>
</tr>
</thead>
<tbody>
<tr>
<td>$3^{4} : 5^{4}$</td>
<td>$4^{5} : 1^{5}$</td>
</tr>
<tr>
<td>12 : 20</td>
<td>20 : 5</td>
</tr>
</tbody>
</table>

**Summary**

- **A : B : C : Total**
  - $20 : 12 : 5 : 37$
- **Difference**
  - $= 20u – 12u$
  - $= 8u$
  - **8u** = 160
  - **1u** = 160 ÷ 8
  - = 20
  - **37u** = 37 × 20
  - = 740
- The sum of money was **$740**.

**Question 3**

<table>
<thead>
<tr>
<th>J : E+G</th>
<th>Total</th>
<th>E : J + G : Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>$1^{13}$ : $4^{13}$</td>
<td>$5^{13}$ : $3^{15}$ : $1^{15}$</td>
<td></td>
</tr>
<tr>
<td>13 : 52</td>
<td>65</td>
<td>15 : 50 : 65</td>
</tr>
</tbody>
</table>

**Summary**

- **E : G : J**
  - 15 : 37 : 13
- **65u** = 130
  - **1u** = 130 ÷ 65
  - = 2
- **Difference**
  - $= 37u – 13u$
  - $= 24u$
  - **24u** = 24 × 2
  - = 48
Grace has **48** more playing cards than Jason.

**Question 4**

<table>
<thead>
<tr>
<th>G : C+J</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>$2^{4}$ : $3^{4}$</td>
<td>$5^{4}$</td>
</tr>
<tr>
<td>8 : 12</td>
<td>20</td>
</tr>
</tbody>
</table>

**Summary**

- **C : G : J**
  - 7 : 8 : 5
- **Total**
  - $= 7u + 8u + 5u$
  - $= 20u$
  - **20u** = 560
  - **1u** = 560 ÷ 20
  - = 28
- **Difference**
  - $= 8u – 5u$
  - $= 3u$
  - **3u** = 3 × 28
  - = 84
Gillian contributed **$84** more than Joan.

**Question 5**

<table>
<thead>
<tr>
<th>A : B : A+B</th>
<th>A+B : B+C</th>
</tr>
</thead>
<tbody>
<tr>
<td>$2^{2} : 1^{2}$ : $3^{2}$</td>
<td>$2^{3}$ : $1^{3}$</td>
</tr>
<tr>
<td>4 : 2 : 6</td>
<td>6 : 3</td>
</tr>
</tbody>
</table>

**Summary**

- **A : B : C**
  - 4 : 2 : 3
- **7u** = 49
  - **1u** = 49 + 7
  - = 7
- **Shaded B** = 2u
  - **2u** = 2 × 7
  - = 14
The area of the shaded part of the figure is **14 cm²**.
Solutions to Unit 3.1 (Cont.)

Question 6

<p>| | | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>B</td>
<td>C</td>
</tr>
</tbody>
</table>

B : C
6 : 12
2 : 4

B : A
5 : 10
2 : 4

12 : 10
12 : 9

Summary
A : B : C
9 : 12 : 10

Unshaded = 9u + 10u
= 19u

19u = 38
1u = 38 ÷ 19
= 2

Shaded part B = 12u
12u = 12 × 2
= 24

The area of the shaded part is 24 cm².

Solutions to Unit 3.2 Family of Change

Let’s Get Started 3.2

<p>| | | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>At first</td>
<td>End (As a result)</td>
<td>What has not changed?</td>
</tr>
<tr>
<td>C : D</td>
<td>2u³ : 5u³</td>
<td>6 : 17</td>
</tr>
<tr>
<td>E : F</td>
<td>4u³ : 7u³</td>
<td>2 : 7</td>
</tr>
<tr>
<td>H : K : Total</td>
<td>3u¹⩾5 : u¹⩾8</td>
<td>45 : 75 : 120</td>
</tr>
<tr>
<td>A : O+P</td>
<td>5u² : 9u²</td>
<td>10 : 6</td>
</tr>
</tbody>
</table>

Find the value of 1 unit.
C
19u – 15u
= 2u
2u = 4
1u = 2

F
14u – 12u
= 2u
2u = 22
1u = 11

Total (H+K)
64u – 45u
= 19
19u = 95
1u = 5

O + P
10u – 3u
= 7u
7u = 21
1u = 3

Ask yourself

1. The change is the fifty-four $1 coins that were removed. To form the relationship based on the change, we write out the “At first” and “End” sets of ratio.

2. There is a change in the ratio as the total number of coins had changed given that some $1 coins were removed.

3. Since the number of 10-cent coins remained the same, the units representing the 10-cent coins must be made the same in the ‘Before/At first’ and ‘After/End’ ratios using the principle of First Common Multiple (FCM).

Think Further

1. Amount of money Patrick had in the end
   = (10 × 2 × 0.1) + (8 × 2 × 1)
   = $18

Let’s Practise 3.2

Question 1

<p>| | | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>At first</td>
<td>End</td>
<td></td>
</tr>
<tr>
<td>G : B</td>
<td>2u³ : 3u³</td>
<td></td>
</tr>
<tr>
<td>6 : 9</td>
<td>3u¹⩾1</td>
<td></td>
</tr>
</tbody>
</table>

Summary
7u = 14
1u = 14 ÷ 7
= 2

8u = 8 × 2
= 16

There were 16 dancers in the dance studio.

Question 2

<p>| | | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>At first</td>
<td>End</td>
<td></td>
</tr>
<tr>
<td>F : B</td>
<td>4u³ : 1u³</td>
<td></td>
</tr>
<tr>
<td>12 : 3</td>
<td>2u¹⩾2</td>
<td></td>
</tr>
</tbody>
</table>

Summary
5u = 2u
= 10u
20u = 1000
1u = 100 ÷ 20
= 50

5u = 5 × 50
= 250

Cost for the bean curds ordered = 250 × $0.80
= $200

The cost of the bean curd added was $200.

Question 3

<p>| | | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>At first</td>
<td>End</td>
<td></td>
</tr>
<tr>
<td>P : C : Total</td>
<td>9 : 21 : 30</td>
<td></td>
</tr>
<tr>
<td>3u¹⩾3 : 9u¹⩾10</td>
<td></td>
<td></td>
</tr>
<tr>
<td>1u : 1u⩾10</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Summary
1u
= 2

Total (end) = 30u
= 30 × 2
= 60

There was a total of 60 toys on the display shelves in the end.

Question 4

<p>| | | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>At first</td>
<td>End</td>
<td></td>
</tr>
<tr>
<td>A : M : Total</td>
<td>8 : 12 : 20</td>
<td></td>
</tr>
<tr>
<td>2u¹⩾4 : 3u¹⩾4</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
| 7u = 84
1u = 84 ÷ 7
= 12 |
Solutions to Unit 3.2 (Cont.)

Question 4 (Cont.)

\[ u = 10 \times 12 \]
\[ = 120 \]

Alan had 120 more stamps than May in the end.

Question 5

At first

<table>
<thead>
<tr>
<th>A</th>
<th>C</th>
<th>Diff</th>
</tr>
</thead>
<tbody>
<tr>
<td>90</td>
<td>300</td>
<td>210</td>
</tr>
</tbody>
</table>

In the end

<table>
<thead>
<tr>
<th>A</th>
<th>C</th>
<th>Diff</th>
</tr>
</thead>
<tbody>
<tr>
<td>1u</td>
<td>4u</td>
<td>3u</td>
</tr>
</tbody>
</table>

3u = 210
1u = 210 ÷ 3
= 70

Total (at first) = 90 + 300
= 390
Total (end) = 5 × 70
= 350
Total left = 390 – 350
= 40

40 adults and children altogether left the exhibition hall.

Question 6

At first

<table>
<thead>
<tr>
<th>R</th>
<th>L</th>
<th>Diff</th>
</tr>
</thead>
<tbody>
<tr>
<td>320</td>
<td>260</td>
<td>60</td>
</tr>
</tbody>
</table>

In the end

<table>
<thead>
<tr>
<th>A</th>
<th>C</th>
<th>Diff</th>
</tr>
</thead>
<tbody>
<tr>
<td>3u</td>
<td>4u</td>
<td>1u</td>
</tr>
</tbody>
</table>

1u = 60
Total (at first) = 320 + 260
= 580
Total (end) = 7 × 60
= 420
Total spent = 580 – 420
= 160

Richard and Larvy spent $160 altogether.

Solutions to Unit 3.3 Branching

Let’s Get Started 3.3

2. Branch Diagram

- Students
  - T
  - Remainer
  - A
  - H

- A
  - 1u \(= 7u\)
  - 2u \(= 14u\)

14u = 42
1u = 42 ÷ 14
= 3

Total voted = 30u
= 30 × 3
= 90

Ask Yourself

1. The keywords are ‘the remaining amount’. I can use Branching approach to solve the question.

Solutions to Unit 3.3 (Cont.)

Let’s Practise 3.3

Question 1

- Total flour
  - 18u
- Remainder
  - 7u

- G
  - 4u
- C
  - 3u

2 \(\frac{3}{2}\) Total = 4u
3 \(\frac{3}{2}\) Total = 2u
4 \(\frac{3}{2}\) Total = 18u

Noodles = 18u – 7u
= 11u

11u = 550
1u = 550 ÷ 11
= 50
3u = 3 × 50
= 150

She used 150 g of flour to bake the cupcakes.

Question 2

- Laundry
  - 5u \(\frac{1}{2}\) (35u)
- Remainder
  - 3u \(\frac{1}{2}\) (21u)
- Cotton
  - 3u \(\frac{1}{2}\) (9u)
- Synthetic
  - 4u \(\frac{1}{2}\) (12u)

(a) Fraction = \(\frac{9}{35}\)

\(\frac{9}{35}\) of his laundry was made of cotton.

(b) 12u = 24
1u = 24 ÷ 12
= 2
35u = 35 × 2
= 70

Derrick had 70 pieces of clothing in his laundry.

Question 3

- Total bikes
  - 7u \(\frac{1}{2}\) (91u)
- Remainder
  - 5u \(\frac{1}{3}\) (65u)
- Rest
  - 3u \(\frac{1}{3}\) (39u)
- Synthetic
  - 2u \(\frac{1}{3}\) (26u)
- Noodles
  - 10u \(\frac{1}{3}\) (30u)
- Linen
  - 2u \(\frac{1}{3}\) (14u)

30u – 26u = 4u
4u = 16
1u = 16 ÷ 4
= 4
9u = 9 × 4
= 36

There were 36 trick bikes.
Solutions to Unit 3.3 (Cont.)

Question 4

Difference between exterior and dashboard = 15u − 6u
= 9u

Amount of polish = 35u
= 35 × 0.02
= 0.7

0.7 ℓ = 700 mℓ
The bottle contained 700 mℓ of polishing liquid at first.

Question 5

Difference = 25u − 9u
= 16u

16u = 208
1u = 208 ÷ 16
= 13

75u = 75 × 13
= 975

There were 975 students at the school fun fair.

Question 6

Donald bought 120 cheese buns.

Alternative solution

Sum of money = 25 tuna buns
1u of money = 25 ÷ 5
= 5 tuna buns
8u of money = 8 × 5
= 40 tuna buns
Total cheese buns = 40 × 3
= 120 cheese buns

Solutions to Unit 3.4 Quantity x Value

Ask Yourself
1. The comparison is the number of 20-cent coins and the number of 50-cent coins; and
2. Yes. The number of coins in each group multiplies by the value of the coins.

Think Further
1. My approach will still be the same but the answer will be different.

Difference = 2.5u − 1.8u
= 0.7u

0.7u = 301
1u = 301 ÷ 0.7 = 430
1.8u = 1.8 × 430
= 774

The total value of her 50-cent coins is $774.

Let’s Practise 3.4

Question 1

<table>
<thead>
<tr>
<th>Items</th>
<th>Quantity of items</th>
<th>×</th>
<th>Value of items ($)</th>
<th>Total value ($)</th>
</tr>
</thead>
<tbody>
<tr>
<td>50-cent</td>
<td>3u</td>
<td>× 0.5</td>
<td></td>
<td>1.5u</td>
</tr>
<tr>
<td>20-cent</td>
<td>2u</td>
<td>× 0.2</td>
<td></td>
<td>0.4u</td>
</tr>
<tr>
<td>Total</td>
<td></td>
<td></td>
<td></td>
<td>1.9u</td>
</tr>
</tbody>
</table>

1.9u = 19
1u = 19 ÷ 1.9
= 10

1.5u = 1.5 × 10
= 15

The value of the 50-cents is $15.

Question 2

<table>
<thead>
<tr>
<th>Items</th>
</tr>
</thead>
<tbody>
<tr>
<td>X</td>
</tr>
<tr>
<td>Y</td>
</tr>
<tr>
<td>Z</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Items</th>
<th>Quantity of items</th>
<th>×</th>
<th>Value of items ($)</th>
<th>Total value ($)</th>
</tr>
</thead>
<tbody>
<tr>
<td>X</td>
<td>4u</td>
<td>× 1.2</td>
<td></td>
<td>4.8u</td>
</tr>
<tr>
<td>Y</td>
<td>2u</td>
<td>× 0.85</td>
<td></td>
<td>1.7u</td>
</tr>
<tr>
<td>Z</td>
<td>5u</td>
<td>× 0.6</td>
<td></td>
<td>3u</td>
</tr>
<tr>
<td>Total</td>
<td>11u</td>
<td></td>
<td></td>
<td>9.5u</td>
</tr>
</tbody>
</table>
Solutions to Unit 3.4 (Cont.)

Question 2 (Cont.)

11u = 451
1u = 451 ÷ 11
= 41

9.5u = 9.5 × 41
= 389.5

Sally collected $389.50 from the sales of all her seashells.

Question 3

<table>
<thead>
<tr>
<th>Late</th>
<th>On time</th>
</tr>
</thead>
<tbody>
<tr>
<td>4</td>
<td>16</td>
</tr>
<tr>
<td>1</td>
<td>4</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Items</th>
<th>Quantity of items</th>
<th>Value of items ($)</th>
<th>Total value ($)</th>
</tr>
</thead>
<tbody>
<tr>
<td>L</td>
<td>1u</td>
<td>3.25</td>
<td>3.25u</td>
</tr>
<tr>
<td>O</td>
<td>4u</td>
<td>5.25</td>
<td>21u</td>
</tr>
<tr>
<td>Total</td>
<td>5u</td>
<td></td>
<td>24.25u</td>
</tr>
</tbody>
</table>

24.25u = 9700
1u = 9700 ÷ 24.25
= 400
4u = 4 × 400
= 1600

1600 pizzas were delivered on time last month.

