P6 Solutions

In all solutions, u represents units and p represents parts

Answer to Unit 1.1

Question 1

\[
\begin{align*}
A : & \quad B+C+D \quad \quad B+C : \quad D \quad \quad B+C+D \\
2^{25} : & \quad 3^{25} \quad \quad 1^{13} : \quad 4^{13} \quad \quad 5^{13} \\
10 : & \quad 15 \quad \quad 3 : \quad 12 \quad \quad 15
\end{align*}
\]

Summary

\[
\begin{align*}
A : & \quad B+C \\
10 : & \quad 3 \quad \quad 12
\end{align*}
\]

Total = 10u + 15u = 25u

25u = 1000

1u = 1000 ÷ 25 = 40

12u = 12 × 40 = 480

Daniel's contribution was $480.

Question 2

\[
\begin{align*}
A : & \quad C \quad \quad B : \quad G \quad \quad C \\
3^{12} : & \quad 7^{12} \quad \quad 1^{7} : \quad 2^{7} \quad \quad 2^{7} \\
6 : & \quad 14 \quad \quad 7 : \quad 14
\end{align*}
\]

Summary

\[
\begin{align*}
A : & \quad B \quad : \quad G \\
6 : & \quad 7 \quad : \quad 7
\end{align*}
\]

At first

\[
\begin{align*}
A+B : \quad G \\
13^{6} : & \quad 7^{6} \quad \quad 1^{7} : \quad 4^{7} \\
52 : & \quad 28 \quad \quad 7 : \quad 28
\end{align*}
\]

Change = 52u − 7u = 45u

45u = 90

1u = 90 ÷ 45 = 2

28u = 28 × 2 = 56

There are 56 girls in the swimming pool.

Answer to Unit 1.2

Question 1 (cont.)

Total (end) = 21u + 39u = 60u

60u = 60 × 3 = 180

The music department had 180 instruments in the end.

Question 2

\[
\begin{align*}
A : & \quad C \quad \quad B : \quad G \quad \quad C \\
7^{3} : & \quad 5^{3} \quad \quad 2^{3} \\
14 : & \quad 10 \quad \quad 4
\end{align*}
\]

Summary

\[
\begin{align*}
A : & \quad B \quad : \quad C \\
3 : & \quad 7 \quad : \quad 7
\end{align*}
\]

7u = 77

1u = 77 ÷ 7 = 11

Total = 3u + 7u + 7u = 17u

17u = 17 × 11 = 187

The total area of the figure is 187 cm².

Question 2

\[
\begin{align*}
E : & \quad T \quad : \quad Diff \\
3 : & \quad 5 \quad : \quad 2 \\
2^{2} : & \quad 3^{2} \quad : \quad 1^{2} \\
4 : & \quad 6 \quad : \quad 2
\end{align*}
\]

Answer to Unit 1.3

Question 1

\[
\begin{align*}
B+C : \quad A+B \quad : \quad Diff \\
7^{2} : & \quad 5^{2} \quad : \quad 2^{2} \\
14 : & \quad 10 \quad : \quad 4
\end{align*}
\]

Summary

\[
\begin{align*}
A : & \quad B \quad : \quad C \\
3 : & \quad 7 \quad : \quad 7
\end{align*}
\]

7u = 77

1u = 77 ÷ 7 = 11

Total = 3u + 7u + 7u = 17u

17u = 17 × 11 = 187

The total area of the figure is 187 cm².

Question 2
Answer to Unit 1.3

Question 2 (cont.)

1u = 6 + 6
= 12

Total age (6 years’ ago) = 3u + 5u
= 8u

Total age (now) = 8u + 12
= 8 × 12 + 12
= 108

The sum of their current ages is 108 years.

Answer to Unit 1.4

Question 1

(Actual)  S  C
At first 4u  9u
Change + 30u  − 15u

In the end 5u  3u

(Working)  S  C
At first 12u  45u
Change + 90  − 75

In the end 15u  15u

45u − 12u = 90 + 75
33u = 165
1u = 165 ÷ 33
= 5
4u = 4 × 5
= 20

Shelly had 20 figurines at first.

Question 2

(Actual)  P  Q
At first 3u  4u
Change − 30u  − 140u

In the end 2u  2u

(Working)  P  Q
At first 6u  12u
Change − 60  − 420

In the end 6u  6u

<table>
<thead>
<tr>
<th>Item</th>
<th>Quantity</th>
<th>× Value ($)</th>
<th>Total value ($)</th>
</tr>
</thead>
<tbody>
<tr>
<td>C</td>
<td>24</td>
<td>× 7u</td>
<td>168u</td>
</tr>
<tr>
<td>S</td>
<td>14</td>
<td>× 2u</td>
<td>28u</td>
</tr>
<tr>
<td>Total</td>
<td>38</td>
<td></td>
<td>196u</td>
</tr>
</tbody>
</table>

196u = 215.6
1u = 215.6 ÷ 196
= 1.1
7u = 7 × 1.1
= 7.7
A cup cost $7.70.

Answer to Unit 1.5

Question 1

<table>
<thead>
<tr>
<th>Items</th>
<th>Quantity</th>
<th>× Value ($)</th>
<th>Total value ($)</th>
</tr>
</thead>
<tbody>
<tr>
<td>B</td>
<td>5u</td>
<td>× 22</td>
<td>110u</td>
</tr>
<tr>
<td>T</td>
<td>1u</td>
<td>× 12</td>
<td>12u</td>
</tr>
<tr>
<td>C</td>
<td>10u</td>
<td>× 32</td>
<td>320u</td>
</tr>
<tr>
<td>Total</td>
<td>16u</td>
<td></td>
<td>442u</td>
</tr>
</tbody>
</table>

442u = 884
1u = 884 ÷ 442
= 2
16u = 16 × 2
= 32

He bought a total of 32 ties, belts and cufflinks.

Question 2

<table>
<thead>
<tr>
<th>Items</th>
<th>Quantity</th>
<th>× Value ($)</th>
<th>Total value ($)</th>
</tr>
</thead>
<tbody>
<tr>
<td>C</td>
<td>24</td>
<td>× 7u</td>
<td>168u</td>
</tr>
<tr>
<td>S</td>
<td>14</td>
<td>× 2u</td>
<td>28u</td>
</tr>
<tr>
<td>Total</td>
<td>38</td>
<td></td>
<td>196u</td>
</tr>
</tbody>
</table>

196u = 215.6
1u = 215.6 ÷ 196
= 1.1
7u = 7 × 1.1
= 7.7
A cup cost $7.70.

Answer to Unit 1.6

Question 1

<table>
<thead>
<tr>
<th>Total Syrup</th>
<th>5u ÷ 2 (10u)</th>
</tr>
</thead>
<tbody>
<tr>
<td>B</td>
<td>3u ÷ 2 (6u)</td>
</tr>
<tr>
<td>Remainder</td>
<td>2u ÷ 2 (4u)</td>
</tr>
<tr>
<td>M</td>
<td>3u</td>
</tr>
<tr>
<td>Left</td>
<td>1u</td>
</tr>
</tbody>
</table>

1u = 210
6u = 210 × 6
= 1260
7
10 of bottle = 1260
1
10 of bottle = 1260 ÷ 7
= 180
3
10 of bottle = 3 × 180
= 540

Mrs Wong would need to prepare 540 l more to fill up the bottle completely.
Answer to Unit 1.6

Question 2

Total papers

1<sup>st</sup>

Remainder

$\frac{3}{8}T + 3$

24

$\frac{1}{8}R + 3$

Left

$\frac{3}{8}R = 3 + 15$

= 18

$\frac{1}{8}R = 18 + 3$

= 6

$\frac{1}{4}R = 6 \times 4$

= 24

$\frac{3}{8}T = 24 + 3$

= 27

$\frac{1}{8}T = 27 + 3$

= 9

$\frac{1}{4}T = 8 \times 9$

= 36

Lina used 72 pieces of origami paper.

Question 3

Total flour 5.4 kg

Cu

Remainder 1

5u<sup>15</sup> (35u)

Co

Remainder 2

3u<sup>17</sup> (21u)

P

Left

5u<sup>15</sup> (15u)

5.4 kg = 5400 g

45u = 5400

1u = 5400 ÷ 45

= 120

10u = 10 \times 120

= 1200

1200 g = 1 kg 200 g

There were 1 kg 200 g of flour left in the container.

Answer to Unit 1.7

Question 1

$\frac{2}{3}M = \frac{3}{5}F$

$\frac{6}{9}M = \frac{6}{10}F$

M : W

9 : 10

Total = 9u + 10u

= 19u

19u = 190

1u = 190 \div 19

= 10

Total children = 3u + 4u

= 7u

7u = 7 \times 10

= 70

There were 70 children at the engagement party.

Question 2

$\frac{5}{12}S = \frac{2}{3}M$

$\frac{5}{12}S = \frac{2}{5}C$

S : M

S : C

10 : 12<sup>1/4</sup>

40 : 45

40 : 48

Summary

S : M : C

40 : 48 : 45

48u = 96

1u = 96 \div 48

= 2

Total = 40u + 48u + 45u

= 133u

133u = 133 \times 2

= 266

Karen’s total score was 266 marks.
Chapter 2  
Advanced Model Drawing

Let's Get Started

2.

At first

\[ \begin{array}{c|c|c}
\text{T} & \frac{2}{2} T & 32 \\
\hline
\text{P} & 10u & 10 \\
\end{array} \]

\[ \begin{array}{c|c|c}
\text{T} & \frac{2}{2} (10u + 32) & \frac{1}{2} (5u + 16) \\
\text{P} & \frac{10}{10} (10u) & \frac{3}{10} (3u) \\
\end{array} \]

In the end

\[ \begin{array}{c|c|c}
\text{T} & 5u & 16 \\
\text{P} & 5u & 16 \\
\end{array} \]

3.

In the end

\[ \begin{array}{c|c|c}
\text{R} & \frac{3}{3} (3u + 15) & \frac{2}{2} (9u + 45) \\
\text{G} & \frac{3}{10} (3u) & \frac{7}{10} (7u) \\
\end{array} \]

At first

\[ \begin{array}{c|c|c}
\text{R} & 10u & 2u \\
\text{G} & 10u & 60 \\
\end{array} \]

4.

At first

\[ \begin{array}{c|c|c}
\text{K} & \frac{8}{8} (40u) & \frac{2}{2} (6u) \\
\text{L} & \frac{5}{5} (40u) & \frac{2}{2} (16u) \\
\end{array} \]

In the end

\[ \begin{array}{c|c|c}
\text{K} & 24u & 220 \\
\text{L} & 24u & \\
\end{array} \]

Let's Learn

Ask Yourself

1. There is sufficient information given at the beginning of the question to form a relationship to solve the question.
2. The problem should be solved using the Model-drawing approach as it involves the keywords “more than/less than” as well as a whole number.

Answer to Advanced Model Drawing (More than/Less than)

Question 1

At first

\[ \begin{array}{c|c|c}
\text{C} & 15u & 24 \\
\text{L} & 15u & \\
\end{array} \]

In the end

\[ \begin{array}{c|c|c}
\text{C} & \frac{2}{2} (15u + 24) & \frac{2}{3} (10u + 16) \\
\text{L} & \frac{5}{5} (15u) & \frac{1}{3} (3u) \\
\end{array} \]

In the end

\[ \begin{array}{c|c|c}
\text{C} & 5u & 8 \\
\text{L} & 5u & 20 \\
\end{array} \]

\[ \begin{array}{c|c|c}
\text{K} & \frac{4}{4} (112) & \frac{4}{4} (25u + 70) \\
\text{G} & \frac{2}{2} (40u) & \frac{2}{2} (15u + 42) \\
\end{array} \]

In the end

\[ \begin{array}{c|c|c|c|c}
\text{K} & 24u & 220 \\
\text{L} & 24u & \\
\end{array} \]

56 cars cleared the gantry.

Question 2

At first

\[ \begin{array}{c|c|c}
\text{B} & 40u & 112 \\
\text{G} & 40u & \\
\end{array} \]

\[ \begin{array}{c|c|c}
\text{B} & \frac{6}{6} (40u + 112) & \frac{5}{5} (25u + 70) \\
\text{G} & \frac{5}{5} (40u) & \frac{2}{2} (16u) \\
\end{array} \]

In the end

\[ \begin{array}{c|c|c}
\text{B} & 15u & 15 \\
\text{G} & 24u & \\
\end{array} \]

Page 4  
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Question 2 (Cont.)