Question 4

<table>
<thead>
<tr>
<th>Items</th>
<th>Quantity of items</th>
<th>Value of items ($)</th>
<th>Total value ($)</th>
</tr>
</thead>
<tbody>
<tr>
<td>$158 tickets (sold)</td>
<td>1u</td>
<td>158</td>
<td>158u</td>
</tr>
<tr>
<td>$88 tickets (sold)</td>
<td>2u</td>
<td>88</td>
<td>176u</td>
</tr>
<tr>
<td>Total</td>
<td>3u</td>
<td></td>
<td>334u</td>
</tr>
</tbody>
</table>

334u = 78 156
1u = 78 156 ÷ 334
= 234
3u = 3 × 234
= 702

(a) 702 tickets were sold in all.

Difference = 87 636 − 78 156
= 9480
No. of another $158 tickets needed to be sold
= 9480 ÷ 158
= 60

(b) 60 more $158-tickets need to be sold to meet the targeted amount.

Question 5

<table>
<thead>
<tr>
<th>Items</th>
<th>Quantity of items</th>
<th>Value of items (stickers)</th>
<th>Total value (stickers)</th>
</tr>
</thead>
<tbody>
<tr>
<td>C</td>
<td>485</td>
<td>2u</td>
<td>970u</td>
</tr>
<tr>
<td>T</td>
<td>520</td>
<td>3u</td>
<td>1560u</td>
</tr>
<tr>
<td>Total</td>
<td>1005</td>
<td></td>
<td>2530u</td>
</tr>
</tbody>
</table>

2530u = 7590

Solutions to Review Questions on Chapter 3

Question 1

L : E+S
E : S
S : E+S

3x^2 : 7x^2
4x^7 : 5x^7
9x^3

27 : 63
28 : 35
35 : 63

Summary

L : E
E : S
27 : 28
35 : 28

At first

L : E
E : S
27 : 28
5x^7 : 4x^7

Total (end) = 35u + 28u + 35u
= 98u

98u = 588
1u = 588 ÷ 98
= 6
35u = 35 × 6
= 210

Lynette had 210 coins.

Question 2

Combining the model of S and L,

H : S + L = Total (H + S + L)
5 : 3 : 8

H : S + L = 5u
30 : 48

Combining the model of S and L,

H : S + L = Total (H + S + L)
5 : 3 : 8
Solutions to Review Questions on Chapter 3 (Cont.)

Question 2 (Cont.)

\[ 2u = 48 \]

\[ 1u = \frac{48}{2} = 24 \]

\[ 5u = 5 \times 24 = 120 \]

\[ S = 5u - 78 = 120 - 78 = 42 \]

The cost of the pair of shoes is \$42.

Question 3

\[ \text{T : C} \]

\[ 2^{3} : 3^{3} \]

\[ 6 : 5 \]

Summary

\[ \text{T : C} = 0 \]

\[ 6 : 5 \]

\[ \begin{array}{cc}
\text{At first} & \text{In the end} \\
T+C & O \\
15 & 5 \\
3 & 5 \\
12u & 12u \\
\end{array} \]

Total mass = \( 6u + 9u + 5u \)

\[ = 20u \]

\[ 20u = 11.2 \]

\[ 1u = \frac{11.2}{20} = 0.56 \]

\[ 12u = 12 \times 0.56 = 6.72 \]

6.72 kg of vegetables were used to make the beef stew.

Question 4

\[ \text{G : F+W} \]

\[ 2^{5} : 3^{5} \]

\[ 1^{3} \times 4^{3} : 5^{3} \]

\[ 10 : 15 \\
3 : 12 \\
15 : 15 \]

Summary

\[ \text{G : F} = \text{W} \]

\[ 10 : 3 : 12 \]

Geetha spent = \( 10u - 3u \)

\[ = 7u \]

Total (at first) = \( 20u + 16u \)

\[ = 36u \]

\[ 36u = 36 \times 3 = 108 \]

The total number of angel fish and clown fish in the aquarium at first was 108.

Question 5

At first

\[ \begin{array}{cc}
A : C & A : C \\
5 : 4 \times 4 : 4^{5} & 3 : 5 \\
20 & 16 \times 20 & 15 \\
\end{array} \]

\[ 1u = 3 \]

Total (at first) = \( 20u + 16u \)

\[ = 36u \]

\[ 36u = 36 \times 3 = 108 \]

The total number of angel fish and clown fish in the aquarium at first was 108.

Question 6

\[ 12u \]

\[ \begin{array}{cc}
4u^{3} (20u) & \text{Total} \\
1u^{5} (5u) & \text{T-shirt} \\
3u^{5} (15u) & \text{Remainder} \\
5u^{3} (15u) & \text{Shoes} \\
\end{array} \]

\[ \begin{array}{cc}
2u^{3} (6u) & \text{Left} \\
3u^{3} (9u) & \text{Left} \\
\end{array} \]

Before John received \$120

\[ \begin{array}{cc}
9 : 20 & \text{Total (at first)} \\
5 : 4 \times 5 : 20 & \text{Total (at first)} \\
\end{array} \]

\[ 20 \times 7.5 \]

\[ = 150 \]

John had \$150 at first.

Question 7

Profit per pair = \( 12 - 7 \)

\[ = 5 \]

Profit (1 set of 5 pairs) = \( 5 \times 4 - 7 \)

\[ = 13 \]

Profit (50 sets of 5 pairs) = \( 80 \times 13 \)

\[ = 1040 \]

Remaining earnings = \( 1540 - 1040 \)

\[ = 500 \]

a) No. of pairs sold singly = \( 500 + 5 \)

\[ = 100 \]

100 pairs of sandals were not sold in sets of 5.

Total no. of pairs = 100 + (80 \times 5)

\[ = 500 \]

b) Total cost = \( 500 \times 7 \)

\[ = 3500 \]

Daniel paid \$3500 for all the pairs of sandals.
Solutions to Review Questions on Chapter 3 (Cont.)

Question 8

L : K : A
4^3 : 5^3 : 5^6 : 5^6
12 : 15
15 : 25

Summary

L : K : A
12 : 15

At first

L : K : Tota

In the end

L : K : Tota

12 : 15 : 25

24 : 30 : 54

3u = 12
1u = 12 ÷ 3
= 4

Difference = 50u - 27u
= 23u
23u = 23 × 4
= 92

Alexis had $92 more than Kyra in the end.

Solutions to Unit 4.1 Average

Let’s Get Started

1.

Average = \frac{115+36+280+41+9+1001}{6}
= \frac{1482}{6}
= 247

The average of the numbers is 247.

2.

Average = \frac{(60×3)+(75×12)+(85×8)+(90×4)}{(3+12+8+4)}
= \frac{2120}{27}
= 78.5 (1 d.p.)

The average mark scored by each student is 78.5.

3.

Average = \frac{(480×5)+(495×10)+(510×11)+(570×6)+(595×2)}{(5×10+11+6+2)}
= \frac{17570}{34}
= 516.76 (2 d.p.)

The average amount of water used by each household is 516.76 litres.

Ask Yourself

1. Given the average mass, the total mass of the 3rd and 4th sculpture can be calculated after subtracting the mass of the 1st and 2nd sculptures from the total mass of the 4 sculptures.

Solutions to Unit 4.1 (Cont.)

Let’s Practise 4.1

Question 1

Total marks (4 subjects) = 65 × 4
= 260

Total marks (English + Science) = 65 + 64
= 129

Total marks (Math + Chinese) = 260 – 120
= 131

M

C

1u

5

3u

131

2u = 131 – 5
= 126
1u = 126 ÷ 2
= 63
1u + 5 = 63 + 5
= 68

John scored 68 marks for his Science.

Question 2

Total number of hotdogs sold from 1st June to 4th June
= 50 × 4
= 200

Total number of hotdogs sold from 5th June to 9th June
= 5 × 24
= 120

Total number of hotdogs sold from 10th June to 20th June
= $240 ÷ $2
= 120

Total number of hotdogs from 1st June to 20th June
= 200 + 120 + 120
= 440

Average number of hotdogs in 20 days = 440 ÷ 20
= 22

An average of 22 hotdogs was sold from 1st June to 20th June.

Question 3

Total number of pens bought
= (3 × 5) + (5 × 20) + (7 × 5) + (9 × 10)
= 240

Total number of children = 5 + 20 + 5 + 10
= 40

Average number of pens = 240 ÷ 40
= 6

Each child bought an average of 6 pens.

Question 4

At first (Mon)

End (Fri)

<table>
<thead>
<tr>
<th>R : N : Total</th>
<th>R : N : Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>3^11 : 4 : 7^11</td>
<td>9^7 : 2^7 : 11^7</td>
</tr>
<tr>
<td>33 : 44 : 77</td>
<td>63 : 14 : 77</td>
</tr>
</tbody>
</table>

No. of pages read on Friday = 63u – 33u
= 30u
Solutions to Unit 4.1 (Cont.)

Question 4 (Cont.)

30u = 60
1u = 60 ÷ 30
= 2
77u = 77 × 2
= 154
Average = 154 ÷ 7
= 22

John would need to read an average of 22 pages each day.

Question 5

At first

<table>
<thead>
<tr>
<th>S</th>
<th>N</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>3rd</td>
<td>5th</td>
<td>8u</td>
</tr>
<tr>
<td>27</td>
<td>45</td>
<td>72u</td>
</tr>
</tbody>
</table>

= 30u

End

<table>
<thead>
<tr>
<th>S</th>
<th>N</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>6th</td>
<td>1st</td>
<td>9u</td>
</tr>
</tbody>
</table>

= 113u

Apples sold in the next 3 days = 64u – 27u
= 37u

37u = 111
1u = 111 ÷ 37
= 3
72u = 72 × 3
= 216
Average = 216 ÷ 9
= 24

Belle sold an average of 24 apples each day.

Question 6

Total score of 23 students = 23 × 76.5
= 1759.5
Total score of next 2 highest score = 2 × 82.25
= 164.5
Total score of the top 3 highest scores = 95 + 164.5
= 259.5
Total score of 20 students = 1759.5 – 259.5
= 1500
Average score of the remaining students = 1500 ÷ 20
= 75

(a) The average score of the remaining students is 75.

New average score = 76.5 + 0.5
= 77
New total score = 77 × 24
= 1848
New score = 1848 – 1759.5
= 88.5

(b) The new student’s score is 88.5.

Solutions to Unit 4.2 (Cont.)

Ask Yourself

In this question, the number of girls in the group is unknown.

Let’s Practise 4.2

Question 1

<table>
<thead>
<tr>
<th>Number of students</th>
<th>Average amount collected ($)</th>
<th>Total amount collected ($)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Before</td>
<td>1u</td>
<td>125</td>
</tr>
<tr>
<td>After</td>
<td>1u + 15</td>
<td>113</td>
</tr>
</tbody>
</table>

B: 113u + 12u = 1275
A: 113u = 1695

12u = 1695 – 1275
= 420
1u = 420 ÷ 12
= 35
1u + 15 = 35 + 15
= 50

There were 50 students in a group.

Question 2

<table>
<thead>
<tr>
<th>Number of days</th>
<th>Average number of pages read</th>
<th>Total number of pages read</th>
</tr>
</thead>
<tbody>
<tr>
<td>Before</td>
<td>1u</td>
<td>15</td>
</tr>
<tr>
<td>After</td>
<td>1u + 4</td>
<td>17</td>
</tr>
</tbody>
</table>

B: 15u + 2u = 88
A: 15u = 68

2u = 88 – 68
= 20
1u = 20 ÷ 2
= 10

Days read in all = 1u + 4
= 10 + 4
= 14

John read for 14 days in all altogether.

Question 3

Method 1

<table>
<thead>
<tr>
<th>Number of babies</th>
<th>Average mass (kg)</th>
<th>Total mass (kg)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Before</td>
<td>1u</td>
<td>3.2</td>
</tr>
<tr>
<td>After</td>
<td>1u + 1</td>
<td>3.4</td>
</tr>
</tbody>
</table>

B: 3.2u + 0.2u = 5.8
A: 3.2u = 6.4

3.4u – 3.2u = 0.2u
0.2u = 5.8 – 3.4
= 2.4
1u = 2.4 ÷ 0.2
= 12

There were 12 babies in the nursery.
Solutions to Unit 4.2 (Cont.)

Question 3 (Cont.)

Method 2
Difference in mass of the new baby = 5.8 – 3.4 = 2.4
Average change with the new baby = 3.4 – 3.2 = 0.2

Number of babies = 2.4 ÷ 0.2 = 12
There were 12 babies in the nursery.

Question 4

Method 1

<table>
<thead>
<tr>
<th>Number pairs of chopsticks</th>
<th>Average price ($)</th>
<th>Total price ($)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Before</td>
<td>1u</td>
<td>12.5</td>
</tr>
<tr>
<td>After</td>
<td>1u + 2</td>
<td>15.75</td>
</tr>
</tbody>
</table>

B

- 12.5u
- 16 + 35 = 51

A

- 12.5u
- 3.25u
- 31.5

3.25u = 51 – 31.5 = 19.5
1u = 19.5 ÷ 3.25 = 6

Nisa bought 6 pairs of stainless steel chopsticks for her friends.

Method 2

Difference in the cost of 1 pair of silver and 1 pair of gold-plated chopsticks = ($16 + $35) – ($15.75 × 2)
= $19.50
Average change = $15.75 – $12.50
= $3.25
Number of stainless steel chopsticks bought
= $19.50 ÷ $3.25
= 6

Nisa bought 6 pairs of stainless steel chopsticks for her friends.

Question 5

<table>
<thead>
<tr>
<th>Number of friends</th>
<th>Average points</th>
<th>Total points</th>
</tr>
</thead>
<tbody>
<tr>
<td>Before</td>
<td>1u + 1</td>
<td>38</td>
</tr>
<tr>
<td>After</td>
<td>1u</td>
<td>36</td>
</tr>
</tbody>
</table>

B

- 36u
- 2u
- 38

A

- 36u
- 48

2u = 48 – 38
= 10
1u = 10 ÷ 2
= 5

5 of Jennifer’s friends took part in the quiz.

Solutions to Unit 4.2 (Cont.)

Question 6

<table>
<thead>
<tr>
<th>Number of people</th>
<th>Average marks</th>
<th>Total marks</th>
</tr>
</thead>
<tbody>
<tr>
<td>C1</td>
<td>1u</td>
<td>90</td>
</tr>
<tr>
<td>C2</td>
<td>1u</td>
<td>87</td>
</tr>
</tbody>
</table>

Difference = 90u – 87u = 3u
Gap = 5 + 13 = 18
3u = 18
1u = 18 ÷ 3 = 6
6 – 1 = 5
Harith has 5 friends.

Solutions to Unit 4.3 Average with Repeated Items

Let’s Get Started

1. Total seashells of M and K = 8 × 2

<table>
<thead>
<tr>
<th></th>
<th>M</th>
<th>L</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Difference = 16 – 12 = 4
(a) Kim had 4 more seashells than Lisa.
   Number of seashells Kim had = 7 + 4
   = 11
(b) Kim had 11 seashells.