24u − 15u = 9u
9u = 27
1u = 27 ÷ 9 = 3
Total (took part) = 25u + 70 + 16u = 41u + 70
41u + 70 = 41 × 3 + 70 = 193

193 students took part in the performance.

Question 3

At first

<table>
<thead>
<tr>
<th></th>
<th>At first</th>
<th>Sold</th>
<th>In the end (Left)</th>
</tr>
</thead>
<tbody>
<tr>
<td>C</td>
<td>36u</td>
<td>45u</td>
<td>(36u + 45)</td>
</tr>
<tr>
<td>J</td>
<td>36u</td>
<td>45u</td>
<td>(20u + 25)</td>
</tr>
</tbody>
</table>

20u − 9u = 11u
11u = 66
1u = 66 ÷ 11 = 6
Total (end) = 16u + 20 + 27u = 43u + 20
43u + 20 = 43 × 6 + 20 = 278

278 crossword puzzle books and jigsaw puzzles remained in total.

Question 4

At first

<table>
<thead>
<tr>
<th></th>
<th>At first</th>
<th>Sold</th>
<th>In the end (Left)</th>
</tr>
</thead>
<tbody>
<tr>
<td>T</td>
<td>12u</td>
<td>30u</td>
<td>(12u + 30)</td>
</tr>
<tr>
<td>S</td>
<td>12u</td>
<td>30u</td>
<td>(20u + 50)</td>
</tr>
</tbody>
</table>

2u = 300 − 74 = 226
1u = 226 ÷ 2 = 113
D (end) = 7 × 113 − 200 = 591

Deanna had $591 in the end.

For more review questions, please visit www.onsponge.com
Answer to Advanced Model Drawing (Equal Stage at first)

**Question 2 (Cont.)**

**In the end**

<table>
<thead>
<tr>
<th></th>
<th>10u</th>
<th>15u</th>
</tr>
</thead>
<tbody>
<tr>
<td>M</td>
<td>7u</td>
<td>18u</td>
</tr>
<tr>
<td>F</td>
<td></td>
<td>48</td>
</tr>
</tbody>
</table>

10u + 7u + 25u = 78 + 48

42u = 126

1u = 126 ÷ 42

= 3

25u = 25 × 3

= 75

Each of them received 75 pins at first.

---

**Answer to Advanced Model Drawing (Equal Stage End)**

**Question 1**

**In the end**

<table>
<thead>
<tr>
<th></th>
<th>15u</th>
</tr>
</thead>
<tbody>
<tr>
<td>D</td>
<td></td>
</tr>
<tr>
<td>W</td>
<td>15u</td>
</tr>
<tr>
<td>S</td>
<td>15u</td>
</tr>
</tbody>
</table>

At first

<table>
<thead>
<tr>
<th></th>
<th>56</th>
</tr>
</thead>
<tbody>
<tr>
<td>D</td>
<td></td>
</tr>
<tr>
<td>W</td>
<td>15u</td>
</tr>
<tr>
<td>S</td>
<td>15u</td>
</tr>
</tbody>
</table>

15u + 15u + 15u + 5u + 9u = 298 + 56

59u = 354

1u = 354 ÷ 59

= 6

D (at first) = 15 × 6 − 56

= 34

Davis had 34 cards at first.

---

**Answer to Advanced Model Drawing (Repeated Items)**

**Question 1**

<table>
<thead>
<tr>
<th></th>
<th>1u</th>
<th>3u</th>
<th>3u</th>
</tr>
</thead>
<tbody>
<tr>
<td>K</td>
<td></td>
<td>72</td>
<td>25u</td>
</tr>
<tr>
<td>C</td>
<td>3u</td>
<td>216</td>
<td></td>
</tr>
<tr>
<td>S</td>
<td>3u</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

\(\frac{2}{25}\) of total = 3u

\(\frac{1}{25}\) of total = 1u

\(\frac{25}{25}\) of total = 25u

25u − 3u − 3u − 1u = 216 + 72

18u = 288

1u = 288 ÷ 18

= 16

25u = 25 × 16

= 400

There are 400 buns in the bakery shop.

---

**Question 2**

**In the end**

<table>
<thead>
<tr>
<th></th>
<th>20u</th>
<th>8u</th>
</tr>
</thead>
<tbody>
<tr>
<td>D</td>
<td>252</td>
<td></td>
</tr>
<tr>
<td>S</td>
<td>222</td>
<td></td>
</tr>
<tr>
<td>R</td>
<td>28u</td>
<td></td>
</tr>
</tbody>
</table>

At first

<table>
<thead>
<tr>
<th></th>
<th>2u</th>
<th>6</th>
</tr>
</thead>
<tbody>
<tr>
<td>H</td>
<td>23</td>
<td></td>
</tr>
<tr>
<td>R</td>
<td></td>
<td></td>
</tr>
<tr>
<td>B</td>
<td>15</td>
<td></td>
</tr>
<tr>
<td>N</td>
<td>2u</td>
<td></td>
</tr>
</tbody>
</table>

5u = 6 + 15 + 6 + 23

= 50

1u = 50 ÷ 5

= 10

2u + 6 = 2 × 10 + 6

= 26

There are 26 rings in the shop.
Answer to Advanced Model Drawing (Internal Transfer)

Question 1

<table>
<thead>
<tr>
<th></th>
<th>At first</th>
<th>Change</th>
<th>End</th>
</tr>
</thead>
<tbody>
<tr>
<td>B</td>
<td>10u</td>
<td>10u</td>
<td>(10u + 200)</td>
</tr>
<tr>
<td>K</td>
<td>10u</td>
<td>+3u + 60</td>
<td>13u + 60</td>
</tr>
</tbody>
</table>

In the end

<p>| | | | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>B</td>
<td>7u</td>
<td>126</td>
<td>14</td>
</tr>
<tr>
<td>K</td>
<td>13u</td>
<td>14</td>
<td>46</td>
</tr>
</tbody>
</table>

13u – 7u = 126
6u = 126
1u = 126 ÷ 6 = 21
3u + 60 = 3 × 21 + 60 = 123

123 people had moved to Kusu Beach.

Question 2

At first

<table>
<thead>
<tr>
<th></th>
<th>At first</th>
<th>Change</th>
<th>End</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>12u</td>
<td>48</td>
<td>(12u + 48)</td>
</tr>
<tr>
<td>B</td>
<td>12u</td>
<td>48</td>
<td>(12u + 48)</td>
</tr>
</tbody>
</table>

In the end

<p>| | | | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>7u</td>
<td>28</td>
<td>2</td>
</tr>
<tr>
<td>B</td>
<td>7u</td>
<td>28</td>
<td>2</td>
</tr>
</tbody>
</table>

17u – 7u = 28 + 2
10u = 30
1u = 30 ÷ 10 = 3
22u + 48 = 24 × 3 + 48 = 120

There are 120 children altogether in both campsites.

Question 3

At first

<table>
<thead>
<tr>
<th></th>
<th>At first</th>
<th>Change</th>
<th>End</th>
</tr>
</thead>
<tbody>
<tr>
<td>L</td>
<td>5u</td>
<td>2400</td>
<td></td>
</tr>
<tr>
<td>M</td>
<td>5u</td>
<td>2400</td>
<td></td>
</tr>
</tbody>
</table>

Question 3 (Cont.)

At first

<table>
<thead>
<tr>
<th></th>
<th>At first</th>
<th>Change</th>
<th>End</th>
</tr>
</thead>
<tbody>
<tr>
<td>L</td>
<td>5u</td>
<td>2400</td>
<td>2400</td>
</tr>
<tr>
<td>M</td>
<td>5u</td>
<td>2400</td>
<td>2400</td>
</tr>
</tbody>
</table>

In the end

<p>| | | | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>L</td>
<td>4u</td>
<td>52</td>
<td>1080</td>
</tr>
<tr>
<td>M</td>
<td>4u</td>
<td>52</td>
<td>1080</td>
</tr>
</tbody>
</table>

2u = 52
1u = 52 ÷ 2 = 26
3u + 1440 = 3 × 26 + 1440 = 1518

Lynette transferred $1518 to Michelle.

Question 4

At first

<table>
<thead>
<tr>
<th></th>
<th>At first</th>
<th>Change</th>
<th>End</th>
</tr>
</thead>
<tbody>
<tr>
<td>H</td>
<td>5u</td>
<td>45</td>
<td></td>
</tr>
<tr>
<td>L</td>
<td>5u</td>
<td>45</td>
<td></td>
</tr>
</tbody>
</table>

In the end

<p>| | | | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>H</td>
<td>4u + 36</td>
<td>+(4u + 6)</td>
<td>8u + 42</td>
</tr>
<tr>
<td>L</td>
<td>4u + 36</td>
<td>+(4u + 6)</td>
<td>8u + 42</td>
</tr>
</tbody>
</table>

Mrs Hagen gave Letilia 14 dumplings.
**Answer to Unit 3.1**

### Let’s Get Started 3.1

1. | Figure no. | 1 | 2 | 3 | 4 | 5 | 6 | ... | 18 |
---|---|---|---|---|---|---|---|---|
No. of dots | 2 | 5 | 8 | 11 | 14 | \[+3\] | \[+3\] | \[+3\] | \[+3\] |

(a) Difference is 3.
(b) Test (Figure 1): \(1 \times 3 - 1 = 2\)
Unique term: Figure no. \(\times 3 - 1\)
(c) No. of dots in Figure 6 = \(6 \times 3 - 1\) = 17
No. of dots in Figure 18 = \(18 \times 3 - 1\) = 53

2. (a) Difference = 7 – 3 = 4
(b) Unique term (No. of dots) = Fig no. \(\times 4 - 1\)
(c) No. of dots in Figure 6 = \(6 \times 4 - 1\) = 23
No. of dots in Figure 15 = \(15 \times 4 - 1\) = 59

### Lets’ Learn 3.1

#### Ask yourself
1. There is an increase in the number of squares by 1.
   This is a number pattern involving common difference.
2. General pattern: Number of squares is the same as the Figure Number.

#### Think Further
(a) | Figure no. | Pattern to find (No. of squares) | Pattern to find (No. of circles) |
---|---|---|---|
1 | 1 \(\times 2\) | 1 \(\times 4 + 2\) |
2 | 2 \(\times 2\) | 2 \(\times 4 + 2\) |
3 | 3 \(\times 2\) | 3 \(\times 4 + 2\) |
4 | 4 \(\times 2\) | 4 \(\times 4 + 2 = 18\) |
5 | 5 \(\times 2\) | 5 \(\times 4 + 2 = 22\) |

(b) Unique term (No. of circles) = Figure no. \(\times 4 + 2\)

### Let’s Practise 3.1

#### Question 1

(a) | Figure no. | No. of triangles | Total no. of dots |
---|---|---|---|
1 | 2 | 10 |
2 | 4 | 14 |
3 | 6 | 18 |
4 | 8 | 22 |
5 | 10 | 26 |

### Question 2

(a) Unique term (No. of shaded coins) = Figure no. \(\times 2 + 2\)
Working Backwards
\(A \times 2 = 40 - 2\) = 38
\(A = 38 + 2\) = 19
(ii) Unique term (No. of unshaded coins) = Figure no.
\(B = 19\)
(iii) Unique term (Total no. of coins) = Figure no.
\(C = 19 \times 3 + 2\) = 59

### Question 3

(a) Unique term (No. of matchsticks) = Figure no. \(\times 5 + 1\)
No. of matchsticks in Figure 5 = \(5 \times 5 + 1\) = 26
(b) Working backwards
\(\text{Figure no.} \times 5 = 131 - 1\) = 130
\(\text{Figure no.} = 130 \div 5\) = 26
The figure number formed is Figure 26.
Answer to Unit 3.1

Question 4 (Cont.)
(b) Unique term (No. of squares) = Figure no. × 10 + 2
No. of squares in Figure 500 = 500 × 10 + 2
= 5002

Working backwards
Figure no. × 10 = 182 – 2
= 180
Figure no. = 180 ÷ 10
= 18

<table>
<thead>
<tr>
<th>Figure No.</th>
<th>Number of squares</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>12</td>
</tr>
<tr>
<td>2</td>
<td>22</td>
</tr>
<tr>
<td>3</td>
<td>21</td>
</tr>
<tr>
<td>…</td>
<td>…</td>
</tr>
<tr>
<td>18</td>
<td>182</td>
</tr>
<tr>
<td>500</td>
<td>5002</td>
</tr>
</tbody>
</table>

Answer to Unit 3.2

Let’s Get Started 3.2

1. (a) 1 = 1 × 1
   4 = 2 × 2
   9 = 3 × 3
   16 = 4 × 4

(b) Figure 1: 1 × 1 = 1
Figure 2: 2 × 2 = 4
Figure 3: 3 × 3 = 9
The number of dots in each figure is the square of its figure number or it can be represented as (Figure no. x Figure no.).