2. Total number of cars of D and M = 20 × 2

<table>
<thead>
<tr>
<th></th>
<th>M</th>
<th>K</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Difference = 16 – 12 = 4
(a) Keith had 17 toy cars.
   Number of cars Keith had = 57 – 40
   = 17
(b) Danny had 18 toy cars.
Solutions to Unit 4.3 (Cont.)

Ask Yourself
1. The repeated items are Louisa and Fanny.

Let’s Practise 4.3

Question 1

Total tags (D + C) = 203 × 2
= 406

Total tags (E + C) = 194 × 2
= 388

Total tags (E + D) = 181 × 2
= 362

Total tags (2D + 2C + 2E) = 406 + 388 + 362
= 1156

Total tags (D + C + E) = 1156 ÷ 2
= 578

E = 578 – 406
= 172

C = 388 – 172
= 216

D = 362 – 172
= 190

Dave, Cherrie and Elaine had 190 tags, 216 tags and 172 tags respectively.

Question 2

<table>
<thead>
<tr>
<th>Average score (points)</th>
<th>Total score (points)</th>
</tr>
</thead>
<tbody>
<tr>
<td>S + M</td>
<td>77</td>
</tr>
<tr>
<td>R + M</td>
<td>71.5</td>
</tr>
<tr>
<td>S + M + A</td>
<td>73</td>
</tr>
<tr>
<td>A + R</td>
<td>69</td>
</tr>
</tbody>
</table>

Ada’s score = 219 – 154
= 65

Risa’s score = 138 – 65
= 73

Mayo’s score = 143 – 73
= 70

Sally’s score = 154 – 70
= 84

Sally, Mayo, Ada and Risa scored 84 points, 70 points, 65 points and 73 points respectively.

Question 3

Total number of door knobs produced by A and B weekly = 3486 × 2
= 6972

Total number of door knobs produced by A and C weekly = 6586 × 2
= 13 172

Difference in the number of door knobs produced between B and C weekly = 13 172 – 6972
= 6200

Difference in units between B and C = 7u – 2u
= 5u

5u = 6200

Solutions to Unit 4.3 (Cont.)

Question 3 (Cont.)

1u = 6200 ÷ 5
= 1240

2u = 2 × 1240
= 2480 (Factory B)

Factory A = 6972 – 2480
= 4492

Factory A produces 4492 door knobs weekly.

Question 4

<table>
<thead>
<tr>
<th>L</th>
<th>1u</th>
<th>3</th>
<th>8</th>
<th>15</th>
</tr>
</thead>
<tbody>
<tr>
<td>R</td>
<td>1u</td>
<td>3</td>
<td>8</td>
<td></td>
</tr>
<tr>
<td>E</td>
<td>1u</td>
<td>3</td>
<td></td>
<td></td>
</tr>
<tr>
<td>H</td>
<td>1u</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Total number of perfume bottles collected = 4 × 25
= 100

(3 × 3) + (2 × 8) + 15 = 40

4u = 100 – 40
= 60

1u = 60 ÷ 4
= 15

Total number of perfume bottles collect by R+E+H = 3u + 14
= 3 × 15 + 14
= 59

Average number of perfume bottles collect by R+E+H = 59 ÷ 3
= 19 u

= 20 (nearest whole number)
The average number of perfume bottles collect by Rachel, Eileen and Henna is 20.

Solutions to Unit 4.4 Rate

Let’s Get Started 4.4

2. (a) $2.50
(b) 25 000 km × 4 = $100 000 km

3. (a) $2.50
(b) 1.45 p.m. to 2.45 p.m. → $2.50
2.45 p.m. to 3.15 p.m. → $1.00
Total parking fee = $2.50 + $1.00
= $3.50
(c) 1.45 p.m. to 2.45 p.m. → $2.50
2.45 p.m. to 3.15 p.m. → $1.00
3.15 p.m. to 3.30 p.m. → $1.00
Total parking fee = $2.50 + $1.00 + $1.00
= $4.50

Ask Yourself
1. Break down the time using a timeline.

Let’s Practise 4.4

Question 1

3.40 p.m. to 4.40 p.m. → $8.50
4.40 p.m. to 5.10 p.m. → $3.50
5.10 p.m. to 5.40 p.m. → $3.50
5.40 p.m. to 6.10 p.m. → $3.50
6.10 p.m. to 6.25 p.m. → $3.50

Total amount paid = $8.50 + (4 × $3.50)
= $22.50

Kyra had to pay $22.50.
Solutions to Unit 4.4 (Cont.)

Question 2

<table>
<thead>
<tr>
<th>Plan A</th>
<th>Plan B</th>
</tr>
</thead>
<tbody>
<tr>
<td>First 30 min → 30 × $0.15 = $4.50</td>
<td>First 30 min → 30 × $0.20 = $6</td>
</tr>
<tr>
<td>3 h 40 min = 220 min</td>
<td>3 h 40 min = 220 min</td>
</tr>
<tr>
<td>Subsequent time</td>
<td>Subsequent time</td>
</tr>
<tr>
<td>= 220 min – 30 min</td>
<td>= 220 min – 30 min</td>
</tr>
<tr>
<td>= 190 min</td>
<td>= 190 min</td>
</tr>
<tr>
<td>Subsequent charges</td>
<td>Subsequent charges</td>
</tr>
<tr>
<td>→ $0.25 × 190</td>
<td>→ $0.15 × 190</td>
</tr>
<tr>
<td>= $47.50</td>
<td>= $28.50</td>
</tr>
<tr>
<td>Total charges</td>
<td>Total charges</td>
</tr>
<tr>
<td>= $20 + $4.50 + $47.50</td>
<td>= $25 + $6 + $28.50</td>
</tr>
<tr>
<td>= $72</td>
<td>= $59.50</td>
</tr>
</tbody>
</table>

Difference → $72 – $59.50 = $12.50

The difference she had to pay is $12.50.

Question 3

0.5 hour → 2100 toys
1 hour → 4200 toys
2 hours → 8400 toys
It can make 8400 toys in 2 hours.

Question 4

80 words → 1.5 min
400 words → 5 × 1.5 min = 7.5 min
She would take 7.5 min.

Question 5

First 1 kg → $4.50
Subsequent
1 kg → $3.50
1 kg → $3.50
750 g → $3.50
Total → $4.50 + (3 × $3.50) = $15
Sam has to pay $15.

Question 6

60 min → 960 litres
1 min → 960 litres ÷ 60 = 16 litres
5 min → 5 × 16 litres = 80 litres
There is 80 litres of water in the tank after 5 minutes.

Solutions to Unit 5.1 Finding Unknown Angles

Let’s Get Started

1. Using the property that the sum of angles on a straight line is 180°,
   \[\angle y = 180° - 112° = 68°\]
2. Using the property that vertically opposite angles between straight lines are equal (or the same),
   \[\angle p = 46°, \quad \angle q = 39°\]

Ask Yourself

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

Solutions to Unit 5.1 (Cont.)

Think Further

1. From the given ratios, \(\angle c\) is the repeated item/subject. Hence, form a relationship between the two sets of ratios where the ratio representing \(\angle c\) is made the same in both ratios.

\[
\frac{\angle a}{2^2} : \frac{\angle c}{1^2} : \frac{\angle b}{3} = \frac{\angle c}{2} \quad \text{Summary}
\]

Let’s Practise 5.1

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° ÷ 3 = 20°
\[\angle a = 2u \quad = 2 \times 20° \quad = 40°\]
\[\angle b = 1u \quad = 20°\]

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° ÷ 5 = 18°
\[\angle m = 2u \quad = 2 \times 18° \quad = 36°\]
\[\angle n = 3u \quad = 3 \times 18° \quad = 54°\]

Question 3

Using the property of vertically opposite angles,
\[\angle a + \angle b = 126°\]
3u = 126°
1u = 126° ÷ 3 = 42°
\[\angle a = 2u \quad = 2 \times 42° \quad = 84°\]
\[\angle b = 42°\]

Question 4

Using the property of vertically opposite angles,
\[\angle m + \angle n + 40° = 135°\]
\[\angle m + \angle n = 135° - 40° = 95°\]
Solutions to Unit 5.1 (Cont.)

Question 4 (Cont.)
5u = 95°
1u = 95° ÷ 5 = 19°
∠m = 3 × 19° = 57°
∠n = 2 × 19° = 38°

Question 5
Using the property of vertically opposite angles,
∠a = 88°
∠b = 88° ÷ 2
= 44° (given: half that of ∠a)
∠a + ∠b = 88° + 44° = 132°

Using the property that the sum of angles on a straight line is 180°,
∠a + ∠b + ∠c = 180°
∠c = 180° − 132° = 48°

Question 6
∠XNY = 115° (Vertically opposite angles)
∠a = 180° − 115° − 42.5° = 22.5° (Sum of angles in a triangle)
∠b = 92.5° (Exterior angles)
∠MKY = 180° − 45° − 92.5° = 42.5° (Angles on a straight line)
∠c = 115° + 42.5° = 157.5° (Exterior Angles)

Solutions to Unit 5.2 Finding Angles in Plane Figures

Let’s Get Started
Question 1
(a) There are two pairs of parallel lines i.e. AB // CD and AC // BD.
(b) ∠ACD = ∠ABD and ∠BAC = ∠BDC
(c) ∠BAC + ∠ACD = 180°, ∠ABD + ∠CDB = 180°,
∠CAB + ∠ABD = 180° and ∠BDC + ∠DCA = 180°.

Question 2
(a) There are two pairs of parallel lines i.e. AB // DC and AD // BC.
(b) ∠ABC = ∠ADC and ∠BAD = ∠BCD
(c) ∠BAD + ∠ABC = 180°, ∠ABC + ∠BCD = 180°,
∠BCD + ∠ADC = 180° and ∠CDA + ∠DAB = 180°.

Question 3
(a) There is 1 pair of parallel lines i.e. CD // BA.
(b) There are no angles that are the same.
(c) ∠ADC + ∠BAD = 180° and ∠DCB + ∠ABC = 180°

Question 4
Using the property that the sum of interior angles between a pair of parallel lines add up to 180°,
∠SRU + 37° = 180°
∠SRU = 180° − 37° = 143°

Solutions to Unit 5.2 (Cont.)

Question 4 (Cont.)
Using the property of the sum of angles at a point is 360°,
∠QRS + 143° + 68° = 360°
143° + 68° = 211°
∠QRS = 360° − 211° = 149°

Using the property that the sum of interior angles between a pair of parallel lines add up to 180°,
∠k + ∠QRS = 180°
∠k + 149° = 180°
∠k = 180° − 149° = 31°

Question 5
Using the property that the sum of angles on a straight line is 180°,
∠a + 52° + 55° = 180°
55° + 52° = 107°
∠a = 180° − 107° = 73°

Method 1
∠a + 52° + ∠c = 180° (Internal angles)
73° + 52° + ∠c = 180°
73° + 52° = 125°
∠c = 180° − 125° = 55°

Method 2
Using the property of corresponding angles,
∠c = 55°

Using the property that the sum of angles in a triangle is 180°,
∠b + 55° + 73° = 180°
55° + 73° = 128°
∠b = 180° − 128° = 52°

Question 6
Using the property that the sum of interior angles between a pair of parallel lines add up to 180°,
107° + ∠BCD = 180°
∠BCD = 180° − 107° = 73°
∠DCF = 73°
∠n = 180° − 73° = 107° (Interior Angles)

Using the property that the sum of angles on a straight line is 180°,
∠n + ∠m = 180°
∠m = 180° − 107° = 73°

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.
Solutions to Unit 5.2 (Cont.)

Let's Practise 5.2 (Cont.)

Question 1

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

(a) $\angle CBD = 45^\circ$

$\angle BDC = 45^\circ$

$\angle CBD : \angle BDC = 1 : 1$

(b) The ratio is $1 : 1$.

Question 2

Using the property that the sum of angles on a straight line is $180^\circ$,

$\angle BED + 65^\circ = 180^\circ$

$\angle BED + 65^\circ = 180^\circ - 65^\circ$

$\angle BED = 115^\circ$

Using the property that Triangle BED is an isosceles triangle and that the sum of angles in a triangle is $180^\circ$,

$\angle DBE = \angle EDB$

$\angle EDB = \frac{180^\circ - 115^\circ}{2}$

$\angle EDB = 32.5^\circ$

Question 3

Using the property that the sum of angles in a triangle is $180^\circ$,

$\angle ECH + 70^\circ + 90^\circ = 180^\circ$

$70^\circ + 90^\circ = 160^\circ$

$\angle ECH = 180^\circ - 160^\circ$

$\angle ECH = 20^\circ$

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

$\angle ACB = 45^\circ$

$\angle ACE = 45^\circ - 20^\circ$

$\angle ACE = 25^\circ$

Question 4

Using the property that the sum of angles on a straight line is $180^\circ$,

$\angle HED = 180^\circ - 60^\circ$

$\angle HED = 120^\circ$

$\angle HDE = 45^\circ$

$\angle DHE = 180^\circ - 120^\circ - 45^\circ$

$\angle DHE = 15^\circ$

$\angle BHC = 180^\circ - 90^\circ - 45^\circ - 15^\circ$

$\angle BHC = 30^\circ$

$\angle HBC = \frac{180^\circ - 30^\circ}{2}$

$\angle HBC = 75^\circ$

Question 5

Using the property that Triangle BDF is an isosceles triangle and that the sum of angles in a triangle is $180^\circ$,

$\angle BFD + \angle BDF + 30^\circ = 180^\circ$

$\angle BFD = \frac{180^\circ - 30^\circ}{2}$

$\angle BFD = 75^\circ$

Question 6

Using the property that the sum of angles in a triangle is $180^\circ$,

$\angle LCFD + 65^\circ + 90^\circ = 180^\circ$

$65^\circ + 90^\circ = 155^\circ$

$\angle LCFD = 180^\circ - 155^\circ$

$\angle LCFD = 25^\circ$

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

$\angle BFC + 25^\circ = 45^\circ$

$\angle BFC = 45^\circ - 25^\circ$

$\angle BFC = 20^\circ$

Question 7

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.

$\angle CDB = \angle CDB = \angle ADB$

$\angle ADB = \frac{180^\circ - 45^\circ}{2}$

$\angle ADB = 67.5^\circ - 30^\circ$

$\angle ADB = 37.5^\circ$

Question 8

$\angle EDB = 118^\circ$

$\angle EBD = \frac{180^\circ - 118^\circ}{2}$

$\angle EBD = 31^\circ$

$\angle BDC = 180^\circ - 118^\circ$

$\angle BDC = 62^\circ$ (Angles on a straight line)

$\angle DBC = 180^\circ - 62^\circ - 62^\circ$

$\angle DBC = 56^\circ$

$\angle EBC = 31^\circ + 56^\circ$

$\angle EBC = 87^\circ$
Solutions to Unit 5.2 (Cont.)