(c) No of dots in Figure 5 = 5 × 5
   = 25
No of dots in Figure 6 = 6 × 6
   = 36
No of dots in Figure 13 = 13 × 13
   = 169

2. (a) Figure 1 = 1 × 1 = 1
   Figure 2 = 2 × 2 = 4
   Figure 3 = 3 × 3 = 9
   Figure 4 = 4 × 4 = 16
The number of squares in each figure is the square of its figure number.

(b) Unique term (No. of squares) = Figure no. × Figure no.

Let’s Learn 3.2

Ask Yourself
1. There is an increase in the number of squares. This type of number pattern is known as square numbers.
2. General pattern: No. of dots = Figure no. × Figure no.

Think Further
(a)

<table>
<thead>
<tr>
<th>Figure no.</th>
<th>No. of dots</th>
<th>Pattern to find no. of dots</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>2</td>
<td>1² + 1</td>
</tr>
<tr>
<td>2</td>
<td>5</td>
<td>2² + 1</td>
</tr>
<tr>
<td>3</td>
<td>10</td>
<td>3² + 1</td>
</tr>
<tr>
<td>4</td>
<td>17</td>
<td>4² + 1</td>
</tr>
<tr>
<td>5</td>
<td>26</td>
<td>5² + 1</td>
</tr>
</tbody>
</table>

(b) Unique term (No. of dots) = Figure no. × Figure no. + 1

Let’s Practise 3.2

Question 1

(a)  No. of dots (Figure 5) = 5 × 5
    = 25

(b) Figure no. = \(\sqrt{81}\)
    = 9

(c) Figure no. = \(\sqrt{256}\)
    = 16

Question 2

(a)  No. of circles (Figure 5) = 11 × 11
    = 121

(b) Unique term (No. of circles) = Figure no. × Figure no.
    No. of circles = 11 × 11
    = 121

(c)  No. of triangles = 2
    No. of circles = 402 – 2
    = 400
Question 2 (Cont.)

Working backwards

Figure no. = \(\sqrt{400}\)

= 20

There will be 402 circles and triangles in Figure 20.

Question 3

(a)

<table>
<thead>
<tr>
<th>Figure no.</th>
<th>Number of shaded rectangles</th>
<th>Pattern to find no. of shaded rectangles</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>2</td>
<td>1 \times 3 – 1</td>
</tr>
<tr>
<td>2</td>
<td>5</td>
<td>2 \times 3 – 1</td>
</tr>
<tr>
<td>3</td>
<td>8</td>
<td>3 \times 3 – 1</td>
</tr>
<tr>
<td>...</td>
<td></td>
<td>Figure no. \times 3 – 1</td>
</tr>
</tbody>
</table>

No. of shaded rectangles = 16 \times 3 – 1

= 47

(b) Working backwards

Figure no. \times 3 = 728 + 1

= 729

Figure no. = 729 + 3

= 243

There will be 728 shaded rectangles in Figure 243.

(c)

<table>
<thead>
<tr>
<th>Figure no.</th>
<th>Total number of rectangles</th>
<th>Pattern to find no. of shaded rectangles</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>4</td>
<td>2 \times 2</td>
</tr>
<tr>
<td>2</td>
<td>9</td>
<td>3 \times 3</td>
</tr>
<tr>
<td>3</td>
<td>16</td>
<td>4 \times 4</td>
</tr>
<tr>
<td>...</td>
<td></td>
<td>Figure no. – 1 \times Figure no. – 1</td>
</tr>
</tbody>
</table>

Working backwards

Figure no. \times 3 = 1091 + 1

= 1092

Figure no. = 1092 \div 3

= 364

364 + 1 = 365

365 \times 365 = 133 225

There will be a total of 133 225 rectangles in a figure with 1091 shaded rectangles.

Question 4

(a) Unique term (No. of unshaded squares)

= (Fig no. – 1) \times (Fig no. – 1)

No. of unshaded squares in Figure 16 = 15 \times 15

= 225

There are 225 unshaded squares in Figure 16.

(b) No. of unshaded squares in Figure 42 = 41 \times 41

= 168

Area of unshaded squares = 1681 \times 25

= 42 025

The area of the unshaded squares in Figure 42 is 42 025 cm\(^2\).

Question 5

(a) No. of cubes in Figure 3 = 1 + 4 + 9

= 14

No. of cubes in Figure 4 = 1 + 4 + 9 + 16

= 30

Difference = 30 – 14

= 16

16 more cubes are needed to make Figure 4.

(b) Difference = (9 \times 9) + (10 \times 10)

= 181

(c) No. of cubes in Layer 18 = 18 \times 18

= 324

Question 6

(a) Unique term (No. of fishes)

= (Day no. – 1) \times (Day no. – 1) + 7

No. of fishes in Day 45 = 44 \times 44 + 7

= 1943

There will be 1943 fishes on Day 45.

(b) Working backwards

3488 – 7 = 3481

\(\sqrt{3481}\) = 59

Fig no. = 59 + 1

= 60

There will be 3488 fishes on Day 60.

(c) No. of sets = 1573 \div 6.5

= 242

No. of fish = 4 \times 242

= 968

Working backwards

968 – 7 = 961

\(\sqrt{961}\) = 31

Fig no. = 31 + 1

= 32

Berlin’s father will earn $1573 on Day 32.
Answer to Unit 3.3

Let’s Get Started 3.3

1. (a) There is a consecutive increase by 1 from one figure number to the next.
(b) Figure 1 = \(\frac{1 \times 2}{2} = 1\)
Figure 2 = \(\frac{2 \times 3}{2} = 3\)
The number of dots in the consecutive figures follows the rule of triangle number where \(\text{Figure no.} \times \text{Figure no.} + 1\).

2. (a) Figure 1 = \(\frac{1 \times 2}{2} = 1\)
Figure 2 = \(\frac{2 \times 3}{2} = 3\)
Figure 3 = \(\frac{3 \times 4}{2} = 6\)
The number of squares in the consecutive figures follows the rule of triangle number where \(\text{Figure no.} \times \text{Figure no.} + 1\).
(b) Unique terms: \(\frac{\text{Figure no.} \times \text{Figure no.} + 1}{2}\)

Let’s Practise 3.3

Question 1
(a) Unique term (Total no. of circles) = \(\frac{\text{Figure no.} \times \text{Figure no.} + 1}{2}\)
Total no. of circles in Figure 12 = \(\frac{12 \times 13}{2} = 78\)
There are 78 circles in Figure 12.
(b) Working backwards
\[1540 \times 2 = 3080\]
\[\sqrt{3080} \approx 55\]
Test 1: \(54 \times 55 = 2970\)
Test 2: \(55 \times 56 = 3080\)
There are 1540 circles in Figure 55.

Question 2
(a) Unique term (Total no. of apples) = \(\frac{\text{Figure no.} \times \text{Figure no.} + 1}{2}\)
Total no. of apples in Figure 10 = \(\frac{10 \times 11}{2} \times 10 = 550\)
There are 550 apples harvested on the 10th day.
(b) 1530 ÷ 10 = 153
\[\frac{\text{Figure no.} \times \text{Figure no.} + 1}{2} = 153\]
\[\text{Figure no.} \times (\text{Figure no.} + 1) = 306\]
\[\sqrt{306} = 17.49286\]
= 17

Question 3
(a) Unique term (Total no. of triangles) = \(\frac{\text{Figure no.} \times \text{Figure no.} + 1}{2}\)
Total no. of triangles in Figure 22 = \(22 \times 23\)
= 484
There are 484 triangles in Figure 22.
(b) Working backwards
\[\sqrt{961} = 31\]
There will be a total of 961 triangles in Figure 31.
(b) Working backwards
\[\text{Figure no.} = \sqrt{121} = 11\]
Unique term (No. of shaded triangles) = \(\frac{\text{Figure no.} \times \text{Figure no.} + 1}{2}\)
No. of shaded triangles in Figure 11 = \(\frac{11 \times 12}{2}\)
= 66
There are 66 shaded triangles.
(c) Unique term (No. of unshaded triangles) = \(\frac{\text{Figure no.}}{2} \times \text{Figure no.} + 2\)
Working backwards
\[2485 \times 2 = 4970\]
\[\sqrt{4974} \approx 70\]
Test 1: \(69 \times 70 = 4830\)
Test 2: \(70 \times 71 = 4970\)
There will be 2485 unshaded triangles in Figure 69.

Question 4
(a) Unique term (Total no. of crosses) = \(\frac{\text{Figure no.} \times \text{Figure no.} + 1}{2}\)
Total no. of crosses (Figure 5) = \(\frac{5 \times 6}{2}\)
= 15
No. of unshaded crosses = 15 – 4
= 11
Unique term (No. of shaded crosses) = \(\frac{\text{Figure no.} – 1}{2}\)
No. of shaded crosses (Figure 8) = 8 – 1
= 7
Total no. of crosses (Figure 8) = \(\frac{8 \times 9}{2}\)
= 36
No. of unshaded crosses = 36 – 7
= 29
(b) Total no. of crosses (Figure 29) = \(\frac{29 \times 30}{2}\)
= 435
There is a total of 435 crosses in Figure 29.
Answer to Unit 3.3

Question 4 (Cont.)
(c) Working backwards
\[741 \times 2 = 1482\]
\[\sqrt{1482} = 70\]
Test 1: 37 \times 38 = 1406
Test 2: 38 \times 39 = 1482
There will be 741 crosses in Figure 38.

(d) Working backwards
\[2080 \times 2 = 4160\]
\[\sqrt{4160} \approx 64\]
Test 1: 63 \times 64 = 4032
Test 2: 64 \times 65 = 4160
No. of shaded crosses (Figure 64) = 64 – 1 = 63
No. of unshaded crosses = 2080 – 63 = 2017
There are 2017 unshaded crosses.

Question 5 (Cont.)
(d) 2163 – 1 = 2162
2162 ÷ 2 = 1081
\[\frac{\text{Fig no.}}{2} \times (\text{Fig No.} + 1) = 1081\]
(Fig No.) \times (Fig No. +1) = 2162
\[\sqrt{2162} = 46.4973\]
Test: 46 \times 47 = 2162
Layer: 46 + 1 = 47
46 \times 2 = 92
2162 – 91 = 2071
The number on the extreme left of the layer is 2071.

Chapter 4 Circles

Let’s Get Started 4.1
1. Area of shaded part
\[= 25 \text{ cm} \times 25 \text{ cm} - \frac{1}{4} \pi \times 25 \text{ cm} \times 25 \text{ cm}\]
\[= 134 \text{ cm}^2\]

2. Area of shaded part
\[= \frac{1}{4} \pi \times 5 \text{ cm} \times 5 \text{ cm} - \frac{1}{2} \pi \times 5 \text{ cm} \times 5 \text{ cm}\]
\[= 7 \text{ cm}^2\]

Let’s Learn 4.1
1. The figures are 1 large quadrant of radius 20 cm, 1 small quadrant of radius 8 cm and a rectangle measuring 8 cm by 20 cm.

Let’s Practise 4.1
Question 1
Area of shaded parts
\[= 36 \text{ cm} \times 36 \text{ cm} - \pi \times 18 \text{ cm} \times 18 \text{ cm}\]
\[= 278 \text{ cm}^2\]
The area of the shaded parts is 278 cm².

Question 2
Perimeter of unshaded Region Q = 2 \times \pi \times 12 \text{ cm}
\[= 75 \text{ cm}\]
The perimeter of the unshaded Region Q is 75 cm.
Area of unshaded Region Q
\[= 24 \text{ cm} \times 24 \text{ cm} - \pi \times 12 \text{ cm} \times 12 \text{ cm}\]
\[= 124 \text{ cm}^2\]
The area of unshaded Region Q is 124 cm².

Question 3
Perimeter of shaded region
\[= \frac{5}{2} \times 2 \times 3.14 \times 12 \text{ cm} + 36 \text{ cm} + 24 \text{ cm} + 36 \text{ cm}\]
\[= 209.04 \text{ cm}\]
The perimeter of the shaded region is 209.04 cm.
For more review questions, please visit www.onsponge.com
Answer to Unit 4.2

Question 2 (Cont.)

Area of small circles
\[ = \frac{22}{7} \times 7 \text{ cm} \times 7 \text{ cm} \times 7 \]
\[ = \frac{22}{7} \times 49 \text{ cm}^2 \times 7 \]
\[ = 1078 \text{ cm}^2 \]

Area of shaded parts
\[ = \frac{1386 - 1078}{12} \times 2 \]
\[ = 51 \frac{1}{3} \text{ cm}^2 \]
The area of the shaded parts is \[51 \frac{1}{3} \text{ cm}^2\].

Question 3

Area of the shaded parts
\[ = 3.14 \times 10 \text{ cm} \times 10 \text{ cm} \]
\[ = 314 \text{ cm}^2 \]
The area of the shaded parts is \[314 \text{ cm}^2\].

Question 4

Area of figure
\[ = \frac{1}{4} \times \frac{22}{7} \times 7 \text{ cm} \times 7 \text{ cm} \]
\[ = 192.5 \text{ cm}^2 \]
The area of the figure is \[192.5 \text{ cm}^2\].

Perimeter of figure
\[ = \frac{1}{4} \times 2 \times \frac{22}{7} \times 7 \text{ cm} + 14 \text{ cm} \]
\[ = 69 \text{ cm} \]
The perimeter of the figure is \[69 \text{ cm}\].

Question 5

Area of shaded figure (3 small squares)
\[ = 192 \text{ cm}^2 \]
Area of 1 small square
\[ = 192 \text{ cm}^2 \div 3 \]
\[ = 64 \text{ cm}^2 \]
Side of square
\[ = \sqrt{64} \text{ cm}^2 \]
\[ = 8 \text{ cm} \]
Radius of quadrant
\[ = 2 \times 8 \text{ cm} \]
\[ = 16 \text{ cm} \]
Perimeter of shaded parts
\[ = \frac{1}{2} \times 2 \times 3.14 \times 16 \text{ cm} + 4 \times 8 \text{ cm} \]
\[ = 82.24 \text{ cm} \]
The perimeter of the shaded parts is \[82.24 \text{ cm}\].

Answer to Chapter 4 Review Questions

Question 1

(a) \(AB = 4u, BC = 3u\)
Perimeter
\[ = 4u + 3u + 4u + 3u \]
\[ = 14u \]
\[14u = 84 \text{ cm} \]
\[1u = 84 \text{ cm} \div 14 \]
\[ = 6 \text{ cm} \]
\[3u = 3 \times 6 \text{ cm} \]
\[ = 18 \text{ cm} \]
The length of each small rectangle is \[18 \text{ cm}\].

(b) \(BC = 3 \times 6 \text{ cm} \)
\[ = 18 \text{ cm} \]
Area of \(ABCD = 24 \text{ cm} \times 18 \text{ cm} \)
\[ = 432 \text{ cm}^2 \]
Area of shaded portions
\[ = 432 \text{ cm}^2 - (\frac{1}{4} \times 3.14 \times 18 \text{ cm} \times 18 \text{ cm}) + 6 \text{ cm} \times 6 \text{ cm} \]
\[ = 213.66 \text{ cm}^2 \]
The area of the shaded portions is \[213.66 \text{ cm}^2\].

Question 2

(a) Circumference of \(ABC = \frac{1}{2} \times 2 \times 3.14 \times 3 \text{ cm} \)
\[ = 9.42 \text{ cm} \]
Circumference of \(CDE = \frac{1}{2} \times 2 \times 3.14 \times 4 \text{ cm} \)
\[ = 12.56 \text{ cm} \]
Circumference of \(ACE = \frac{1}{2} \times 2 \times 3.14 \times 5 \text{ cm} \)
\[ = 15.7 \text{ cm} \]
Perimeter of \(PQRS = 4 \times \sqrt{50} \text{ cm} \)
Perimeter of shaded regions
\[ = 9.42 \text{ cm} + 12.56 \text{ cm} + 15.7 \text{ cm} + 4 \times \sqrt{50} \text{ cm} \]
\[ = 65.96 \text{ cm} \]
The perimeter of the shaded regions is \[65.96 \text{ cm}\].

(b) Area of \(PQRS = \frac{1}{2} \times 10 \text{ cm} \times 5 \text{ cm} \times 2 \)
\[ = 50 \text{ cm}^2 \]
Area of unshaded part in semicircle \(ACE\) not covered by triangle \(ACE\)
\[ = \frac{1}{2} \times 3.14 \times 5 \text{ cm} \times 5 \text{ cm} \div 2 \times 6 \text{ cm} \times 8 \text{ cm} \]
\[ = 15.25 \text{ cm}^2 \]
Area of shaded parts in semicircles \(ABC\) and \(CDE\)
\[ = \frac{1}{2} \times 3.14 \times 3 \text{ cm} \times 3 \text{ cm} \div \frac{1}{2} \times 3.14 \times 4 \text{ cm} \times 4 \text{ cm} \]
\[ = 24 \text{ cm}^2 \]
Total area of shaded regions
\[ = 50 \text{ cm}^2 + 24 \text{ cm}^2 \]
\[ = 74 \text{ cm}^2 \]
The total area of the 3 shaded regions is \[74 \text{ cm}^2\].
Answer to Chapter 4 Review Questions

Question 3
(a) \( OL = 5 \text{ cm} - 2 \text{ cm} = 3 \text{ cm} \)
   The length \( OL \) is \( 3 \text{ cm} \).
(b) Area of shaded triangle = \( \frac{1}{2} \times 4 \text{ cm} \times 3 \text{ cm} = 6 \text{ cm}^2 \)
Area of shaded \( \frac{3}{4} \) circle = \( \frac{3}{4} \pi \times 5 \text{ cm} \times 5 \text{ cm} = 18.75 \pi \text{ cm}^2 \)
Area of shaded parts = \( 6 \text{ cm}^2 + 18.75 \pi \text{ cm}^2 \approx 64.9 \text{ cm}^2 \)
The area of the shaded parts is \( 64.9 \text{ cm}^2 \).

Question 4
Area of the shaded parts
\[
= \frac{1}{2} \pi \left( \frac{9}{2} \right)^2 + 2 \times \frac{1}{2} \times 9 \times 9
\]
\[
= 208.2345 \text{ cm}^2
\]
\[
= 208.2 \text{ cm}^2
\]

Question 5
\( A + B = 110 \text{ cm}^2 \)
\( A + B + C = 180 \text{ cm}^2 \)
\( C = 180 - 110 = 70 \text{ cm}^2 \)
\( B + C + D = 130 \text{ cm}^2 \)
\( B + D = 130 - 70 = 60 \text{ cm}^2 \)
The area of shaded parts is \( 60 \text{ cm}^2 \).

Question 6
Area of the shaded part
\[
= \left( \frac{1}{2} \times 7.5 \times 12 \right) + \left( \frac{1}{4} \pi \times \left( 7.5 \right)^2 \right)
\]
\[
= 45 + 16.0536
\]
\[
= 61.05 \text{ cm}^2
\]
The area of shaded parts is \( 61.05 \text{ cm}^2 \).

Question 7
Area of 4 half-rugby
\[
= 4 \times \left[ \frac{1}{4} \pi \times (4 \text{ cm})^2 - \frac{1}{2} \times 4 \text{ cm} \times 4 \text{ cm} \right]
\]
\[
= 4 \times (4\pi - 8) \text{ cm}^2
\]
\[
= (16\pi - 32) \text{ cm}^2
\]
Area of shaded parts in the square
\[
= \left( \frac{1}{2} \times 16 \text{ cm} \times 8 \text{ cm} \times 2 \right) - (\pi \times 4 \text{ cm} \times 4 \text{ cm}) - (2 \times \frac{1}{2} \times 8 \text{ cm} \times 4 \text{ cm})
\]
\[
= (96 - 16\pi) \text{ cm}^2
\]
Area of shaded parts
\[
= 16\pi - 32 + (96 - 16\pi)
\]
\[
= 64 \text{ cm}^2
\]
The total area of the shaded parts is \( 64 \text{ cm}^2 \).

Answer to Unit 5.1

Let’s Get Started 5.1
1. (a) Distance = 90 \times 2
   = 180
   Distance travelled for the first part of her journey was \( 180 \text{ km} \).

   (b) Total distance = 3 \times 180
   = 540
   The total distance of her journey was \( 540 \text{ km} \).

   (c) Time taken = 5 \text{ h} - 2 \text{ h}
   = 3 \text{ h}
   Distance travelled = 540 - 180
   = 360
   Speed = 360 \div 3
   = 120
   Jaime’s speed for the last part of the journey was \( 120 \text{ km/h} \).

   (d) Average speed for whole journey = 540 \div 7
   = 77\frac{1}{2}
   Jaime’s average speed for the whole journey was \( 77\frac{1}{2} \text{ km/h} \).

2. (a) \( \frac{3}{4} \) Total = 300 km
   \[
   \frac{1}{4} \text{ Total} = 300 \text{ km} \div 3
   \]
   = 100 km
   \[
   \frac{1}{4} \text{ Total} = 4 \times 100 \text{ km}
   \]
   = 400 km
   Town A and Town B is \( 400 \text{ km} \) apart.

   (b) Time taken = 100 \div 80
   = 1\frac{1}{4}
   He took \( 1\frac{1}{4} \text{ h} \) to travel the first part of the journey.
Answer to Unit 5.1

(c) Time taken = 400 ÷ 100
   = 4

He took 4 h to travel from Town A to Town B.

Let's Learn 5.1
Ask Yourself
1. The entire journey is made up of 4 parts.
2. Yes. At any part of the journey, there is only one unknown where the other two variables are given.

Let's Practise 5.1

Question 1
Speed for the 2nd part of the journey = 150 ÷ 1.5
   = 100

Mr Wong was travelling at a constant speed of 100 km/h.

Question 2
\[
\frac{1}{5} \text{Total} = 2.6 \text{ km} \\
\frac{3}{5} \text{Total} = 2.6 \text{ km} \times 3 \\
   = 7.8 \text{ km} \\
\text{Time taken for } \frac{1}{5} \text{ of journey} = \frac{7.8}{12} \\
   = \frac{13}{20} \text{ (h)} \\
   = 39 \text{ (min)} \\
\text{Time taken for } \frac{3}{5} \text{ of remaining journey} = 2.6 + 13 \\
   = \frac{1}{5} \text{ (h)} \\
   = 12 \text{ (min)} \\
\text{Time taken} = 39 + 12 + 15 \\
   = 66
\]

Alice took 1 hr 6 min to complete the whole journey.

Question 3
1st part of journey = \frac{3}{20} \text{ of Total} \\
2nd part of journey = \frac{5}{20} \text{ of Total} \\
3rd part of journey = 1 - \frac{3}{20} - \frac{5}{20} \\
   = \frac{1}{20} \text{ (of Total)} \\
\frac{2}{20} \text{Total} = 84 \text{ km} \\
\frac{1}{20} \text{Total} = 84 \text{ km} ÷ 7 \\
   = 12 \text{ km} \\
\frac{5}{20} \text{Total} = 5 \times 12 \text{ km} \\
   = 60 \text{ km} \\
\text{Speed for last part of journey} = 60 ÷ 1 \\
   = 60

His average speed for the last part of the journey was 60 km/h.

Answer to Unit 5.1

Question 4

Distance (1st part) = 59 km/h × 1\frac{1}{2} h \\
   = 29.5 \text{ km} \\
Distance (middle part) = 352 km - 126 km - 29.5 km \\
   = 196.5 \text{ km} \\
Time taken (last part) = 126 km ÷ 72 km/h \\
   = 1\frac{1}{2} h \\
   = 1 h 45 min \\
Time taken (middle part) \\
   = 5 h 15 min - 30 min - 1 h 45 min \\
   = 3 h \\
Average speed (middle part) = 196.5 km ÷ 3 h \\
   = 65.5 \text{ km/h} \\
The average speed for the middle part of the journey was 65.5 km/h.

Question 5

Distance (A to B to C) = 6 km/h × 2\frac{2}{5} h \\
   = 24 \text{ min} \\
Total distance = 2.4 km × 2 \\
   = 4.8 \text{ km} \\
Total time taken = 24 min + 12 min \\
   = 36 min \\
   = \frac{3}{5} h \\
Belinda’s average speed = 4.8 km ÷ \frac{3}{5} h \\
   = 8 \text{ km/h} \\
Belinda’s average speed to walk around the rectangular path was 8 km/h.