Question 9
\[ \angle B E C = 180° - 100° - 10° \]
\[ = 70° \text{ (Sum of angles in a triangle)} \]
\[ \angle A F D \text{ (Corresponding angles)} \]

Question 10
Using the property that opposite angles in a parallelogram are equal.
\[ \angle A E C = 75° \]
(a) \[ \angle A E D = 180° - 75° \]
\[ = 105° \]
\[ \angle A E F = 35° \text{ (Alternate angles)} \]
(b) \[ \angle F E C = 75° - 35° \]
\[ = 40° \]

Question 11
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,
(a) \[ \angle C D B = 60° \]
Since AF = AE, ABEF and BCDE are identical rhombuses,
(b) \[ \angle E A K = 60° - 50° \]
\[ = 10° \]

Question 12
\[ \angle E F C = 180° - 50° \]
\[ = 130° \text{ (Interior angles)} \]
\[ \angle G F A = 130° \text{ (Vertically opposite angles)} \]
\[ \angle A G F = \frac{180° - 130°}{2} \]
\[ = 25° \text{ (Sum of angles in an isosceles triangle)} \]
\[ \angle G H B = 180° - 25° - 78° \]
\[ = 77° \text{ (Sum of angles in a triangle)} \]

Question 13
Using the property that the sum of angles in isosceles triangle is 180°,
30° + 30° = 60°
\[ \angle A C B = 180° - 60° \]
\[ = 120° \]
Using the property of vertically opposite angles,
\[ \angle D C E = 120° \]
\[ \angle D C E = \angle C E D \]
\[ = \frac{180° - 120°}{2} \]
\[ = 30° \]
Using the property of vertically opposite angles,
\[ \angle F E K = 30° \]
\[ \angle G E K = 30° - 18° \]
\[ = 12° \]
Using the property that the sum of angles on a straight line is 180°,
\[ \angle E G K = 180° - 105° \]
\[ = 75° \]
Using the property that the sum of angles in a triangle is 180°.

Solutions to Unit 5.2 (Cont.)

Question 13 (Cont.)
12° + 75° = 87°
\[ \angle G K E = 180° - 87° \]
\[ = 93° \]
\[ \angle G K J = 180° - 93° \]
\[ = 87° \]
Using the property that the sum of angles in a triangle is 180°,
30° + 93° = 123°
\[ \angle E F K = 180° - 123° \]
\[ = 57° \]

Question 14
Using the property that the sum of interior angles between a pair of parallel lines add up to 180°,
\[ \angle A C D = 180° - 47° \]
\[ = 133° \]
Using the property that the sum of angles in a triangle is 180°,
\[ \angle A D C = 180° - 133° - 13° \]
\[ = 34° \]
\[ \angle C A B = 180° - 78° \times 2 \]
\[ = 47° \]
\[ \angle G A D = 47° - 13° \]
\[ = 34° \]

Question 15
Using the property that the sum of angles in a triangle is 180° and Triangle BGF is an isosceles triangle,
\[ \angle B F G = \angle B G F \]
\[ = \frac{180° - 24°}{2} \]
\[ = 78° \]
Using the property that the sum of angles on a straight line is 180°,
78° + 39° + 49° = 166°
\[ \angle C F D = 180° - 166° \]
\[ = 14° \]
\[ \angle D C E = 63° \text{ (Corresponding angles)} \]
\[ \angle D C F = 180° - 63° \]
\[ = 117° \text{ (Interior angles)} \]

Solutions to Unit 6.1 Triangles with Common Base or Height

1. Height: AB
2. Base: AB; Height: CD
3. Base: AB; Height: GF
4. Area of A = \( \frac{1}{2} \times 4 \text{ cm} \times 3 \text{ cm} \)
\[ = 6 \text{ cm}^2 \]
Area of B = \( \frac{1}{2} \times 6 \text{ cm} \times 1 \text{ cm} \)
\[ = 3 \text{ cm}^2 \]
Area of C = \( \frac{1}{2} \times 2 \text{ cm} \times 4 \text{ cm} \)
\[ = 4 \text{ cm}^2 \]
5. (a) Area of the shaded triangle
\[ = \frac{1}{2} \times 6 \text{ cm} \times 5 \text{ cm} \]
\[ = 15 \text{ cm}^2 \]
(b) Area of the shaded triangle

\[ \frac{1}{2} \times 5 \text{ cm} \times 6 \text{ cm} \]

\[ = 15 \text{ cm}^2 \]

Let’s Get Started 6.1

2. (a) Method 1

Area of Triangle A = \[ \frac{1}{2} \times 22 \text{ cm} \times 20 \text{ cm} \]

\[ = 220 \text{ cm}^2 \]

Area of Triangle B = \[ \frac{1}{2} \times 22 \text{ cm} \times 30 \text{ cm} \]

\[ = 330 \text{ cm}^2 \]

Total area of Triangles A and B = \[ 220 \text{ cm}^2 + 330 \text{ cm}^2 \]

\[ = 550 \text{ cm}^2 \]

Method 2

Total area = \[ \frac{1}{2} \times 22 \text{ cm} \times 50 \text{ cm} \]

\[ = 550 \text{ cm}^2 \]

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

3. Area of the shaded part = \[ \frac{1}{2} \times (10 \text{ cm} \times 5 \text{ cm} \]

\[ = 25 \text{ cm}^2 \]

OR

\[ \frac{1}{2} \times \text{common base} \times \text{combined height} \]

\[ = \frac{1}{2} \times 5 \text{ cm} \times 10 \text{ cm} \]

\[ = 25 \text{ cm}^2 \]

4. Area of Triangle ABC = \[ \frac{1}{2} \times 20 \text{ cm} \times (25 - 12) \text{ cm} \]

\[ = 130 \text{ cm}^2 \]

Area of Triangle ABD = \[ \frac{1}{2} \times 20 \text{ cm} \times 25 \text{ cm} \]

\[ = 250 \text{ cm}^2 \]

Ratio = 130 : 250

\[ = 13 : 25 \]

(Notice that the ratio of the two areas of triangles sharing a common base is actually the same as the ratio of its height.)

5. Area of the shaded triangles

\[ \frac{1}{2} \times 12 \text{ cm} \times (14 - 5) \text{ cm} + \frac{1}{2} \times 12 \text{ cm} \times (10 - 5) \text{ cm} \]

\[ = 84 \text{ cm}^2 \]

Ask Yourself

1. The height of both triangles are the same.

Let’s Practise 6.1

Question 1

Total area of the unshaded triangles

\[ \frac{1}{2} \times 20 \text{ cm} \times 10 \text{ cm} \]

\[ = 100 \text{ cm}^2 \]

Question 2

Total area of the unshaded triangles

\[ \frac{1}{2} \times 24 \text{ cm} \times 18 \text{ cm} \]

\[ = 216 \text{ cm}^2 \]

Solution 3

Total area of the shaded triangles

\[ \frac{1}{2} \times (9 + 7 + 3) \text{ cm} \times 6 \text{ cm} \]

\[ = 57 \text{ cm}^2 \]

Question 4

Total area of the 3 shaded triangles

\[ \frac{1}{2} \times (15 + 2) \text{ cm} \times 18 \text{ cm} \]

\[ = 153 \text{ cm}^2 \]

Question 5

Total area of the shaded triangles

\[ \frac{1}{2} \times 20 \text{ cm} \times (10 + 5) \text{ cm} \]

\[ = 150 \text{ cm}^2 \]

Question 6

Total area of the shaded triangles

\[ \frac{1}{2} \times 32 \text{ cm} \times 28 \text{ cm} \]

\[ = 448 \text{ cm}^2 \]

Question 7

Total area of the shaded triangles

\[ \frac{1}{2} \times (10 + 15) \text{ cm} \times 20 \text{ cm} \]

\[ = 250 \text{ cm}^2 \]

Question 8

Total area of the unshaded triangles

\[ \frac{1}{2} \times 15 \text{ cm} \times 48 \text{ cm} \]

\[ = 360 \text{ cm}^2 \]

Question 9

Total area of the shaded triangles

\[ \frac{1}{2} \times (10 + 8) \text{ cm} \times 20 \text{ cm} \]

\[ = 180 \text{ cm}^2 \]

Question 10

Total area of the unshaded parts of the figure

\[ (11 + 20) \text{ cm} \times 18 \text{ cm} - \frac{1}{2} \times 20 \text{ cm} \times 18 \text{ cm} \]

\[ = 378 \text{ cm}^2 \]

Question 11

Total area of the shaded parts

\[ \frac{1}{2} \times (26 + 26) \text{ cm} \times 26 \text{ cm} \]

\[ = 676 \text{ cm}^2 \]

Question 12

Area of A = Area of B + C

Area of A = \[ \frac{1}{2} \times 18 \text{ cm} \times 18 \text{ cm} \]

\[ = 162 \text{ cm}^2 \]

Area of D + E = \[ \frac{1}{2} \times (18 + 18) \text{ cm} \times 18 \text{ cm} \]

\[ = 324 \text{ cm}^2 \]

Total area of the shaded parts (A + B + C + D + E) = \[ 162 \text{ cm}^2 + 162 \text{ cm}^2 + 324 \text{ cm}^2 \]

\[ = 648 \text{ cm}^2 \]

Question 13

Length of square = \[ \sqrt{64} \text{ cm} \]

\[ = 8 \text{ cm} \]

PX = PY = \[ 8 \text{ cm} + 2 \]

\[ = 4 \text{ cm} \]

Area of Triangle PXY = \[ \frac{1}{2} \times 4 \text{ cm} \times 4 \text{ cm} \]

\[ = 8 \text{ cm}^2 \]

Area of Triangle RSY = \[ \frac{1}{2} \times 8 \text{ cm} \times 4 \text{ cm} \]

\[ = 16 \text{ cm}^2 \]
Solutions to Unit 6.1 (Cont.)

Question 13 (Cont.)

Area of Triangle QRX = $\frac{1}{2} \times 4 \text{ cm} \times 8 \text{ cm}$

$= 16 \text{ cm}^2$

Area of the shaded triangle

$= 64 \text{ cm}^2 - 8 \text{ cm}^2 - 16 \text{ cm}^2 - 16 \text{ cm}^2$

$= 24 \text{ cm}^2$

Solutions to Unit 6.2 Triangles with Composite Figures

Let’s Get Started 6.2

1. Area of the square

$= 2 \times \frac{1}{2} \times 48 \text{ cm} \times (48 \div 2) \text{ cm}$

$= 1152 \text{ cm}^2$

2. Height of each identical triangle $= 20 \div 2$

$= 10$

Area of figure $= 8 \times \frac{1}{2} \times 9 \text{ cm} \times 10 \text{ cm}$

$= 360 \text{ cm}^2$

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

$= 450 \text{ cm}^2$

Ask Yourself

1. The sum of the 3 triangles on each side of diagonal line is the same.

Think Further

1. If the figure is made up of 6 identical triangles, then the area of Triangle F would be found using the formula:

$\frac{1}{2} \times \text{base length} \times \text{height}$

Let’s Practise 6.2

Question 1

Area of Figure $= 24 \text{ cm} \times 24 \text{ cm}$

$= 576 \text{ cm}^2$

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

$= 72 \text{ cm}^2$

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

$= 54 \text{ cm}^2$

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

$= 36 \text{ cm}^2$

Area of Triangle D is the same as Area of Triangle A

$= 72 \text{ cm}^2$

Area of shaded area

$= 576 \text{ cm}^2 - 72 \text{ cm}^2 - 54 \text{ cm}^2 - 36 \text{ cm}^2 - 72 \text{ cm}^2$

$= 324 \text{ cm}^2$

Question 2

Area of shaded Triangle A

$= \frac{1}{2} \times 6 \text{ cm} \times (12 - 5) \text{ cm}$

$= 21 \text{ cm}^2$

Solutions to Unit 6.2 (Cont.)

Question 2 (Cont.)

Area of shaded Triangle B

$= \frac{1}{2} \times 11 \text{ cm} \times 12 \text{ cm} + \frac{1}{2} \times 11 \text{ cm} \times 8 \text{ cm}$

$= 110 \text{ cm}^2$

Question 3

Total units $= 4u + 3u + 2u$

$= 9u$

9u $= 36 \text{ cm}$

1u $= 36 \text{ cm} \div 9$

$= 4 \text{ cm}$

AH $= 4 \times 4 \text{ cm}$

$= 16 \text{ cm}$

HG $= 3 \times 4 \text{ cm}$

$= 12 \text{ cm}$

GF $= 2 \times 4 \text{ cm}$

$= 8 \text{ cm}$

Total area of Triangle ABH and Triangle BHC

$= \frac{1}{2} \times 16 \text{ cm} \times 10 \text{ cm}$

$= 80 \text{ cm}^2$

Area of Triangle BCH and Triangle DCE

$= \frac{1}{2} \times 12 \text{ cm} \times 10 \text{ cm}$

$= 60 \text{ cm}^2$

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

$= 40 \text{ cm}^2$

Area of the figure

$= 80 \text{ cm}^2 + 60 \text{ cm}^2 + 40 \text{ cm}^2 + 110 \text{ cm}^2$

$= 290 \text{ cm}^2$

Question 4

\[
\begin{array}{ccc}
\text{AB} & : & \text{EF} & : & \text{CD} & : & \text{AB} \\
1^3 & : & 2^3 & : & 6 & : & 3 \\
3 & : & 6 & : & 2 \\
\end{array}
\]

Summary ratio

\[
\begin{array}{ccc}
\text{AB} & : & \text{EF} & : & \text{CD} \\
3 & : & 6 & : & 2 \\
\end{array}
\]

Difference $= 6u - 2u = 4u$

4u $= 12 \text{ cm}$

1u $= 12 \text{ cm} \div 4$

$= 3 \text{ cm}$

AB $= 3 \times 3 \text{ cm}$

$= 9 \text{ cm}$

Area of figure $= \frac{1}{2} \times 10 \text{ cm} \times (9 + 12) \text{ cm}$

$= 105 \text{ cm}^2$

Alternative solution

Area of Triangle AEH $= \frac{1}{2} \times 10 \text{ cm} \times 9 \text{ cm}$

$= 45 \text{ cm}^2$

Area of Triangle EGC $= \frac{1}{2} \times 10 \text{ cm} \times (18 \text{ cm} - 6 \text{ cm})$

$= 60 \text{ cm}^2$

Area of figure $= 45 \text{ cm}^2 + 60 \text{ cm}^2$

$= 105 \text{ cm}^2$

Question 5

\[
\begin{array}{c}
\text{AB} = \frac{3}{4} \times 200 \text{ m} \\
= 75 \text{ m}
\end{array}
\]
Solutions to Unit 6.2 (Cont.)