Answer to Unit 5.2

Let’s Get Started 5.2

Scenario A
(a) sum; total distance 
(b) Sunny; Hector; 20 m/min 
(c) meet 
(d) 100 m 
(e) 80 m

Scenario B
(a) Sunny; 20 m/min 
(b) 1000 m or 1 km 
(c) 9 min 
(d) 600 m 
(e) 760 m 
(f) 20 m 
(g) 19 min 
(h) 1.36 km
Answer to Unit 5.2

Let's Learn 5.2

Ask Yourself
1. The total distance travelled is the same.

Let's Practise 5.2

Question 1
Time taken to meet = 544 ÷ (64 + 72)
= 4 (hours)
4 hours after 5 p.m. is 9 p.m.
They will meet each other at 9 p.m.

Question 2
Distance bus travelled in 15 min = 100 km/h x \(\frac{1}{4}\) h
= 25 km
Distance lorry travelled in 15 min = 80 km/h x \(\frac{1}{4}\) h
= 20 km
Distance between two towns = 25 km + 20 km
= 45 km
The distance between the two towns is 45 km.

Question 3
(a) Time taken to meet = 217.5 ÷ (80 + 65)
= 1.5 (hours)
1.5 hours after 09 30 was 11 00.
They met at 11 00.
(b) Distance Adrian travelled more = 1.5 h × 15 km/h
= 22.5 km
Adrian had travelled 22.5 km further than Ben when they met each other.

Question 4
Distance Tom covered at 3 p.m. = 70 km/h × 4 h
= 280 km
Distance Bill covered at 3 p.m. = 440 km – 280 km
= 160 km
Bills speed = 160 km × 4
= 40 km/h
Bill’s speed was 40 km/h.

Question 5
Time taken to meet = 1600 ÷ (120 + 80)
= 8 (seconds)
Distance Bala covered in 8 s = 120 m/s × 8 s
= 960 m
Distance more to reach Point P = 1600 m – 960 m
= 640 m
Bala will have to cycle a further 640 m.

Answer to Unit 5.3

Let's Get Started 5.3

Case 1:

<table>
<thead>
<tr>
<th>Time taken</th>
<th>Alex</th>
<th>Benson</th>
<th>Ratio</th>
</tr>
</thead>
<tbody>
<tr>
<td>480 ÷ 80 = 6 (h)</td>
<td>480 ÷ 60 = 8 (h)</td>
<td>A : B 3 : 4</td>
<td></td>
</tr>
</tbody>
</table>

Case 2:

<table>
<thead>
<tr>
<th>Speed</th>
<th>Alex</th>
<th>Benson</th>
<th>Ratio</th>
</tr>
</thead>
<tbody>
<tr>
<td>80</td>
<td>60</td>
<td>A : B 4 : 3</td>
<td></td>
</tr>
</tbody>
</table>

| Distance travelled | 320 (km) | 240 (km) | A : B 320 : 240 4 : 3 |

Case 3:

<table>
<thead>
<tr>
<th>Time taken</th>
<th>Alex</th>
<th>Benson</th>
<th>Ratio</th>
</tr>
</thead>
<tbody>
<tr>
<td>4 h</td>
<td>2 h</td>
<td>A : B 2 : 1</td>
<td></td>
</tr>
</tbody>
</table>

| Distance travelled | 200 (km) | 100 (km) | A : B 200 : 100 2 : 1 |

Circle “opposite”
Circle “the same”
Circle “the same”

Let's Learn 5.3

Ask Yourself
1. Distance travelled is the common/the same.

Let's Practise 5.3

Question 1
SJ : ST : DJ : DT
3 : 4

Distance covered by J for 1st 30 mins = \(\frac{1}{2}\) × 60
= 30 km

4 – 3 = 1
1u = 30
4u = 30 × 4
= 120

Time taken by T to overtake = \(\frac{120}{80}\) = 1.5 h
Tom would have travelled for 1.5 hours before he overtook Julianna.

Question 2
SJ : SB : DJ : DB
54 : 63

60 mins = 54 km
1 min = \(\frac{54}{60}\)
20 mins = \(\frac{54}{60} \times 20\)
= 18
1u = 18 km
Question 2 (Cont.)

7u = 7 × 18 km
= 126 km

Time taken by Ben = \( \frac{126}{63} \)
= 2 h

2 h after 06 20 = 08 20
Ben will overtake John at 08 20.

Question 3

Common distance

\[
\begin{array}{ccc}
T_L & : & T_F \\
28 & : & 16 \\
7 & : & 4 \\
\end{array}
\]

Difference (Speed) = 7u – 4u
= 3u

3u = 24
1u = 24 ÷ 3
= 8
4u = 4 × 8
= 32

(a) Linda’s speed was 32 m/min.
Distance of the race = 32 m/min × 28 min
= 896 m

(b) The distance of the race is 896 m.

Question 4

Common distance

\[
\begin{array}{ccc}
S_A & : & S_B \\
4 & : & 5 \\
\end{array}
\]

\[
\begin{array}{ccc}
T_A & : & T_B \\
5 & : & 4 \\
\end{array}
\]

5u = 6 (h)
1u = 6 ÷ 5
= 1.2 (h)
4u = 4 × 1.2
= 4.8 (h)

Time difference = 5 h – 4 h 48 min
= 12 min

Train B reached Station Q 12 minutes ahead of Train A.

Answer to Chapter 5 Review Questions

Question 1

(a) 56 × 1.5 = 84 km
Kumar’s speed = 84 ÷ 1 \( \frac{1}{4} \)
= 67.2 km/h
Mr Kumar’s speed was 67.2 km/h.

(b) 67.2 × 1.5 = 100.8 km
84 + 100.8 + 56 = 240.8 km
Time taken by Mr Lim = \( \frac{240.8}{56} \)
= 4h 18 min
4h 18 min before 7.45pm is 3.27 pm or 15 27.
Mr Lim left Town Y at 15 27.

Question 2

(a) 11.30 am to 2.10 pm = 2 h 40 mins
= 2 \( \frac{2}{3} \) h

70 × \( \frac{8}{3} \) = \( \frac{560}{3} \) km
350 – 35 – \( \frac{560}{3} \) = \( \frac{385}{3} \) km
\( \frac{385}{3} \) ÷ 45 = \( \frac{35}{3} \) km

Bill’s speed = \( \frac{520}{3} \) ÷ \( \frac{8}{3} \)
= 65 km/h
Bill’s speed was 65 km/h.

(b) 70 + 65 = 135

Time taken to meet = \( \frac{350-35}{135} \)
= \( \frac{2}{3} \) h

2 \( \frac{1}{3} \) h after 11.30 am
= 1.50 pm
Tom and Bill met at 1.50 pm.
Answer to Chapter 5 Review Questions

Question 3

<table>
<thead>
<tr>
<th>Speed</th>
<th>Time</th>
</tr>
</thead>
<tbody>
<tr>
<td>Y : X</td>
<td>Y : X</td>
</tr>
<tr>
<td>5 : 4</td>
<td>4 : 5</td>
</tr>
</tbody>
</table>

1u = 10 min
5u = 50 min
50 mins after 9 am = 9.50 am
Train X reached Station B at 9.50 am.

Question 4

60 × 2 = 120
120 + 25 = 145
5u = 145 km
1u = 145 ÷ 5
= 29 km
7u = 7 × 29 km
= 203 km

Time taken to travel from Town X to Town Y = \(\frac{203}{60}\) h
= 3 h 23 mins

It would take the van 3 h 23 mins to travel from Town X to Town Y.

Question 5

(a) Difference for \(\frac{1}{3}\) of the journey = 25 km
Difference for \(\frac{2}{3}\) of the journey = 25 × 3 = 75 km

10 km = 1 h
75 km = \(\frac{10}{11}\) × 75
= 7.5 h

It took Mr Cheong 7.5 hours to complete the journey.

(b) Mr Soon’s speed = \(\frac{450}{75} + 10\) km/h

Time taken by Mr Soon = \(\frac{450}{70}\) h
= 6 \(\frac{3}{7}\) h
≈ 6 h 26 mins

Mr Soon took 6 hr 26 mins to complete the journey.

Question 6

(a) 3u = 36 km
1u = 36 ÷ 3
= 12 km
2u = 12 × 2
= 24 km

Time taken for the 1st 36 km = \(\frac{36}{108}\) h
= \(\frac{1}{3}\) h

(b) Mr Soon’s speed = \(\frac{450}{75} + 10\) km/h

Time taken by Mr Soon = \(\frac{450}{70}\) h
= 6 \(\frac{3}{7}\) h
≈ 6 h 26 mins

Mr Soon took 6 hr 26 mins to complete the journey.

Answer to Chapter 5 Review Questions

Question 6 (Cont.)

Time taken for the remaining 24 km = \(\frac{24}{72}\)
= \(\frac{1}{3}\) h

Total time taken = \(\frac{1}{3} + \frac{1}{3}\)
= \(\frac{2}{3}\) h
= 40 mins

40 mins before 1.20 pm = 12.40 pm

(b) Average speed of the van = \(\frac{36 + 24}{\frac{7}{3}}\)
= 90 km/h

Chapter 6 Simultaneous

Answer to Unit 6

Let’s Get Started

2. \(\frac{1}{4} C + \frac{1}{10} L = 26\)
\(\frac{1}{4} C + \frac{10}{70} L = 140\)

3. \(\frac{1}{2} M + \frac{1}{2} S + J = 540\)
\(\frac{2}{2} M + \frac{2}{2} S + J = 540\)

Let’s Learn

Ask Yourself

1. The fractions or relationship of the unknown can be formed.

Let’s Practise

Question 1

\(\frac{1}{5} B + \frac{1}{4} F = 32 \ldots (1)\)
\(\frac{5}{5} B + \frac{4}{4} F = 130 \ldots (2)\)

Multiply (1) by 5,
\(\frac{5}{5} B + \frac{5}{4} F = 160 \ldots (3)\)

(3) – (2),
\(\frac{1}{4} F = 160 – 130\)
\(\frac{4}{4} F = 4 \times 30\)
\(= 120\)

There are 120 fridge magnets in the box.
Answer to Unit 6

Question 2

\[
\frac{2}{7} C + \frac{3}{10} S = 68 \ldots(1)
\]
\[
\frac{7}{7} C + \frac{10}{10} S = 231 \ldots(2)
\]

Multiply (1) by 10 and (2) by 3,

\[
\frac{21}{7} C + \frac{30}{10} S = 680 \ldots(3)
\]
\[
\frac{21}{7} C + \frac{30}{10} S = 693 \ldots(4)
\]

(4) – (3),

\[
\frac{5}{7} C = 693 - 680
\]
\[
= 13
\]
\[
\frac{5}{7} C = 5 \times 13
\]
\[
= 65
\]

**65 cupcakes** were eaten.

Question 3

40P = 25N
8P = 5N
32P = 20N

Total items in the box (based on N) = 20 + 3

= 23

Max no. of N to be added = 25 – 23

= 2

2 more nail-clippers can be added to the box.

Question 4

52P = 38B
26P = 19B

Total items bought (based on B) = 19 + 14

= 33

Additional bookmarks she can buy = 38 – 33

= 5

Jennifer can buy 5 more bookmarks with her remaining money.

Question 5

7B + 2C = 10.3 \ldots(1)
6B + 5C = 13.1 \ldots(2)

Multiply (1) by 5 and (2) by 2,

35B + 10C = 51.5 \ldots(1)
12B + 10C = 26.2 \ldots(2)

(1) – (2),

23B = 25.3

1B = 25.3 \div 23

= 1.1

12B = 12 \times 1.1

= 13.2

10C = 26.2 – 13.2

= 13

1C = 13 \div 10

= 1.3

\[
12C = 12 \times 1.3
\]
\[
= 15.6
\]
\[
12B + 12C = 13.2 + 15.6
\]
\[
= 28.8
\]

1 dozen bottles of soft drink and 1 dozen cartons of milk cost **$28.80**.

Question 6

6S = 8P
2S + 5P = 12.65
6S + 15P = 12.65 \times 3

= 37.95

8P + 15P = 37.95
23P = 37.95
1P = 37.95 \div 23

= 1.65

5P = 5 \times 1.65

= 8.25

2S = 12.65 – 8.25

= 4.4

1S = 4.4 \div 2

= 2.2

1S + 1P = 2.2 + 1.65

= 3.85

1GB = 3.85
7GB = 3.85 \times 7

= 26.95

Ali spent **$26.95** on the goodie bags

Answer to Unit 7

Let's Get Started

1. Durian = \(\frac{135}{360} \times 16\)

= 6

6 children like durian ice cream.

2. Walk = 1600 \div 4

= 400

400 students walk to school.

Let's Learn

Ask Yourself

1. Fractions
Let’s Practise

Question 1
M + C = $\frac{1}{2} + \frac{9}{20} = \frac{7}{10}$
V + B = $1 - \frac{7}{10} = \frac{3}{10}$
No. of vans = $400 \div 2 = 200$
No. of vans and bicycles = $400 + 200 = 600$
\(\frac{3}{10}\) Total = 600
\(\frac{1}{10}\) Total = $600 \div 3 = 200$
Total = $10 \times 200 = 2000$
Percentage of bicycles = $\frac{400}{2000} \times 100\% = 20\%$
20% of the vehicles were bicycles.

Question 2
Rent = $\frac{1}{2} - \frac{1}{12} - \frac{1}{4} = \frac{1}{6}$
(a) $\frac{1}{6}$ of her money was spent on rent.
Savings = $50\% - 2.5\% = 47.5\%$
(b) She saved 47.5% of her money monthly.
\(\frac{1}{6}\) Total = 850
Total = $6 \times 850 = 5100$
Savings a year = 47.5% $\times 5100 \times 6 = 14 535$
(c) She would save $14 535 in half a year.

Question 3
Fraction of hamsters = $1 - \frac{1}{4} - \frac{1}{12} - \frac{1}{3} = \frac{1}{3}$
Difference between hamsters and birds = $\frac{1}{3} - \frac{1}{4}$
= $\frac{1}{12}$
Percentage difference = $\frac{1}{12} \times 100\% = 8\frac{1}{3}\%$
There are 8\frac{1}{3}% more hamsters than birds.

Question 4
(a) Fraction of boys = $1 - \frac{1}{20} - \frac{3}{10} - \frac{1}{10}$
= $\frac{9}{20}$
of the people who attended the event were boys.
(b) $\frac{9}{20}$ Total = 180
\(\frac{1}{20}\) Total = $180 \div 9 = 20$
\(\frac{20}{20}\) Total = $20 \times 20 = 400$
400 people attended the event last December.
(c) 80% = 400
1% = $400 \div 80 = 5$
100% = $5 \times 100 = 500$
500 people attended the event in the previous year.

Question 5
(a) Percentage of Tiramisu and butter cakes sold
= 50% - 15% - 10%
= 25%
(b) 5u = 25%
1u = $25\% \div 5 = 5\%$
3u = $3 \times 5\% = 15\%$
50% = 80
1% = $80 \div 50 = 1.6$
15% = $15 \times 1.6 = 24$
24 Tiramisu cakes were sold.

Question 6
(a) 25% = $16 + 14 = 30$
100% = $4 \times 30 = 120$
120 students took part in the survey.
(b) Oranges + Durians = 60
Oranges = $\frac{2}{3} \times 60 = 40$
Fraction = $\frac{40}{120}$
= $\frac{1}{3}$
\(\frac{1}{3}\) of the students preferred oranges.
Chapter 8 Algebra

Let’s Get Started
1. Value of \( x \)

<table>
<thead>
<tr>
<th>Value of ( x )</th>
<th>Value of ( 68 + x )</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>( 68 + 1 = 69 )</td>
</tr>
<tr>
<td>2</td>
<td>( 68 + 2 = 70 )</td>
</tr>
<tr>
<td>3</td>
<td>( 68 + 3 = 71 )</td>
</tr>
<tr>
<td>4</td>
<td>( 68 + 4 = 72 )</td>
</tr>
</tbody>
</table>

2. Value of \( a \)

<table>
<thead>
<tr>
<th>Value of ( a )</th>
<th>Value of ( b )</th>
<th>Value of ( \frac{a+b}{2} )</th>
</tr>
</thead>
<tbody>
<tr>
<td>12</td>
<td>10</td>
<td>( \frac{12+10}{2} = 11 )</td>
</tr>
<tr>
<td>21</td>
<td>11</td>
<td>( \frac{21+11}{2} = 16 )</td>
</tr>
<tr>
<td>28</td>
<td>12</td>
<td>( \frac{28+12}{2} = 20 )</td>
</tr>
<tr>
<td>35</td>
<td>13</td>
<td>( \frac{35+13}{2} = 24 )</td>
</tr>
<tr>
<td>40</td>
<td>0</td>
<td>( \frac{40+0}{2} = 20 )</td>
</tr>
</tbody>
</table>

Let’s Learn

Ask Yourself
1. Add the values.
2. Add the total values. Then divide the result by the quantity that make up the total value.

Think Further
1. The solution changes to the following:
   Michelle = 8m sweets
   Total no. of sweets eaten = \( 4n + 8n \)
   Average = \( \frac{12m}{2} = 6n \)
   Both girls ate an average of 6n sweets.

Let’s Practise

Question 1

Total no. of pencils = \( 10 + p + 3p \)
   Average = \( \frac{10+4p}{3} \)
   The girls bought an average of \( \frac{10+4p}{3} \) pencils.

Question 2

Total mass = \( 5x \) kg + (5x + 7) kg
   Average mass = \( \frac{10x+7}{2} \) kg
   Their average mass was \( \frac{10x+7}{2} \) kg.

Let’s Learn

Think Further
1. The solution changes to the following:
   Michelle = 8m sweets
   Total no. of sweets eaten = \( 4n + 8n \)
   Average = \( \frac{12m}{2} = 6n \)
   Both girls ate an average of 6n sweets.

Let’s Practise

Question 1

Total no. of pencils = \( 10 + p + 3p \)
   Average = \( \frac{10+4p}{3} \)
   The girls bought an average of \( \frac{10+4p}{3} \) pencils.

Question 2

Total mass = \( 5x \) kg + (5x + 7) kg
   Average mass = \( \frac{10x+7}{2} \) kg
   Their average mass was \( \frac{10x+7}{2} \) kg.

Answer to Chapter 8

Question 3

Mia’s cookies = \( 8a - 16 \)
   = \( 8 \times 17 - 16 \)
   = 120
Anita’s cookies = \( 8 \times 17 \)
   = 136
Anita and Mia had 136 and 120 cookies respectively.

Question 4

No. of plates sold on Tue = \( (4k + 2 + 2k) \)
   = \( 6k + 2 \)
No. of plates sold on Wed = \( (4k + 2) + (4k + 2) \)
   = \( 8k + 4 \)
Total no. of plates sold = \( (6k + 2) + (8k + 4) + (4k + 2) \)
   = \( 18k + 8 \)
Lena sold a total of \( (18k + 8) \) plates of chicken rice over the 3 days.

Question 5

Keith’s stamps = \( 3m \)
Calissa’s stamps = \( 3m + 8 \)
(a) Total stamps = \( m + 3m + (3m + 8) \)
   = \( 7m + 8 \)
   They have \( (7m + 8) \) stamps altogether.
(b) Total stamps = \( 7 \times 9 + 8 \)
   = 71
   The 3 children have 71 stamps altogether.

Question 6

(a) Total (at first) = \( (39y + 6) \) stickers
   Mr Lee had \( (39y + 6) \) stickers at first.
(b) Total (at first) = \( 39 \times 4 + 6 \)
   = 162
   Mr Lee had 162 stickers at first.

Question 7

Weiqi’s age = \( \frac{1}{2}n \)
(a) Natalie’s age = \( \frac{1}{3}n - 4 \)
   Natalie is \( (\frac{1}{3}n - 4) \) years old.
(b) Total ages = \( n + \frac{1}{3}n + \frac{1}{3}n - 4 \)
   = 15 + 5 + 5 - 4
   = 21
   Their total ages is 21 years.

Question 8

Perimeter (units) = \( 3u + 2u + 3u + 2u \)
   = 10u
Question 8 (Cont.)

10u = 2h
2u = \frac{2h}{5}

The breadth of the rectangle is \frac{2h}{5} cm.

Chapter 9

Mixed Review Questions

Question 1

<table>
<thead>
<tr>
<th>Case 1: 80 pears left</th>
<th>Case 2: 400 pears left</th>
</tr>
</thead>
<tbody>
<tr>
<td>A : P</td>
<td>A : P</td>
</tr>
<tr>
<td>20 : 60</td>
<td>60 : 20</td>
</tr>
<tr>
<td>\text{1}^3 : \text{3}^3</td>
<td>3 : 1</td>
</tr>
<tr>
<td>3 : 9</td>
<td></td>
</tr>
</tbody>
</table>

8u = 400 – 80
= 320
1u = 320 ÷ 8
= 40
9u + 80 = 9 × 40 + 80
= 440

There are **440 pears** at the stall.

Question 2

At first | End
---|---
C : J : A | C : J : A
$2^2$ : $6^2$ : $9^2$ | $7$ : $15$ : $21$
$4$ : $12$ : $18$ | $8$ : $6$

Difference = \text{7u} – \text{4u} = \text{3u}
3u = 90
1u = 90 ÷ 3
= 30
Total (in the end) = \text{7u} + 15u + 21u
= 43u
43u = 43 × 30
= 1290
The 3 girls have **$1290 now.**

Question 3

Case 1: Scott → $16 to Omera

S : O : Total
\text{1}^2 : \text{3}^2 : \text{4}^2
2 : 6 : 8

Case 2: Omera → $23 to Scott

S : O : Total
\text{5} : \text{3} : \text{8}

Question 4

Commission received for first 100 jerseys
= \text{100} \times 20
= $2000
Commission earned from the remaining jerseys sold
= \text{3708} – 2000
= 828
No. of jerseys sold for the $828 commission
= \frac{828}{36} = 23

Total jerseys sold = 100 + 23
= 123
Fred sold **123 jerseys.**

Question 5

<table>
<thead>
<tr>
<th>Items</th>
<th>Quantity</th>
<th>\times</th>
<th>Value ($)</th>
<th>Total value ($)</th>
</tr>
</thead>
<tbody>
<tr>
<td>$5$-stamps</td>
<td>1u</td>
<td>\times</td>
<td>5</td>
<td>5u</td>
</tr>
<tr>
<td>(Arun)</td>
<td>1u + 30</td>
<td>\times</td>
<td>2</td>
<td>2u + 60</td>
</tr>
<tr>
<td>$2$-stamps</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>(Kavita)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Total</td>
<td>2u + 30</td>
<td></td>
<td>7u + 60</td>
<td></td>
</tr>
</tbody>
</table>

$5$ stamps

\[2u \quad 3u\]

$2$ stamps

\[2u \quad 60\]

3u = 60 + 180
= 240
1u = 240 ÷ 3
= 80
Arun has **80 stamps.**

Question 6

2-m : 3-m : 2-m : Incorrect
\text{1}^2 : \text{3}^2 : 2 : 1
2 : 6
Question 6 (Cont.)

<table>
<thead>
<tr>
<th>Items</th>
<th>Quantity</th>
<th>Value (Marks)</th>
<th>Total value (Marks)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Correct answer (2-mark qn)</td>
<td>2u</td>
<td>2</td>
<td>4u</td>
</tr>
<tr>
<td>Correct answer (3-mark qn)</td>
<td>6u</td>
<td>3</td>
<td>18u</td>
</tr>
<tr>
<td>Total</td>
<td>8u</td>
<td></td>
<td>22u</td>
</tr>
</tbody>
</table>

22u = 176
1u = 176 ÷ 22
= 8
Total attempt = 8u
= 8 × 8
= 64
Unanswered questions = 75 – 64
= 11
11 questions were left unanswered.

Question 7
A (now) : R (before) : Total
3 : 1 : 4
A (before) : R (now) : Total
1\textsuperscript{st} : 1\textsuperscript{st} : 2\textsuperscript{nd}
2 : 2 : 4

Total current age = 5u
= 30
1u = 30 ÷ 5
= 6
A now = 3u
= 3 × 6
= 18
(a) Alda is 18 years old now.

(b) In 12 years’ time, Rena’s age will be 80% of Alda’s age.