Question 5 (Cont.)

(a) Cost of building the picnic area
   \[= 75 \text{ m} \times 75 \text{ m} \times $20\]
   \[= $112,500\]

(b) Cost of fencing the fountain
   \[= (250 \text{ m} + 150 \text{ m} + 200 \text{ m}) \times $12\]
   \[= $7,200\]

Question 6

Area of square = 20 m × 20 m
   \[= 400 \text{ m}^2\]

Area of A = \[\frac{1}{2} \times 400 \text{ m}^2 - \frac{1}{2} \times 20 \text{ m} \times (20 - 7) \text{ m}\]
   \[= 270 \text{ m}^2\]

Area of C = \[\frac{1}{2} \times 20 \text{ m} \times (15 - 13) \text{ m}\]
   \[= 20 \text{ m}^2\]

Difference = 270 \text{ m}^2 - 20 \text{ m}^2
   \[= 250 \text{ m}^2\]

Question 7

Base length of Triangle B and Triangle C
   \[= 70 \text{ m}^2 \times \frac{2}{7} \text{ m}\]
   \[= 20 \text{ m}\]

Area of A = 28 m × 20 m - 70 \text{ m}^2
   \[= 490 \text{ m}^2\]

Area of D = \[\frac{1}{2} \times (28 \text{ m} - 21 \text{ m}) \times 8 \text{ m}\]
   \[= 28 \text{ m}^2\]

Sum of areas of A and D = 490 \text{ m}^2 + 28 \text{ m}^2
   \[= 518 \text{ m}^2\]

Question 8

Area of Rectangle FBCD = 2 × 52 cm²
   \[= 104 \text{ cm}^2\]

Area of Triangle ABF = \[\frac{1}{2} \times 52 \text{ cm}^2\]
   \[= 26 \text{ cm}^2\]

Area of Triangle FDE = 52 cm²

Sum of areas of A, B, and D = 104 cm² + 26 cm² + 52 cm²
   \[= 182 \text{ cm}^2\]

Question 9

Area of the entire figure = 3 × 100 cm²
   \[= 300 \text{ cm}^2\]

Question 10

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

Length of small square = \[\sqrt{144}\]
   \[= 12 \text{ cm}\]

Area of big square = 24 cm × 24 cm
   \[= 576 \text{ cm}^2\]

Area of unshaded parts = \[\frac{1}{2} \times 24 \text{ cm} \times 24 \text{ cm}\]
   \[= 288 \text{ cm}^2\]

Fraction = \[\frac{576 - 288 + 144}{576}\]
   \[= \frac{1}{4}\]

\[\frac{1}{4}\] of the figure is made up of the shaded triangles.

Solutions to Unit 6.2 (Cont.)

Question 11

Area of Triangle BCJ and Triangle CDE
   \[= 2 \times \frac{1}{2} \times 20 \text{ cm} \times 10 \text{ cm}\]
   \[= 200 \text{ cm}^2\]

Area of Triangle GJE = \[\frac{1}{2} \times 30 \text{ cm} \times 10 \text{ cm}\]
   \[= 150 \text{ cm}^2\]

Area of Triangle ABG = \[\frac{1}{2} \times 20 \text{ cm} \times 20 \text{ cm}\]
   \[= 200 \text{ cm}^2\]

Area of two big squares = 2 × 20 cm × 20 cm
   \[= 800 \text{ cm}^2\]

Total area of shaded parts
   \[= 800 \text{ cm}^2 - (150 \text{ cm}^2 + 200 \text{ cm}^2 + 200 \text{ cm}^2)\]
   \[= 250 \text{ cm}^2\]

Question 12

Area of unshaded parts of Triangle ABC
   \[= \frac{1}{2} \times 36 \text{ cm} \times (18 - 5) \text{ cm} - 125 \text{ cm}^2\]
   \[= 109 \text{ cm}^2\]

Question 13

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

Area of A = 22 cm² + 24 cm² + 16 cm²
   \[= 62 \text{ cm}^2\]

Area of F = 62 cm² - 21 cm² - 18 cm²
   \[= 23 \text{ cm}^2\]

Solutions to Unit 7.1 More than/Less than

Let’s Get Started 7.1

<table>
<thead>
<tr>
<th>S/N</th>
<th>Sentence</th>
<th>What should we do?</th>
<th>Ratio</th>
<th>Model drawing</th>
</tr>
</thead>
<tbody>
<tr>
<td>2</td>
<td>E has 50% more money than F.</td>
<td>Step 1: Convert the percentage into fraction in its simplest form.</td>
<td>E : F 3 : 2</td>
<td>E [\frac{3}{2} \text{ units}] F [\frac{2}{2} \text{ units}]</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Step 2: Find the relationship between E and F.</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Step 3: Express the relationship in the form of ratio of draw models if you prefer.</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

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<thead>
<tr>
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<th>Ratio</th>
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</tr>
</thead>
<tbody>
<tr>
<td>3</td>
<td>P has 80% more than R. R has $125 more than J.</td>
<td>Step 1: Convert the percentage into fraction in its simplest form.</td>
<td>P : R 9 : 5</td>
<td>P [\frac{9}{5} \text{ units}] R [\frac{5}{5} \text{ units}] J [\frac{5}{5} \text{ units} - $125]</td>
</tr>
</tbody>
</table>
Ask Yourself

1. Convert the percentage given into a fraction in its simplest form i.e. \(20\% = \frac{1}{5}\).

   Using the fraction, Roy has 1 more unit than Joe at first i.e Roy : Joe = 6 : 5

   At the end, Joe has 1 more unit than Roy, i.e.

   Roy : Joe = 5 : 6

2. If the event were to occur, Roy would have fewer stamps than Joe; and the number of stamps Joe has would increase; and the total number of stamps between them would remain the same.

Think Further

It can be rephrased as:

‘Joe has 120\% as many stamps as Roy’ or

‘Roy has 83\frac{1}{3}\% (\frac{5}{6} \times 100\%) as many stamps as Joe.’

Solutions to Unit 7.1 (Cont.)

Question 4

Percentage of forks are spoons = \(\frac{10}{20} \times 100\% = 50\%\)

50\% of the forks are the number of spoons.

Question 5

Difference between pink and green marbles = 50 – 40 = 10

Percent more pink than green marbles = \(\frac{10}{40} \times 100\% = 25\%\)

There are 25\% more pink marbles than green marbles in the bag.

To check that your answer is correct, you can work backwards.

25\% more pink than green marbles means that the ratio of the number of pink marbles to the number of green marbles is 5 : 4.

Total = 5u + 4u = 9u

9u = 90

1u = 90 ÷ 9 = 10

5u = 5 × 10 = 50

4u = 4 × 10 = 40

Difference = 50 – 40 = 10

There are 10 more pink marbles than green marbles in the bag.

Question 6

1st Month : 2nd Month

100 : 120

5 : 6

6u = 594

1u = 594 ÷ 6 = 99

5u = 5 × 99 = 495

There were 495 hamsters at the pet shop at first.

Solutions to Unit 7.2 (Equal Stage)

Let’s Get Started 7.2

<table>
<thead>
<tr>
<th>S/N</th>
<th>Sentence</th>
<th>What should we do?</th>
<th>Ratio comparison</th>
<th>Model drawing</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>X has $350 less than Z.</td>
<td><strong>Step 1:</strong> Find the relationship between X and Z.</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>X = 1u</td>
<td>Z = 1u + 350</td>
<td></td>
<td>X = 1u</td>
</tr>
<tr>
<td></td>
<td>Z = 1u</td>
<td></td>
<td></td>
<td>Z = 1u</td>
</tr>
</tbody>
</table>

P has 4 more money than R.

Step 3:
Find the relationship between R and J.

Step 4:
When there is a comparison involving whole number, drawing models is necessary.
Ask Yourself

1. Convert the percentage into a fraction in its simplest form i.e. $35\% = \frac{7}{20}$

2. The number of girls is 7 units fewer than the number of adults (20 units). Therefore the relationship between the number of girls and the number of adults in the form of ratio is $13 : 20$.

Think Further

<table>
<thead>
<tr>
<th>A : G</th>
<th>20 : 13</th>
</tr>
</thead>
<tbody>
<tr>
<td>26 : 16</td>
<td></td>
</tr>
</tbody>
</table>

$40u - 13u = 27u$  
$27u = 324$  
$1u = 324 \div 27$  
$= 12$  

Total people = $40u + 26u + 13u$  
$= 79u$  
$79u = 79 \times 12$  
$= 948$  

948 people attended the concert.

Solutions to Unit 7.2 (Cont.)

Let’s Practise 7.2

Question 1

<table>
<thead>
<tr>
<th>B : G : C</th>
<th>50 : 100 : 10</th>
</tr>
</thead>
<tbody>
<tr>
<td>2 : 3</td>
<td>1 (\text{st}) : 9 (\text{th})</td>
</tr>
<tr>
<td>3 : 27</td>
<td></td>
</tr>
</tbody>
</table>

Summary

| B : G : A | 1 : 2 : 27 |

27$u = 540$  
$1u = 540 \div 27$  
$= 20$  
$2u = 2 \times 20$  
$= 40$  

There were 40 girls.

Question 2

At first  
End

<table>
<thead>
<tr>
<th>C : K : Total</th>
<th>2 (6) : 3 (6) : 5 (6)</th>
</tr>
</thead>
<tbody>
<tr>
<td>12 : 18 : 30</td>
<td></td>
</tr>
</tbody>
</table>

C (end), $12u = 12 \times 30$  
$= 360$  
K (end), $18u = 18 \times 30$  
$= 540$  

Cliff and Kevin had 360 and 540 marbles in the end respectively.

Question 3

Last Year

<table>
<thead>
<tr>
<th>Daughter : Yvonne</th>
<th>20 : 100</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 : 5</td>
<td></td>
</tr>
</tbody>
</table>

Total age (last yr), $6u = 50 - 2$  
$= 48$  
$1u = 48 \div 6$  
$= 8$  

Daughter’s age (3 yrs’ time) = $8 + 4$  
$= 12$  

Her daughter will be 12 years old in 3 years’ time.

Question 4

End

<table>
<thead>
<tr>
<th>J : B : Total</th>
<th>80 : 100</th>
</tr>
</thead>
<tbody>
<tr>
<td>4 : 5 : 9</td>
<td></td>
</tr>
</tbody>
</table>

9$u = 360$  
$1u = 360 \div 9$  
$= 40$  
$4u (\text{remaining 50\%}) = 4 \times 40$  
$= 160$  

Julian gave $160 to Brendon.
Question 5

A : B : C
100 : 80 : 60
5\(^3\) : 4\(^3\) : 3\(^4\)
15 : 12 : 20

Summary
A : B : C
15 : 12 : 20

5u = 500
1u = 500 ÷ 5
= 100
12u = 12 × 100
= 1200

(a) Brenna’s salary is $1200.

Brenna (current) : Brenna (New)
100 : 80
5 : 4

5p = 1200
1p = 1200 ÷ 5
= 240
4p = 4 × 240
= 960

Or, Brenna’s new salary = 4\(\frac{5}{2}\) × 1200
= 960

(b) Brenna’s new salary is $960.

Question 6

G : R : P
20 : 100 : 70
2 : 10 : 7

Summary
G : R : P
2 : 10 : 7

5u = 330
1u = 330 ÷ 5
= 66
19u = 19 × 66
= 1254

(a) There are a total of 1254 balls in the playpen.

Percentage of the number of green balls is the number of purple = \(\frac{2}{7}\) × 100%
= 28\(\frac{4}{7}\%\)

(b) There are 28\(\frac{4}{7}\)% green balls as compared to the number of purple balls.

Solutions to Unit 7.3 Equal Stage

Ask Yourself
1. ‘same number of stamps’ at first hints that we have to solve the problem sum from the beginning.

Think Further
1. At 25% (\(\frac{1}{4}\)), Vincent’s end = 3u.
   At 50% (\(\frac{1}{2}\)), Vincent’s end = 2u
   Difference (end) = 3u – 2u
   = 1u
   1u = 30

Vincent had 30 more stamps in the end.
Solutions to Unit 7.3 (Cont.)

Question 4

Morning

<table>
<thead>
<tr>
<th></th>
<th>T</th>
<th>C</th>
</tr>
</thead>
<tbody>
<tr>
<td>T</td>
<td>10u</td>
<td>10u</td>
</tr>
<tr>
<td>C</td>
<td>10u</td>
<td></td>
</tr>
</tbody>
</table>

Noon

<table>
<thead>
<tr>
<th></th>
<th>T</th>
<th>C</th>
</tr>
</thead>
<tbody>
<tr>
<td>T</td>
<td>7u</td>
<td>3u</td>
</tr>
<tr>
<td>C</td>
<td>7u</td>
<td>3u</td>
</tr>
</tbody>
</table>

7 p.m.

<table>
<thead>
<tr>
<th></th>
<th>T</th>
<th>C</th>
</tr>
</thead>
<tbody>
<tr>
<td>T</td>
<td>7u</td>
<td>3u</td>
</tr>
<tr>
<td>C</td>
<td>7u</td>
<td>3u</td>
</tr>
</tbody>
</table>

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.

Question 5

At end

<table>
<thead>
<tr>
<th></th>
<th>W</th>
<th>B</th>
</tr>
</thead>
<tbody>
<tr>
<td>W</td>
<td>7u</td>
<td></td>
</tr>
<tr>
<td>B</td>
<td>7u</td>
<td></td>
</tr>
</tbody>
</table>

At first

<table>
<thead>
<tr>
<th></th>
<th>W</th>
<th>B</th>
</tr>
</thead>
<tbody>
<tr>
<td>W</td>
<td>7u</td>
<td>70</td>
</tr>
<tr>
<td>B</td>
<td>7u</td>
<td>3u</td>
</tr>
</tbody>
</table>

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

<table>
<thead>
<tr>
<th></th>
<th>50₵</th>
<th>2u</th>
</tr>
</thead>
<tbody>
<tr>
<td>50₵</td>
<td>2u</td>
<td></td>
</tr>
<tr>
<td>20₵</td>
<td>2u</td>
<td></td>
</tr>
</tbody>
</table>

At first

<table>
<thead>
<tr>
<th></th>
<th>50₵</th>
<th>2u</th>
</tr>
</thead>
<tbody>
<tr>
<td>50₵</td>
<td>2u</td>
<td>51</td>
</tr>
<tr>
<td>20₵</td>
<td>2u</td>
<td>3u</td>
</tr>
</tbody>
</table>

3u = 51 – 24
= 27
1u = 27 ÷ 3
= 9

Value of 20₵ used = 27 × 0.2
= 5.4

<table>
<thead>
<tr>
<th></th>
<th>50₵</th>
<th>2u</th>
</tr>
</thead>
<tbody>
<tr>
<td>50₵</td>
<td>2u</td>
<td>51</td>
</tr>
<tr>
<td>20₵</td>
<td>2u</td>
<td>3u</td>
</tr>
</tbody>
</table>

Value of 50₵ used = 51 × 0.5
= 25.5

Cost of present = 25.5 + 5.4
= 30.9

The present cost $30.90.