Question 8

\begin{align*}
\frac{3}{4} \text{Remainder 1} \\
\frac{3}{4} \text{Remainder 2} \\
\frac{3}{4} \text{Remainder 3}
\end{align*}

\begin{align*}
\text{A} & : \text{Remainder 1} \\
\text{C} & : \text{Remainder 2} \\
\text{F} & : \text{Remainder 3}
\end{align*}

\begin{align*}
\frac{3}{4} \text{R2} & = \frac{1}{4} \\
\frac{3}{4} \text{R2} & = 4 \times \frac{1}{4} \\
& = 1 \\
\frac{1}{4} \text{R1} & = 1 + \frac{1}{4} \\
& = 1\frac{1}{4} \\
\frac{3}{4} \text{R1} & = 4 \times \frac{3}{4} \\
& = 3 \\
\frac{1}{4} \text{T} & = 5 + \frac{1}{4} \\
& = 5\frac{1}{4} \\
\frac{3}{4} \text{T} & = 4 \times 2\frac{1}{4} \\
& = 21
\end{align*}

Althea bought 21 pizzas.

Question 9

(Actual) | P | W
---|---|---
At first | 3u\textsuperscript{-3} | 4u\textsuperscript{-3}
Change | −18\textsuperscript{-3} | −10\textsuperscript{-3}
End | 3p\textsuperscript{-3} | 5p\textsuperscript{-3}

(Working) | P | W
---|---|---
At first | 15u | 12u
Change | −90 | −30
End | 15p | 15p

There are 60 pink meringues in the jar.
Answer to Chapter 9

Question 10

<table>
<thead>
<tr>
<th>At first</th>
<th>Silver</th>
<th>Platinum</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Shop A</td>
<td>$\frac{2}{5} A = 32$</td>
<td>$\frac{2}{5} A = 48$</td>
<td>$\frac{5}{5} A = 80$</td>
</tr>
<tr>
<td>Shop B</td>
<td>$\frac{3}{10} B = 36$</td>
<td>$\frac{7}{10} B = 84$</td>
<td>$\frac{7}{7} B = 120$</td>
</tr>
<tr>
<td>Total</td>
<td>$32 + 36 = 68$</td>
<td>$48 + 84 = 132$</td>
<td>$80 + 120 = 200$</td>
</tr>
</tbody>
</table>

End

| Shop A   | $\frac{2}{5} A = 5$ | $\frac{2}{5} A = 5$ | $\frac{5}{5} A = 10$ |
| Shop B   | $\frac{7}{10} B = 18$ | $\frac{12}{10} B = 25$ | $\frac{25}{25} B = 25$ |
| Total    | $68 + 132 = 200$ |

\[
\frac{2}{5} A + \frac{2}{5} B = 68 \quad \text{--------- (1) x 3}
\]
\[
\frac{3}{5} A + \frac{18}{25} B = 132 \quad \text{--------- (2) x 2}
\]
\[
\frac{6}{5} A + \frac{21}{25} B = 204 \quad \text{--------- (3)}
\]
\[
\frac{6}{5} A + \frac{26}{25} B = 264 \quad \text{--------- (4)}
\]
\[
(4) - (3)
\]
\[
\frac{15}{25} B = 60
\]
\[
\frac{1}{25} B = 4
\]
\[
\frac{18}{25} B = 72
\]

Difference = $84 - 72$

= 12

The owner of Shop B passed 12 platinum bracelets to Shop A.

Question 11

Distance bus covered in 3 h = 3 h $\times$ 70 km/h

= 210 km

Distance bus covered from where they passed each other to H = 210 + 170

= 380 km

Speed of car = $380 \div 4$

= 95 km/h

Distance between two towns = 7 h $\times$ 95 km/h

= 665 km

The distance between the 2 towns is 665 km.

Question 12

\[
\frac{1}{5} \text{ of total} = 4u
\]

Total = 20u

20u $- 11u = 63$

9u = 63

1u = $63 \div 9$

= 7

20u = $20 \times 7$

= 140

There were 140 muffins in the box altogether.

Question 13

Case 1:

Sarah 360 muffins left

Case 2:

Sarah 72 muffins left

\[
S : J \quad S : J
\]

25 : 50

50 : 25

1 : 2

2$^{12}$ : 1$^{12}$

\[
\text{Increase of 3u}
\]

\[
3u = 360 - 72
\]

= 288

1u = $288 \div 3$

= 96

Sarah = 1u + 360

= 1$\times$ 96 + 360

= 456

Check

Sarah = 4u + 72

= $4 \times 96 + 72$

= 456

Sarah baked 456 muffins.

Question 14

\[
\text{Total cost of pairs of boots} = 5152
\]

\[
\text{Total cost of pairs of sneakers} = 5152 + 266
\]

= 5418

\[
\begin{array}{|c|c|c|c|}
\hline
\text{Items} & \text{Units} & \times & \text{Value ($)} \\
\hline
\text{Boots} & 2u & \times & ? \\
\hline
\text{Sneakers} & 3u & \times & ? \\
\hline
\text{Total} & 5u & & 10570 \\
\hline
\end{array}
\]

Cost of 3u of sneakers = 5418

Cost of 1u of sneakers = $5418 \div 3$

= 1806

Cost of 2u of boots = 5152

For more review questions, please visit www.onsponge.com
Answer to Chapter 9

Question 14 (Cont.)
Cost of 1u of boots = \( \frac{5152}{2} \)
= 2576

\[ 1u = \frac{770}{55} \]
= 14

No. of pairs of sneakers = 3u
\[ = 3 \times 14 \]
= 42

Cost of 1 pair of sneaker = \( \frac{5418}{42} \)
= 129

The cost of 1 pair of sneaker was $129.

Question 15
Candle A (7.30 a.m. to 1.30 p.m.) = 6 hours
Candle B (9 a.m. to 1 p.m.) = 4 hours
Rate of burning in 1 hour,
Candle A = \( \frac{1}{6} \)
Candle B = \( \frac{1}{4} \)

Fraction of Candle A left unburnt at 11.30 a.m.
\[ = \frac{2}{3} \]

Fraction of Candle B left unburnt at 11.30 a.m.
\[ = \frac{1}{3} \]

\( \frac{1}{9} A = \frac{1}{8} B \)
A : B
9 : 8
1u = 3

Length of Candle A = 9u
\[ = 9 \times 3 \]
= 27

The original length of Candle A was 27 cm respectively.

Question 16
In 2021
<table>
<thead>
<tr>
<th>L</th>
<th>1u</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>1u 3u</td>
</tr>
</tbody>
</table>

In 6 years’ time
<table>
<thead>
<tr>
<th>L</th>
<th>6 1u</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>6 1u 6 1u 8</td>
</tr>
</tbody>
</table>

2u = 6 + 8
\[ = 14 \]
1u = 7

Abigail (in 2021) = 4u
\[ = 4 \times 7 \]
= 28

Abigail (in 2031) = 28 + 10
\[ = 38 \]

Abigail will be 38 years old in the year 2031.

Question 17
Summary
A : B : C : D
13 : 7 : 4 : 5

\[ \frac{14}{12} \]

Rate of burning in 1 hour,
\[ = \frac{4}{5} \]

Ali and Bryan = 20u + 15u
\[ = 35u \]

35u = 35 \times 6
\[ = 210 \]

All and Bryan have 210 marbles altogether.

Question 18
Common volume
\[ \frac{3}{10} R = \frac{2}{3} S \]
\[ \frac{3}{12} R = \frac{3}{15} S \]
R : S
10 : 12

Difference = 12u – 10u = 2u
\[ = 24 \]

1u = 48 + 2 = 24
10u = 10 \times 24 = 240
\[ = 210 \]

Height of rectangular tank = 240 ÷ (8 \times 6) = 5
The height of the rectangular tank is 5 m.

Question 19
\[ BF \]
Remainder
40
4u^+ (16u)

\[ C \]
Left
1u^+ (4u)
3u^- (12u)

\[ T = 3u^+ (12u) \]
\[ T = 12u + 4 \]
\[ = 3u \]
Question 19 (Cont.)

\[ T = 7 \times 3u \]
\[ = 21u \]
Friend = 21u – 16u
\[ = 5u \]
5u = 40
1u = 40 ÷ 5
\[ = 8 \]
21u = 21 × 8
\[ = 168 \]
There were 168 gummies in the bag at first.

Question 20

9 steps

<table>
<thead>
<tr>
<th>W</th>
<th>R</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>81</td>
</tr>
</tbody>
</table>

9 more run than 9 walk = 100 – 19
\[ = 81 \text{ (seconds)} \]
1 more run than 1 walk = 81 ÷ 9
\[ = 9 \text{ (seconds)} \]
10 more run than 10 walk = 10 × 9
\[ = 90 \text{ (seconds)} \]
To convert 10 run to 10 walk, take Luther 90 s more.
Time taken to walk 1 flight = 100 + 90
\[ = 190 \text{ (seconds)} \]
Time taken to walk 2 flights = 190 × 2
\[ = 380 \text{ (seconds)} \]
Luther would take 380 s to walk up both flights of stairs.

Question 21

At first
A : B
3 : 5
Since Box B has 110 more apples than Box A,
2u = 110
1u = 110 ÷ 2
\[ = 55 \]
Total apples = 8u
\[ = 8 \times 55 \]
\[ = 440 \]
Red apples = \( \frac{3}{4} \times 440 \)
\[ = 330 \]
There were 330 red apples.

Question 22

\[ \frac{3}{4} P = 12u + 30 \]
\[ \frac{4}{3} P = 4u + 10 \text{ (red marbles)} \]
\[ \frac{5}{4} Q = 12u \]
\[ \frac{3}{4} Q = 9u \text{ (red marbles)} \]
4u + 9u = 62 – 10
13u = 52
1u = 52 ÷ 13
\[ = 4 \]
12u + 30 = 12 × 4 + 30
\[ = 78 \]
There were 78 marbles in Box P.

Question 23

Case 1:
<table>
<thead>
<tr>
<th>6u</th>
<th>4</th>
</tr>
</thead>
</table>
Case 2:
| 6u | 2u |

2u = 4
1u = 4 × 2 = 2
Gretel
C1: 6u + 4 = 6 × 2 + 4
\[ = 16 \]
C2: 8u = 8 × 2
\[ = 16 \]
Keith
C1: 15u = 15 × 2
\[ = 30 \]
C2: 13u + 4 = 13 × 2 + 4
\[ = 30 \]
Gretel and Keith have 16 boxes of cookies and 30 boxes of cookies respectively.

Question 24

Case 1
<table>
<thead>
<tr>
<th>5B + 8C ($31)</th>
<th>1B</th>
</tr>
</thead>
</table>
Case 2
| 5B + 8C (\$31) | 1C |

B
\[ 1 \times 5 \]
\[ = 31 \]
**Answer to Chapter 9**

**Question 24 (Cont.)**

5u + 8u = 31 − 5  
= 26

13u = 26

1u = 26 ÷ 13  
= 2

2u + 1 = 2 × 2 + 1  
= 5

The total cost of 1 bracelet and 1 hairclip is $5.

**Question 25**

<table>
<thead>
<tr>
<th>Choco</th>
<th>Gum</th>
<th>Mint</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>88 × 4 = 352</td>
<td>12 × 7 = 84</td>
<td>0 × 22 = 0</td>
<td>436</td>
</tr>
<tr>
<td>86 × 4 = 344</td>
<td>13 × 7 = 91</td>
<td>1 × 22 = 22</td>
<td>457</td>
</tr>
<tr>
<td>56 × 4 = 224</td>
<td>28 × 7 = 196</td>
<td>16 × 22 = 0</td>
<td>772</td>
</tr>
</tbody>
</table>

Diff between 772 and 436 = 336

Gap of 336 divided by 21 = 336 ÷ 21  
= 16

Graham ordered 28 gumballs.