Solutions to Unit 7.4 Internal Transfer

Ask Yourself

The individual amount of money will change. However, their total amount of money will remain unchanged.

Let’s Practise 7.4

Question 1

At first

<table>
<thead>
<tr>
<th></th>
<th>B</th>
<th>R</th>
</tr>
</thead>
<tbody>
<tr>
<td>B</td>
<td>3u</td>
<td></td>
</tr>
<tr>
<td>R</td>
<td>2u</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th></th>
<th>7u</th>
<th>10u</th>
</tr>
</thead>
<tbody>
<tr>
<td>7u</td>
<td>3u</td>
<td>2u</td>
</tr>
<tr>
<td>7u</td>
<td>3u</td>
<td></td>
</tr>
</tbody>
</table>

Gave = 6u – 5u
= 1u

1u = 1 × 5
= 5

20u = 20 × 5
= 100

The boys were given a total of $100.

Question 2

At first

<table>
<thead>
<tr>
<th></th>
<th>J</th>
<th>P</th>
</tr>
</thead>
<tbody>
<tr>
<td>J</td>
<td>5u</td>
<td></td>
</tr>
<tr>
<td>P</td>
<td>4u</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th></th>
<th>6</th>
<th>11</th>
</tr>
</thead>
<tbody>
<tr>
<td>5u</td>
<td>6</td>
<td></td>
</tr>
<tr>
<td>4u</td>
<td>11</td>
<td></td>
</tr>
</tbody>
</table>

Passed = 30u – 11u
= 19u

19u = 19 × 5
= 95

55u = 55 ÷ 3
= 18.3

40% cards sold = 0.4 × 18.3
= 6.9

Amount collected = 66 × $2
= $132

$132 was collected from the sale of the cards.

Question 3

At first

<table>
<thead>
<tr>
<th></th>
<th>A</th>
<th>B</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>2u</td>
<td></td>
</tr>
<tr>
<td>B</td>
<td>2u</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th></th>
<th>51</th>
<th>24</th>
</tr>
</thead>
<tbody>
<tr>
<td>2u</td>
<td>51</td>
<td></td>
</tr>
<tr>
<td>2u</td>
<td>24</td>
<td></td>
</tr>
</tbody>
</table>

5u = 110
1u = 110 ÷ 5
= 22

Transferred = 6u – 5u
= 1u

22 mint candies were transferred from Tin A to Tin B.
Solutions to Unit 7.4 (Cont.)

Question 4

<table>
<thead>
<tr>
<th>At first</th>
<th>J : K</th>
</tr>
</thead>
<tbody>
<tr>
<td>Transfer (1)</td>
<td>+4 : -4</td>
</tr>
<tr>
<td>End</td>
<td>13 : 16</td>
</tr>
</tbody>
</table>

Working

Transfer 1: K = J
20% of K = \( \frac{1}{5} \times 20u \)
\[ = 4u \]

3u = 18
1u = 18 \div 3
\[ = 6 \]

29u = 29 \times 6
\[ = 174 \]
The girls had 174 bangles altogether.

Question 5

<table>
<thead>
<tr>
<th>At first</th>
<th>W : X : Y</th>
</tr>
</thead>
<tbody>
<tr>
<td>Transfer (1)</td>
<td>+4 : 3 : -4</td>
</tr>
<tr>
<td>Transfer (2)</td>
<td>-3 : +3</td>
</tr>
<tr>
<td>End</td>
<td>12 : 9 : 19</td>
</tr>
</tbody>
</table>

Working

Transfer 1: Y = W
20% of Y = \( \frac{1}{5} \times 20u \)
\[ = 4u \]

Transfer 2: X = Y
25% of X = \( \frac{1}{4} \times 12u \)
\[ = 3u \]

9 : 31
The ratio of Xavier’s marbles to the sum of Willy’s and Yoshua’s marbles in the end was 9 : 31.

Question 6

<table>
<thead>
<tr>
<th>At First</th>
<th>A : B : C</th>
</tr>
</thead>
<tbody>
<tr>
<td>Transfer (1)</td>
<td>-3 : 3 : +3</td>
</tr>
<tr>
<td>Transfer (2)</td>
<td>+9 : -9</td>
</tr>
<tr>
<td>End</td>
<td>7 : 32 : 6</td>
</tr>
</tbody>
</table>

Working

Transfer 1: A \rightarrow B
30% of A = \( \frac{3}{10} \times 10u \)
\[ = 3u \]

Transfer 2: C \rightarrow B
60% of C = \( \frac{3}{5} \times 15u \)
\[ = 9u \]

32u = 38.4
1u = 38.4 \div 32
\[ = 1.2 \]

Total transferred to B = 3u + 9u
\[ = 12u \]

12u = 12 \times 1.2
\[ = 14.4 \]

14.4 kg of cement were transferred into Bag B.

Solutions to Unit 7.5 Branching

Ask Yourself
1. Yes. The keywords are “of the remaining”.
2. Units are used.

Let’s Practise 7.5

Question 1

Salary 4u

[Diagram]

Petrol 1u

Remainder 3u

Groceries 1u

Left 2u

(a) Percentage of salary on grocery = \( \frac{1}{4} \times 100\% \)
\[ = 25\% \]

She spent 25% of her salary on groceries.

Question 2

<table>
<thead>
<tr>
<th>Total amount of money</th>
</tr>
</thead>
<tbody>
<tr>
<td>TV set $1400</td>
</tr>
<tr>
<td>Remainder 5u</td>
</tr>
</tbody>
</table>

| Blue-ray 2u |
| Bed 3u |

\( \frac{1}{4} \) Total = 3u
\( \frac{1}{4} \) Total = 4 \times 3u
\[ = 12u \]

TV set = 12u – 5u
\[ = 7u \]

7u = 1400
1u = 1400 \div 7
\[ = 200 \]

3u (Bed) = 3 \times 200
\[ = 600 \]

Difference = 1400 – 600
\[ = 800 \]

The TV set cost $800 more than the bed.

Question 3

(b) 2u = 560
1u = 560 \div 2
\[ = 280 \]

4u = 4 \times 280
\[ = 1120 \]

Her monthly salary was $1120.
Solutions to Unit 7.5 (Cont.)

Question 4

Total number of jerseys

Blue-striped

250

Remainder 1

4u\^5 \times (20u)

1u\^5 (5u)

Red-striped

3u\^5 (15u)

Black-striped

2u\^5 (6u)

Yellow-striped

3u\^5 (9u) = \frac{1}{5} \text{ Total}

\frac{1}{5} \text{ Total} = 9u

\frac{1}{5} \text{ Total} = 5 \times 9u

= 45u

Blue-striped = 45u – 20u

= 25u

25u = 250

1u = 250 \div 25

= 10

30u = 30 \times 10

= 300

300 red and blue-striped jerseys were sold altogether.

Question 5

Total number of fruits (T)

Oranges

\frac{2}{3} T + $10

Remainder (R)

\frac{4}{5} R = $8 + $16

\frac{1}{5} R = $24 \div 4

\frac{5}{5} R = 5 \times $6

\frac{1}{3} T = $10 + $30

\frac{3}{3} T = 3 \times $40

= $24

= $6

= $30

= $40

= $120

(a) Rachel had $120 at first.

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

= $6 + $8

= $14

Number of kg = $14 \div $2

= 7

(b) She bought 7 kg of mangosteens.

Solutions to Unit 7.5 (Cont.)

Question 6

Total number of coins (T)

50c coins

\frac{3}{5} T + 3

Remainder (R)

\frac{3}{4} R = 18 + 9

\frac{1}{4} R = 27 + 3

\frac{4}{4} R = 4 \times 9

\frac{3}{5} T = 36 + 3

\frac{1}{5} T = 39 + 3

= 9

= 36

= 39

= 13

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

= 9 + 9

= 18

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

= 2 \times 13 + 3

= 29

Total amount = 18 \times 0.2 + 29 \times 0.5 + 18 \times 1

= 36.1

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

Solutions to Unit 7.6 Numerators the Same

Ask Yourself

1. ‘equal amounts of money left’ hints to start solving

   from the end of the problem sum by working backwards.

Think Further

The ‘Numerator the Same’ concept will still be used to

arrive at the total but the answer will change to $405.

Spent

\frac{3x}{100} \text{ C} = \frac{a}{25} L

\frac{2}{25} \text{ C} = \frac{a}{25} L

Difference between Catherine and Lucy = 30u – 20u

= 10u

10u = 225

1u = 225 \div 10

= 22.5

Total spent = 2 \times 9u

= 18u

18u = 18 \times 22.5

= 405

They spent $405 altogether.
Solutions to Unit 7.6 (Cont.)

Let’s Practise 7.6

Question 1

Let’s Practise 7.6 (Cont.)

Let’s Practise 7.6 (Cont.)

30% = \( \frac{3}{10} \)

3 \( \frac{1}{9} \) \( E \) - \( \frac{1}{B} \)

3 \( \frac{3}{9} \) \( E \) - \( \frac{3}{B} \)

Total

\( E \) : \( B \)

10 : 9

\( 19u = 380 \)

\( 1u = 380 \div 19 \)

\( 10u = 10 \times 20 \)

= 200

Eddie has 200 stamps.

Question 3

45% = \( \frac{9}{20} \)

60% = \( \frac{3}{5} \)

\( \frac{11}{9} \) \( A \) = \( \frac{2}{D} \)

\( \frac{22}{9} \) \( A \) = \( \frac{22}{5} \) \( D \)

Total

\( A \) : \( D \)

40 : 55

Difference = 55u – 40u

= 15u

15u = 450

\( 1u = 450 \div 15 \)

= 30

44u = 44 \times 30

= 1320

They had $1320 altogether in the end.

Solutions to Unit 7.6 (Cont.)

Let’s Practise 7.6

Question 4

Let

\( 9 \) \( \frac{A}{R} \) = \( \frac{1}{Z} \)

\( 9 \) \( \frac{A}{R} \) = \( \frac{9}{Z} \)

Total

\( R \) : \( Z \)

50 : 18

Difference = 50u – 18u

= 32u

32u = 640

\( 1u = 640 \div 32 \)

= 20

18u = 18 \times 20

= 360

They had $360 altogether in the end.

Solutions to Unit 7.7 Repeated Items

Ask Yourself

1. Ginny

2. Make the units representing Ginny the same in both ratios.

Think Further

At first

\( J \) : \( G \) : \( A \)

14 : 35 : 25

\( G + A \)

= 60u

\( \frac{1}{5} \) of 60u = 12u

\( G \) : \( A \) : Total

3 : 1 : 4

4p = 12u

1p = 12u + 4

= 3u

Annie gave = 3u

Ginny gave = 9u

End

\( J \) : \( G \) : \( A \)

26 : 26 : 22

(a) Annie would have the least number of beads in the end.

(b) Most number of beads = Jessie/Ginny

Difference = 26u – 22u

= 4u

Percentage = \( \frac{4}{22} \times 100 \)

= 15.38%

Let’s Practise 7.7

Question 1

\( J \) : \( D \)

\( K \) : \( D \)

120 : 100

200 : 100

6 : 5

\( 2^5 \) : \( 1^5 \)

10 : 5

Summary

\( J \) : \( D \) : \( K \)

6 : 5 : 10

5u = 25

\( 1u = 25 \div 5 \)

= 5
Solutions to Unit 7.7 (Cont.)

Question 1 (Cont.)

21u = 21 \times 5
  = 105

They had a total of 105 crayons.

Question 2

<table>
<thead>
<tr>
<th>S</th>
<th>J</th>
<th>D</th>
<th>J</th>
</tr>
</thead>
<tbody>
<tr>
<td>110 : 100</td>
<td>100 : 80</td>
<td></td>
<td></td>
</tr>
<tr>
<td>11^{12} : 10^{12}</td>
<td>5^{12} : 4^{12}</td>
<td></td>
<td></td>
</tr>
<tr>
<td>22 : 20</td>
<td>25 : 20</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Summary

<table>
<thead>
<tr>
<th>S</th>
<th>J</th>
<th>D</th>
</tr>
</thead>
<tbody>
<tr>
<td>22 : 20</td>
<td>25 : 20</td>
<td></td>
</tr>
</tbody>
</table>

3u = 9
1u = 9 \div 3
  = 3
20u = 20 \times 3
  = 60

Joey’s score was 60.

Question 3

At first

<table>
<thead>
<tr>
<th>M</th>
<th>W</th>
</tr>
</thead>
<tbody>
<tr>
<td>13^{14} : 5^{14}</td>
<td></td>
</tr>
<tr>
<td>52 : 20</td>
<td></td>
</tr>
</tbody>
</table>

Women, end (65%) = \frac{13}{20} \times 20u
  = 13u

Change in the no. of men = 52u - 13u
  = 39u

Percentage change in the no. of men = \frac{39}{52} \times 100%
  = 75%

75% of the men must leave.

Question 4

Last week

<table>
<thead>
<tr>
<th>C</th>
<th>M</th>
<th>C+M</th>
</tr>
</thead>
<tbody>
<tr>
<td>3^{12} : 2^{12} : 5^{12}</td>
<td></td>
<td></td>
</tr>
<tr>
<td>12 : 8 : 20</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Sold


<table>
<thead>
<tr>
<th>Last week (C+M)</th>
<th>This week (C+M)</th>
</tr>
</thead>
<tbody>
<tr>
<td>4^{12} : 5^{12}</td>
<td></td>
</tr>
<tr>
<td>20 : 25</td>
<td></td>
</tr>
</tbody>
</table>

25u = 150
1u = 150 \div 25
  = 6

Sold last week = 20u
  = 20 \times 6
  = 120

120 cannoli and mudpies were sold last week.

Solutions to Unit 7.8 Family of Change

Ask Yourself

1. The total number of items (in this case, dominoes) in Day 1 and Day 2 remain unchanged since Kyle wanted to lay a pattern using all his dominoes.

Think Further

1. Total dominoes

\begin{align*}
3u^{14} (12u) \\
1u^{12} (7u) \\
3u^{12} (21u)
\end{align*}

21u = 84
1u = 84 \div 21
  = 4
40u = 40 \times 4
  = 160

Kyle had 160 dominoes in his collection.

Let’s Practise 7.8

Question 1

At first

<table>
<thead>
<tr>
<th>Complete</th>
<th>Incomplete</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>7</td>
<td>13</td>
<td>20</td>
</tr>
<tr>
<td>End</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Complete</th>
<th>Incomplete</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>3^{12}</td>
<td>1^{12}</td>
<td>4^{12}</td>
</tr>
<tr>
<td>15</td>
<td>5</td>
<td>20</td>
</tr>
</tbody>
</table>

Ran in 2nd hr = 15u - 7u
  = 8u
8u = 16.8
1u = 16.8 \div 8
  = 2.1
20u = 20 \times 2.1
  = 42

The total distance of the running event was 42 km.

Question 2

1st week

<table>
<thead>
<tr>
<th>Not fixed</th>
<th>Fixed</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>6^{17}</td>
<td>5^{17}</td>
<td>11^{17}</td>
</tr>
<tr>
<td>42</td>
<td>35</td>
<td>77</td>
</tr>
</tbody>
</table>

2nd week

<table>
<thead>
<tr>
<th>Not fixed</th>
<th>Fixed</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>2^{11}</td>
<td>5^{11}</td>
<td>7^{11}</td>
</tr>
<tr>
<td>22</td>
<td>55</td>
<td>77</td>
</tr>
</tbody>
</table>

55u = 110
1u = 110 \div 55
  = 2

77u = 77 \times 2
  = 154

The model aeroplane required 154 pieces.

Question 3

At first

<table>
<thead>
<tr>
<th>Chocolate : Vanilla</th>
<th>Chocolate : Vanilla</th>
</tr>
</thead>
<tbody>
<tr>
<td>2^{12} : 3^{12}</td>
<td>4 : 1</td>
</tr>
<tr>
<td>4 : 6</td>
<td>5u</td>
</tr>
</tbody>
</table>
Solutions to Unit 7.8 (Cont.)

Question 3 (Cont.)

\[ 5u = 25 \]
\[ 1u = 25 \div 5 \]
\[ = 5 \]
\[ 10u = 10 \times 5 \]
\[ = 50 \]

Jasmine bought 50 cupcakes for her family.

Question 4

At first

<table>
<thead>
<tr>
<th>Male : Female</th>
<th>Male : Female</th>
</tr>
</thead>
<tbody>
<tr>
<td>5 : 2</td>
<td>2 : 2</td>
</tr>
<tr>
<td>10 : 6</td>
<td>10 : 15</td>
</tr>
</tbody>
</table>

\[ 9u = 81 \]
\[ 1u = 81 \div 9 \]
\[ = 9 \]
\[ 6u = 6 \times 9 \]
\[ = 54 \]

There were 54 female passengers at the terminal at first.

Question 5

Now

<table>
<thead>
<tr>
<th>J</th>
<th>G</th>
<th>Diff</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>14</td>
<td>13</td>
</tr>
<tr>
<td>11</td>
<td>14</td>
<td>3</td>
</tr>
<tr>
<td>14</td>
<td>70</td>
<td>56</td>
</tr>
</tbody>
</table>

Future

30u = 30 \times 0.5
\[ = 15 \]

In 15 years' time, Jordan's age will be 44% of Gordon's age.

Question 6

Past (4 yrs ago)

<table>
<thead>
<tr>
<th>W</th>
<th>R</th>
<th>Diff</th>
</tr>
</thead>
<tbody>
<tr>
<td>9</td>
<td>5</td>
<td>4u</td>
</tr>
<tr>
<td>4u = 4 + 8</td>
<td>= 12</td>
<td></td>
</tr>
<tr>
<td>1u = 12 \div 4</td>
<td>= 3</td>
<td></td>
</tr>
</tbody>
</table>

Difference between Raymond and Wayne = 15u

\[ 15u = 15 \times 3 \]
\[ = 45 \]

Raymond is 45 years older than Wayne.

Solutions to Unit 7.9 Quantity x Value

Ask Yourself

1. The number of units of each item is provided as well as the total value of the items whereas in Guess and Check, the number of units representing each item will not be given.

Let's Practise 7.9

Question 1

<table>
<thead>
<tr>
<th>Items</th>
<th>Quantity of items</th>
<th>( \times )</th>
<th>Value of items ($)</th>
<th>Total value ($)</th>
</tr>
</thead>
<tbody>
<tr>
<td>B</td>
<td>2u</td>
<td>( \times )</td>
<td>8</td>
<td>16u</td>
</tr>
<tr>
<td>G</td>
<td>3u</td>
<td>( \times )</td>
<td>6</td>
<td>18u</td>
</tr>
<tr>
<td>Total</td>
<td>5u</td>
<td></td>
<td></td>
<td>34u</td>
</tr>
</tbody>
</table>

34u = 5440
\[ 1u = 5440 \div 34 \]
\[ = 160 \]
\[ 5u = 5 \times 160 \]
\[ = 800 \]

800 students were at the party.

Question 2

Cost of 1 peach = 150% \( \times \) $1.20
\[ = $1.80 \]

<table>
<thead>
<tr>
<th>Items</th>
<th>Quantity of items</th>
<th>( \times )</th>
<th>Value of items ($)</th>
<th>Total value ($)</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>7u</td>
<td>( \times )</td>
<td>1.2</td>
<td>8.4u</td>
</tr>
<tr>
<td>P</td>
<td>13u</td>
<td>( \times )</td>
<td>1.8</td>
<td>23.4</td>
</tr>
<tr>
<td>Total</td>
<td>20u</td>
<td></td>
<td></td>
<td>31.8u</td>
</tr>
</tbody>
</table>

31.8u = 636
\[ 1u = 636 \div 31.8 \]
\[ = 20 \]
(a) \[ 8.4u = 8.4 \times 20 \]
\[ = 168 \]

The apricots cost $168.

(b) \[ 13u = 13 \times 20 \]
\[ = 260 \]

He ordered 260 peaches.

Question 3

Quantity Bought

<table>
<thead>
<tr>
<th>P</th>
<th>T</th>
<th>B</th>
</tr>
</thead>
<tbody>
<tr>
<td>6u^2</td>
<td>5u^2</td>
<td>4u^3 : 5u^3</td>
</tr>
<tr>
<td>12 : 10</td>
<td>12 : 15</td>
<td></td>
</tr>
</tbody>
</table>

Value/ Cost of items

Toy : Pullover

<table>
<thead>
<tr>
<th>Value of items ($)</th>
<th>Total value ($)</th>
</tr>
</thead>
<tbody>
<tr>
<td>$12</td>
<td>$10</td>
</tr>
<tr>
<td>$20</td>
<td>$20</td>
</tr>
</tbody>
</table>

Summary of value/cost

Toy = $12

Book = $12 \( \div \) $2
\[ = $10 \]

Pullover = $20
Solutions to Unit 7.9 (Cont.)

Question 3 (Cont.)

<table>
<thead>
<tr>
<th>Items</th>
<th>Quantity of items</th>
<th>Value of items ($)</th>
<th>Total value ($)</th>
</tr>
</thead>
<tbody>
<tr>
<td>P</td>
<td>12u</td>
<td>20</td>
<td>240u</td>
</tr>
<tr>
<td>T</td>
<td>10u</td>
<td>12</td>
<td>120u</td>
</tr>
<tr>
<td>B</td>
<td>15u</td>
<td>10</td>
<td>150u</td>
</tr>
<tr>
<td>Total</td>
<td>37u</td>
<td></td>
<td>510u</td>
</tr>
</tbody>
</table>

510u = 19,380
1u = 19,380 ÷ 510
= 38

No. of pullovers, 12u = 12 × 38
= 456

No. of toys, 10u = 10 × 38
= 380

No. of books, 15u = 15 × 38
= 570

Mrs Poon bought 456 pullovers, 380 toys and 570 books.

Question 4

<table>
<thead>
<tr>
<th>Value of items</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pin = $2.50</td>
</tr>
<tr>
<td>Band = 150% × $2.50 = $3.75</td>
</tr>
<tr>
<td>Necklace = $2.50 × 2 = $5</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Items</th>
<th>Quantity of items</th>
<th>Value of items ($)</th>
<th>Total value ($)</th>
</tr>
</thead>
<tbody>
<tr>
<td>P</td>
<td>5u</td>
<td>2.50</td>
<td>12.5u</td>
</tr>
<tr>
<td>B</td>
<td>4u</td>
<td>3.75</td>
<td>15u</td>
</tr>
<tr>
<td>N</td>
<td>1u</td>
<td>5</td>
<td>5u</td>
</tr>
<tr>
<td>Total</td>
<td>10u</td>
<td></td>
<td>42.5u</td>
</tr>
</tbody>
</table>

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

<table>
<thead>
<tr>
<th>Items</th>
<th>Quantity of items</th>
<th>Value of items ($)</th>
<th>Total value ($)</th>
</tr>
</thead>
<tbody>
<tr>
<td>20₵</td>
<td>1u</td>
<td>0.2</td>
<td>0.2u</td>
</tr>
<tr>
<td>50₵</td>
<td>2u</td>
<td>0.5</td>
<td>1u</td>
</tr>
<tr>
<td>$1</td>
<td>2u</td>
<td>1</td>
<td>2u</td>
</tr>
<tr>
<td>Total</td>
<td>5u</td>
<td></td>
<td>3.2u</td>
</tr>
</tbody>
</table>

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

<table>
<thead>
<tr>
<th>Items</th>
<th>Quantity of items</th>
<th>Value of items ($)</th>
<th>Total value ($)</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>13u</td>
<td>0.5</td>
<td>6.5u</td>
</tr>
<tr>
<td>P</td>
<td>7u</td>
<td>0.4</td>
<td>2.8u</td>
</tr>
<tr>
<td>Total</td>
<td>20u</td>
<td></td>
<td>9.3u</td>
</tr>
</tbody>
</table>

9.3u = 195.3
1u = 195.3 ÷ 9.3
= 21
13u = 13 × 21
= 273
(a) 273 apples were sold.
2.8u = 2.8 × 21
= 58.8
(b) $58.80 was collected from the sale of the pears only.

Solutions to Review Questions on Chapter 7

Question 1

<table>
<thead>
<tr>
<th>L</th>
<th>M</th>
<th>N</th>
</tr>
</thead>
<tbody>
<tr>
<td>5u</td>
<td>2u</td>
<td>6u</td>
</tr>
<tr>
<td>25</td>
<td>10</td>
<td>30</td>
</tr>
</tbody>
</table>

Change +3   +6   −9

End 28 : 16 : 21
= 60% of 10u = 6u

Difference in the end = 28u − 21u
= 7u
7u = 210
1u = 210 ÷ 7
= 30
30u = 30 × 30
= 900

Nina had 900 buttons at first.

Question 2

<table>
<thead>
<tr>
<th>C</th>
<th>L</th>
</tr>
</thead>
<tbody>
<tr>
<td>3u</td>
<td>3u</td>
</tr>
<tr>
<td>12</td>
<td>20</td>
</tr>
</tbody>
</table>

3u + 12 = 3u + 12
3u + 1 = 3u + 12
3u + 5 = 3u + 20
3u + 3 = 3u + 6u

At first

<table>
<thead>
<tr>
<th>C</th>
<th>L</th>
</tr>
</thead>
<tbody>
<tr>
<td>5u</td>
<td>3u</td>
</tr>
<tr>
<td>20</td>
<td>75</td>
</tr>
</tbody>
</table>

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 camomile tea bags than lavender tea bags were given away.
Solutions to Review Questions on Chapter 7 (Cont.)

Question 3

<table>
<thead>
<tr>
<th>Items</th>
<th>Quantity of items</th>
<th>×</th>
<th>Value of items ($)</th>
<th>Total value ($)</th>
</tr>
</thead>
<tbody>
<tr>
<td>RB</td>
<td>8u</td>
<td>×</td>
<td>1p</td>
<td>8up (28.8)</td>
</tr>
<tr>
<td>D</td>
<td>5u</td>
<td>×</td>
<td>1p + 1.5</td>
<td>5up + 7.5u (40.5)</td>
</tr>
<tr>
<td>Total</td>
<td>13u</td>
<td>×</td>
<td></td>
<td>13up + 7.5u (69.3)</td>
</tr>
</tbody>
</table>

8up = 28.8
1up = 28.8 ÷ 8 = 3.6
5up = 5 × 3.6 = 18
7.5u = 40.5 – 18 = 22.5
1u = 22.5 ÷ 7.5 = 3
(a) 5u = 5 × 3
= 15
She bought 15 durian puffs.
(b) Cost of 1 durian puffs = 40.5 ÷ 15
= 2.7
Cost of 1 red bean cream puff = 2.7 – 1.5
= 1.20
Each red bean cream puff cost $1.20.

Question 4

<table>
<thead>
<tr>
<th>Items</th>
<th>Quantity of items</th>
<th>×</th>
<th>Value of items ($)</th>
<th>Total value ($)</th>
</tr>
</thead>
<tbody>
<tr>
<td>RB</td>
<td>9u</td>
<td>×</td>
<td>50</td>
<td>450u</td>
</tr>
<tr>
<td>D</td>
<td>8u</td>
<td>×</td>
<td>100</td>
<td>800u</td>
</tr>
<tr>
<td>Total</td>
<td>17u</td>
<td>×</td>
<td></td>
<td>1700u</td>
</tr>
</tbody>
</table>

1700u = 20 400
1u = 20 400 ÷ 1700
= 12
3u = 3 × 12
= 36
There were 36 $150 dining vouchers.

Question 5

<table>
<thead>
<tr>
<th>Items</th>
<th>Quantity of items</th>
<th>×</th>
<th>Value of items ($)</th>
<th>Total value ($)</th>
</tr>
</thead>
<tbody>
<tr>
<td>P</td>
<td>24</td>
<td>×</td>
<td>15</td>
<td>360</td>
</tr>
<tr>
<td>C</td>
<td>24</td>
<td>×</td>
<td>6</td>
<td>144</td>
</tr>
<tr>
<td>E</td>
<td>24</td>
<td>×</td>
<td>6</td>
<td>144</td>
</tr>
</tbody>
</table>

Summary

<table>
<thead>
<tr>
<th>Items</th>
<th>Quantity of items</th>
<th>×</th>
<th>Value of items ($)</th>
<th>Total value ($)</th>
</tr>
</thead>
<tbody>
<tr>
<td>P</td>
<td>24</td>
<td>×</td>
<td>15</td>
<td>360</td>
</tr>
<tr>
<td>C</td>
<td>24</td>
<td>×</td>
<td>6</td>
<td>144</td>
</tr>
<tr>
<td>E</td>
<td>24</td>
<td>×</td>
<td>6</td>
<td>144</td>
</tr>
</tbody>
</table>

16u = 20 400
1u = 20 400 ÷ 16 = 1250

Change

At first 24u15c6e
Change −44u10c5e
In the end 4p5c4e

Question 6

<table>
<thead>
<tr>
<th>Items</th>
<th>Quantity of items</th>
<th>×</th>
<th>Value of items ($)</th>
<th>Total value ($)</th>
</tr>
</thead>
<tbody>
<tr>
<td>$50</td>
<td>9u</td>
<td>×</td>
<td>50</td>
<td>450u</td>
</tr>
<tr>
<td>$100</td>
<td>8u</td>
<td>×</td>
<td>100</td>
<td>800u</td>
</tr>
<tr>
<td>$150</td>
<td>3u</td>
<td>×</td>
<td>150</td>
<td>450u</td>
</tr>
<tr>
<td>Total</td>
<td>20u</td>
<td>×</td>
<td></td>
<td>1700u</td>
</tr>
</tbody>
</table>

There were 54 people at the exhibition.

Question 7

<table>
<thead>
<tr>
<th>Items</th>
<th>Quantity of items</th>
<th>×</th>
<th>Value of items ($)</th>
<th>Total value ($)</th>
</tr>
</thead>
<tbody>
<tr>
<td>P</td>
<td>24</td>
<td>×</td>
<td>15</td>
<td>360</td>
</tr>
<tr>
<td>C</td>
<td>24</td>
<td>×</td>
<td>6</td>
<td>144</td>
</tr>
<tr>
<td>E</td>
<td>24</td>
<td>×</td>
<td>6</td>
<td>144</td>
</tr>
</tbody>
</table>

Summary

<table>
<thead>
<tr>
<th>Items</th>
<th>Quantity of items</th>
<th>×</th>
<th>Value of items ($)</th>
<th>Total value ($)</th>
</tr>
</thead>
<tbody>
<tr>
<td>P</td>
<td>24</td>
<td>×</td>
<td>15</td>
<td>360</td>
</tr>
<tr>
<td>C</td>
<td>24</td>
<td>×</td>
<td>6</td>
<td>144</td>
</tr>
<tr>
<td>E</td>
<td>24</td>
<td>×</td>
<td>6</td>
<td>144</td>
</tr>
</tbody>
</table>

16u = 20 400
1u = 20 400 ÷ 16 = 1250

Change

At first 24u15c6e
Change −44u10c5e
In the end 4p5c4e

Difference (at first) = 27u – 9u
= 18u
18u = 72
1u = 72 ÷ 18
= 4

For more review questions, please visit www.onsponge.com
Solutions to Review Questions on Chapter 7
(Cont.)

Question 7

W (left) = 27u – 17u
= 10u
10u = 10 × 4
= 40
40 women left the room.

Question 8

Case 1: N → A
Case 1: N → A

N : A : Total

<table>
<thead>
<tr>
<th>65</th>
<th>11</th>
<th>21</th>
</tr>
</thead>
<tbody>
<tr>
<td>60</td>
<td>11</td>
<td>71</td>
</tr>
<tr>
<td>60</td>
<td>60</td>
<td>120</td>
</tr>
</tbody>
</table>

4u² : 7u² : 11u²
N = 40

Case 2 (check): 11u + 5 = 22u + 5
= 225

Natasha has 225 coloured pencils.

Question 9

G : B : I
15 45 60

E : I
15 60

Case 1: N → A
Case 1: N → A

N : A : Total

<table>
<thead>
<tr>
<th>30</th>
<th>11</th>
<th>41</th>
</tr>
</thead>
<tbody>
<tr>
<td>21</td>
<td>11</td>
<td>32</td>
</tr>
<tr>
<td>21</td>
<td>21</td>
<td>42</td>
</tr>
</tbody>
</table>

11u – 8u = 3u
3u = 65 – 5
= 60
u = 60 ÷ 3
= 20

Case 1: 8u + 65 = 8 × 20 + 65
= 225

Boys in Island Junior (end) = 130
100 × 45u
= 58.5u

Girls moved from Emerald Junior = 1
3 × 21u
= 7u

Girls in Island Junior (end) = 15u + 7u
= 22u

Difference in boys (end) = 58.5u – 9u
= 49.5u

49.5u = 396
1u = 396 ÷ 49.5
= 8

Total in Island Junior (end) = 58.5u + 22u
= 80.5u

80.5u = 80.5 × 8
= 644

644 children were at Island Junior School in the end.

Question 10

J (thrice) = 2
7 J (Make numerator of Jonas to be thrice that of Gordon)

J : G
10u³ : 7u³

J : M
3¹⁰ : 5¹⁰

Summary

J : G : M
30 : 21 : 50

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 11

(Actual)

Case 1

12u
7u

Change
+5
−11

Case 2

4p
5p

(Working)

Case 1

$2
$5

Case 2

$2
$5

No. of $2-notes (at first) = 12u
= 12 × 5
= 60

No. of $5-notes (at first) = 7u
= 7 × 5
= 35

Total value = 60 × $2 + 35 × $5
= $295

Michelle had $295 at first.

Question 12

(Actual)

Case 1

1u³
7u³

Change
+5u³
−11

Case 2

1p³
5p³

(Working)

Case 1

5u
7u

Case 2

5p
5p

No. of $2-notes (at first) = 12u
= 12 × 5
= 60

No. of $5-notes (at first) = 7u
= 7 × 5
= 35

Total value = 60 × $2 + 35 × $5
= $295

Michelle had $295 at first.
Question 12 (Cont.)

\[2u = 25 + 11\]
\[= 36\]
\[1u = 36 ÷ 2\]
\[= 18\]

Stamps (at first) = 1u + 5
\[= 18 + 5\]
\[= 23\]

Envelopes (at first) = 7u
\[= 7 × 18\]
\[= 126\]

Difference = 126 – 23
\[= 103\]

Angelica had 103 more envelopes than stamps.

Solutions to Unit 8.1 Volume of Cubes and Cuboids

Let’s Get Started 8.1
1. Volume of cuboid = Length × Breadth × Height
\[= 25 \text{ cm} × 9 \text{ cm} × 12 \text{ cm}\]
\[= 2700 \text{ cm}^3\]

2. Volume of cuboid = Length × Breadth × Height
\[= 8 \text{ cm} × 7 \text{ cm} × 18 \text{ cm}\]
\[= 1008 \text{ cm}^3\]

3. Volume of cuboid = Length × Breadth × Height
\[= 32 \text{ cm} × 32 \text{ cm} × 40 \text{ cm}\]
\[= 40 \, 960 \text{ cm}^3\]

Let’s Practise 8.1

Question 1
Greatest number of blocks that fits its length
\[= 20 ÷ 6\]
\[= 3R2 \text{ cm}\]

Greatest number of blocks that fits its width
\[= 16 ÷ 8\]
\[= 2\]

Greatest number of blocks that fits its height
\[= 10 ÷ 4\]
\[= 2R2 \text{ cm}\]

Total number of wooden blocks = 3 × 2 × 2
\[= 12\]

Anna can pack 12 wooden blocks into the box.

Question 2
Number of cubes that fits its length
\[= 32 ÷ 2\]
\[= 16\]

Number of cubes that fits its width
\[= 23 ÷ 2\]
\[= 11R1 \text{ cm (use the least whole number value only)}\]

Number of cubes that fits its height
\[= 13 ÷ 2\]
\[= 6R1 \text{ cm (use the least whole number value only)}\]

Total number of cubes = 16 × 11 × 6
\[= 1056\]

1056 2-cm cubes can fit into the box.

Question 3
80% = 0.8

Height of cuboid = 0.8 × 19 cm
\[= 15.2 \text{ cm}\]

Volume = 19 cm × 19 cm × 15.2 cm
\[= 5487.2 \text{ cm}^3\]

The volume of the cuboid is 5487.2 cm³.

Question 4

Volume of 1 cube = 7 cm × 7 cm × 7 cm
\[= 343 \text{ cm}^3\]

Number of cubes that make up the solid = 6

Volume of solid = 6 × 343 cm³
\[= 2058 \text{ cm}^3\]

(a) The volume of the solid figure is 2058 cm³.

Area of 1 face = 7 cm × 7 cm
\[= 49 \text{ cm}^2\]

Number of faces on the surface = 6 + 6 + 12
\[= 24\]

Total surface area solid = 24 × 49 cm²
\[= 1176 \text{ cm}^2\]

(b) The total surface area of the solid figure is 1176 cm².

Question 5

Let H : L : B

130 : 100
120 : 100
13 : 10
60 : 60

H : L : B

78 : 60

Summary

Height = 78u

78u = 39 cm

1u = 39 cm ÷ 78
\[= 0.5 \text{ cm}\]

60u = 60 × 0.5 cm
\[= 30 \text{ cm}\]

65u = 65 × 0.5 cm
\[= 32.5 \text{ cm}\]

Volume = 30 cm × 32.5 cm × 39 cm
\[= 38 \, 025 \text{ cm}^3\]

The volume of the cuboid is 38 025 cm³.

Question 6

Total number of edges = 20

Length of one edge = 120 cm ÷ 20
\[= 6 \text{ cm}\]

Volume of one cube = 6 cm × 6 cm × 6 cm
\[= 216 \text{ cm}^3\]

Volume of solid = 3 × 216 cm³
\[= 648 \text{ cm}^3\]

The volume of the solid is 648 cm³.

Question 7

Number of cubes that make up solid = 30

Volume of 1 cube = 3 cm × 3 cm × 3 cm
\[= 27 \text{ cm}^3\]

Volume of figure = 30 × 27 cm³
\[= 810 \text{ cm}^3\]

(a) The volume of the solid figure is 810 cm³.

(b) Since the figure is placed on the floor when the paint is poured onto the solid, the faces at the bottom of the solid will not be coated with paint. So, only 10 cubes will have only 2 of its faces coated with paint.
Solutions to Unit 8.2 Volume of Liquids

Let's Get Started 8.2
(a) Volume of water = 42 cm × 22 cm × 8 cm
   = 7392 cm³
   = 7 ℓ 392 mℓ
capacity = 42 cm × 22 cm × 15 cm
   = 13 860 cm³
   = 13.86 ℓ
(b) Height of water = \( \frac{4}{3} \times 24 \) cm
   = 19.2 cm
Volume of water = 35 cm × 10 cm × 19.2 cm
   = 6720 cm³
   = 6 ℓ 72 mℓ
capacity = 35 cm × 10 cm × 24 cm
   = 8400 cm³
   = 8.4 ℓ
(c) Volume of water = 17 cm × 17 cm × 5 cm
   = 1445 cm³
   = 1 ℓ 445 mℓ
capacity = 17 cm × 17 cm × 17 cm
   = 4913 cm³
   = 4.913 ℓ
d) \( 3u = 3 \) cm
   \( 1u = 3 \) cm ÷ 3
   = 1 cm
   \( 7u = 7 \times 1 \) cm
   = 7 cm
Volume of water = 10 cm × 10 cm × 7 cm
   = 700 cm³
   = 0 ℓ 700 mℓ
capacity = 10 cm × 10 cm × 10 cm
   = 1000 cm³
   = 1 ℓ
Ask Yourself
1. Yes. Both refers to the height of saline in the canister.
   ‘20% filled with saline’ refers to the amount of saline in the canister ‘at first’ and \( \frac{1}{2} \) full refers to the amount of saline in the canister ‘in the end’.
2. The fraction \( \frac{1}{2} \) refer to half of the height of the rectangular canister.

Let's Practise 8.2
Question 1
Change in height of cooking oil = \( \frac{7}{24} \) of total
   = 2.1 ℓ

\( \frac{1}{2} \) of total = 2.1 ℓ + 7
   = 0.3 ℓ
Unfilled = \( \frac{1}{3} \)
   = \( \frac{1}{3} \)
   = \( \frac{8}{24} \)
\( \frac{5}{24} \) of total = 8 × 0.3 ℓ
   = 2.4 ℓ

Solutions to Unit 8.2 (Cont.)
Question 1 (Cont.)
2.4 litres more cooking oil would be needed to completely fill the container.
Question 2
Amount of water in fish tank
   = \( \frac{4}{7} \times 80 \) cm × 50 cm × 28 cm
   = 64 000 cm³
   = 64 ℓ
Amount of water left in 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
Volume of water in Container M
   = 5 cm × 10 cm × 24 cm
   = 1200 cm³
5u = 1200 cm³
1u = 1200 cm³ ÷ 5
   = 240 cm³
2u = 2 × 240 cm³
   = 480 cm³
   = 480 mℓ
capacity = 5 cm × 10 cm × 9 cm
   = 225 cm³
Total volume of water in tank, end
   = 225 cm³ + 262.5 cm³
   = 487.5 cm³
   = 487.5 mℓ
There was 487.5 mℓ of water in the tank now.
Question 4
Volume of water in container at first
   = \( \frac{3}{4} \times 700 \) cm³
   = 525 cm³
Volume of water poured into tank
   = 525 cm³ \( \div \) 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, end
   = 225 cm³ + 262.5 cm³
   = 487.5 cm³
   = 487.5 mℓ
There was 487.5 mℓ of water in the tank now.
Question 5
5 pails = 60 cm × 60 cm × 0.25 cm
   = 900 cm³
1 pail = 900 cm³ ÷ 5
   = 180 cm³
   = 180 mℓ
capacity = 180 mℓ
(a) Each pail can hold 180 mℓ of petrol.
Solutions to Unit 8.2 (Cont.)

Question 5 (Cont.)

Height of petrol in the container at first
= 0.3 \times 60 \text{ cm}
= 18 \text{ cm}

Amount of petrol left in container
= 60 \text{ cm} \times 60 \text{ cm} \times (18 \text{ cm} – 0.25 \text{ cm})
= 63900 \text{ cm}^3
= 63.9 \text{ ℓ}

Time taken to completely drain the petrol
= 63.9 \text{ ℓ} \div 3 \text{ ℓ/min}
= 21.3 \text{ min}

(b) It would take 21.3 min to drain the petrol completely from the container.

Question 6

Volume of orange juice dispensed out
= 15 \text{ min} \times 200 \text{ mℓ/min}
= 3000 \text{ mℓ}
= 3 \text{ ℓ}

Amount of orange juice left in dispenser
= 5.7 \text{ ℓ} – 3 \text{ ℓ}
= 2.7 \text{ ℓ}

Percentage left = \frac{2.7}{5.7} \times 100\%
= 47.37\% \text{ (2 d.p.)}

(a) 47.37\% of the orange juice in the cylindrical dispenser was left.

Amount of orange juice in container in the end
= \frac{2}{3} \times 18 \text{ cm} \times 18 \text{ cm} \times 18 \text{ cm}
= 3888 \text{ cm}^3
= 3.888 \text{ ℓ}

Amount of orange juice in container at first
= 3.888 \text{ ℓ} – 3\ell
= 0.888 \text{ ℓ}

(b) There was 0.888 ℓ of orange juice in the container at first.

Solutions to Unit 8.3 Drawing Cubes and Cuboids Using Isometric Grids

Let’s Get Started 8.3

1. 2.

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

Let’s Practise 8.3

Question 1

(a)  (b) 5 cubes

(c)