**Question 26**

\[
\frac{2}{5} A = \frac{3}{4} B  \\
\frac{6}{15} A = \frac{5}{8} B
\]

<table>
<thead>
<tr>
<th>(Actual)</th>
<th>A</th>
<th>B</th>
</tr>
</thead>
<tbody>
<tr>
<td>At first</td>
<td>15u^2</td>
<td>8u^3</td>
</tr>
<tr>
<td>Change</td>
<td>−222^-2</td>
<td>−136^-3</td>
</tr>
<tr>
<td>End</td>
<td>3p^7</td>
<td>2p^3</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>(Working)</th>
<th>A</th>
<th>B</th>
</tr>
</thead>
<tbody>
<tr>
<td>At first</td>
<td>30u</td>
<td>24u</td>
</tr>
<tr>
<td>Change</td>
<td>−444</td>
<td>−408</td>
</tr>
<tr>
<td>End</td>
<td>6p</td>
<td>6p</td>
</tr>
</tbody>
</table>

**Question 27**

<table>
<thead>
<tr>
<th>Items</th>
<th>Change</th>
<th>End</th>
<th>At first</th>
</tr>
</thead>
<tbody>
<tr>
<td>(3) L</td>
<td>− 1/3 (1u)</td>
<td>5/6 (6u)</td>
<td>1/5 (5u)</td>
</tr>
<tr>
<td>(2) J</td>
<td>− 1/2 (6u)</td>
<td>1/2 (6u)</td>
<td>1/12 (12u)</td>
</tr>
<tr>
<td>(1) K</td>
<td>+3 (9u)</td>
<td>4 (12u)</td>
<td>1 (3u)</td>
</tr>
</tbody>
</table>

| K : J : L | 1u^6 : 1u^6 : 1u^6 |
| Rev(3) | 6u : 6u : 5u |
| Rev(2) | + 6u |
| Rev(1) | − 9u |

At first  
3u : 24u : 10u

Total (at first) = 3u + 24u + 10u  
= 37u

37u = 14 060
1u = 14 060 ÷ 37  
= 380

Lenny at first = 10u  
= 10 × 380  
= 3800

Lenny saved $3800 at first.

**Question 28**

Salary $4236

General  
18u + 96

Remainder  
7u^4 (28u)

Parents  
4u^4 (16u)

Saved  
3u^4 (12u)

\[
\frac{1}{6} G = 3u + 16  \\
\frac{5}{6} G = 18u + 96
\]

18u + 96 + 28u = 4236  
46u = 4236 − 96  
= 4140

1u = 4140 ÷ 46  
= 90

There were 138 mini tarts in both boxes at first.
Answer to Chapter 9

Problem 28 (Cont.)

General = 18u + 96
= 18 \times 90 + 96
= 1716

Sienna’s monthly general expenses was $1716.

Problem 29

At first

<p>| | | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>40u</td>
<td>80</td>
</tr>
<tr>
<td>Z</td>
<td>40u</td>
<td></td>
</tr>
</tbody>
</table>

\[ \frac{8}{5} \]

Spent

<p>| | | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Zeph</td>
<td>$\frac{7}{8}$ (5u)</td>
<td>$\frac{2}{3}$ (35u)</td>
</tr>
<tr>
<td>Adelia</td>
<td>$\frac{3}{5}$ (16u + 32)</td>
<td>$\frac{3}{5}$ (24u + 48)</td>
</tr>
</tbody>
</table>

End

<p>| | | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>24u</td>
<td>48</td>
</tr>
<tr>
<td>Z</td>
<td>24u</td>
<td>48</td>
</tr>
<tr>
<td></td>
<td></td>
<td>51</td>
</tr>
</tbody>
</table>

11u = 51 + 48
= 99
1u = 99 ÷ 9
= 9

Adelia at first = 40u + 9 \times 80
= 440

Adelia had $440 at first.

Problem 30

In 1 h

Fred = \frac{1}{3} \text{ journey}
= \frac{1}{3} \times 2 = \frac{2}{3} \text{ journey}

William = \frac{1}{4} \text{ journey}
= \frac{1}{4} \times 2 = \frac{1}{2} \text{ journey}

Fred’s speed = \frac{24}{60} = \frac{1}{3} \text{ km/h}
Fred’s speed = 80 \text{ km/h}.

Problem 31

1 group of $72 = $9 (discount)
Amount to pay for every group = $72 − $9
= $63

No. of groups of $63 = 840 ÷ 63
= 13 \times 21
13 groups of $63 = 13 \times $9
= $117 \text{ (discount)}

Amelia was given $117 discount.

Problem 32

\begin{array}{|c|c|c|c|}
\hline
\text{Items} & \text{Quantity} & \times & \text{Value($)} \\
\hline
\text{On time} & 15u & x & 5 \\
\hline
\text{Late} & 4u & x & 3.5 \\
\hline
\text{Total} & 19u & & 89u \\
\hline
\end{array}

89u = 7298
1u = 7298 ÷ 89
= 82

Late = 4u
= 4 \times 82
= 328

(a) \text{ 328 parcels were delivered late.}

\begin{align*}
\text{Difference in cost of 1 parcel} &= 5 - 3.5 = 1.5 \\
\text{Difference in total cost} &= 328 \times 1.5 = 492
\end{align*}

(b) The company would collect an \textbf{additional $492.}

Problem 33

\begin{array}{|c|c|c|c|}
\hline
\text{R} & \text{P+N} & \text{P} & \text{N} \\
\hline
5 & \text{7} & 1 & \text{4} \\
20 & \text{28} & 7 & \text{21} \\
\hline
\end{array}

\text{Summary Ratio}

\begin{array}{|c|c|c|c|}
\hline
\text{R} & \text{N} & \text{P} \\
\hline
20 & 21 & 7 \\
\hline
\end{array}

\begin{array}{|c|c|c|c|}
\hline
\text{Items} & \text{Quantity} & \times & \text{Value($)} & \text{Total($)} \\
\hline
\text{R} & 20u & x & 2 & \text{40u} \\
\hline
\text{N} & 21u & x & 8 & \text{168u} \\
\hline
\text{P} & 7u & x & 4 & \text{28u} \\
\hline
\text{Total} & 48u & & & \text{236u} \\
\hline
\end{array}

236u = 705
1u = 208 ÷ 236
= 3

Total items = 48u
= 48 \times 3
= 144

Sumitha bought \textbf{144 items} altogether.
Answer to Chapter 9

Question 34
At first                End
J : F : Total     J : F : Total
3\(^3\) : 1\(^3\) : 4\(^3\)    2\(^4\) : 1\(^4\) : 3\(^4\)
9 : 3 : 12  8 : 4 : 12

1u = 77
8u = 8 \times 77
= 616
Jonas had 616 comic books left.

Question 35
Diff in saving = 5 – 2
= 3
No. of days = 180 ÷ 3
= 60
(a) Alfred took 60 days to save $180 less than Bruce.
Total no. of days from Dec to Mar = 31 \times 3 + 28
= 121
Total savings = 2 \times 121 + 5 \times 121
= 847
(b) Both of them would have save $847 altogether at the end of March.

Question 36
At first

A
\[ \frac{5}{2} \] A
15u
60

C
\[ \frac{2}{3} \] C

\[ \frac{1}{3} (5u) \]
(12u + 48)
\[ \frac{1}{3} (15u + 60) \]

\[ \frac{1}{3} (5u) \]
\[ \frac{2}{3} (10u) \]
\[ \frac{3}{3} (15u) \]

Gave          End          At first
A
(3u + 12)       (12u + 48)    (15u + 60)
C
\[ \frac{1}{3} (5u) \]
\[ \frac{2}{3} (10u) \]
\[ \frac{3}{3} (15u) \]

\[ \frac{1}{3} (5u) \]
\[ \frac{2}{3} (10u) \]
\[ \frac{3}{3} (15u) \]

At first

A
\[ \frac{1}{3} \]
\[ \frac{2}{3} \]
\[ \frac{3}{3} \]

M
\[ \frac{3}{25} \]
\[ 22 \]
\[ 25 \]

\[ \frac{3}{5} \]
\[ \frac{5}{5} \]
\[ \frac{70}{50} \]

\[ \frac{3}{5} \]
\[ \frac{5}{5} \]
\[ \frac{70}{50} \]

Summary
A : M : A+M    S : A+M
55 : 50 : 105  2\(^{55} \times\) : 3\(^{55} \)
70 : 105

Summary
A : M : S
55 : 50 : 70

Question 37
Speed   Time
S1 : S2    T1 : T2
60 : 80   4 : 3
3 : 4
1u of time = 6 + 8
= 14
4u of time = 4 \times 14
= 56
Time taken to reach on time = 56 – 6
= 50

Check
3u of time = 3 \times 14
= 42
Time taken to reach on time = 42 + 8
= 50
Time to reach = 50 min after 7.30 a.m.
= 8.20 a.m.
(a) Logan needs to reach his office at 8.20 a.m. to be on time.
Distance = 60 \times \frac{56}{60}
= 56

Check
Distance = 80 \times \frac{42}{60}
= 56

(b) The distance between Logan’s office and his house is 56 km.

Question 38
Sold          Left          At first
A
\[ \frac{1}{5} \]
\[ 4 \]
\[ 5 \]

M
\[ \frac{3}{25} \]
\[ 22 \]
\[ 25 \]

\[ \frac{3}{5} \]
\[ \frac{5}{5} \]
\[ \frac{70}{50} \]

Summary
A : M : A+M    S : A+M
55 : 50 : 105  2\(^{55} \times\) : 3\(^{55} \)
70 : 105

Summary
A : M : S
55 : 50 : 70

Apples Pie remained = 12u + 48
= 12 \times 3 + 48
= 84
84 apple pies remained in the end.
Answer to Chapter 9

Question 38 (Cont.)
Apples and mango strudel left = 88u
88u = 352
1u = 352 ÷ 88
= 4
Strawberry = 70u
70u = 70 × 4
= 280
(a) There were 280 strawberry strudels.
Sold = 11u + 6u
= 17u
17u = 17 × 4
= 68
(b) 68 strudels were sold.

Question 39

<table>
<thead>
<tr>
<th></th>
<th>Gave</th>
<th>Left</th>
<th>At first</th>
</tr>
</thead>
<tbody>
<tr>
<td>Blue</td>
<td>$ \frac{2}{5}$</td>
<td>$\frac{3}{5}$</td>
<td>$\frac{5}{5}$</td>
</tr>
<tr>
<td></td>
<td>$(2u + 8)$</td>
<td>$(3u + 12)$</td>
<td>$(5u + 20)$</td>
</tr>
<tr>
<td>Red</td>
<td>$\frac{1}{2}(3u)$</td>
<td>$\frac{1}{2}(3u)$</td>
<td>$\frac{1}{2}(6u)$</td>
</tr>
</tbody>
</table>

At first

<p>| | | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>B</td>
<td>5u</td>
<td>20</td>
</tr>
<tr>
<td>R</td>
<td>6u</td>
<td></td>
</tr>
</tbody>
</table>

11u = 42 − 20
= 22
1u = 22 ÷ 11
= 2
Red pens gave away = 3u
= 3 × 2
= 6
Amira gave away 6 red pens.

Question 40

<p>| | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Gordon</td>
<td>16 km/h</td>
</tr>
<tr>
<td>Julian</td>
<td>$\frac{3}{4}$</td>
</tr>
</tbody>
</table>

When Julian reached the finish line, Gordon would be 8 km ahead of him (assuming Gordon continues running).

Question 40 (Cont.)
Time taken for Gordon 8 km = $8 ÷ 16$
= $\frac{1}{2}$ h

Time Julian reached the finishing line
= $\frac{1}{2}$ h + 11.45 a.m.
= 12.15 p.m.
Julian reached the finishing line at 12.15 p.m.

Question 41

1 bootie = 6.75
Case 1, 6 Booties = $6 \times 6.75$
= 40.50
Case 2, 4 Booties = $4 \times 6.75$
= 27

2 mittens = 46 − 23.5
= 22.5
1 mitten = 22.5 ÷ 2
= 11.25
Using Case 1,
Cassandra’s $ = 4M + 46$
= $4 \times 11.25 + 46$
= 91

Check
6M + 23.5 = $6 \times 11.25 + 23.5$
= 91
Cassandra has $91.

Question 42

$\frac{1}{4}R = \frac{1}{3}G$

<table>
<thead>
<tr>
<th>(Actual)</th>
<th>R</th>
<th>G</th>
</tr>
</thead>
<tbody>
<tr>
<td>At first</td>
<td>4u$^3$</td>
<td>3u$^2$</td>
</tr>
<tr>
<td>Change</td>
<td>$-206.5$</td>
<td>$+80^2$</td>
</tr>
<tr>
<td>End</td>
<td>2p$^3$</td>
<td>5p$^2$</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>(Working)</th>
<th>R</th>
<th>G</th>
</tr>
</thead>
<tbody>
<tr>
<td>At first</td>
<td>20u</td>
<td>6u</td>
</tr>
<tr>
<td>Change</td>
<td>$-1030$</td>
<td>$+160$</td>
</tr>
<tr>
<td>End</td>
<td>10p</td>
<td>10p</td>
</tr>
</tbody>
</table>
Answer to Chapter 9

Question 42 (Cont.)

14u = 160 + 1030
   = 1190
1u = 1190 ÷ 14
   = 85
Ryan at first = 4u
    = 4 × 85
    = 340
(a) Ryan had $340 at first.

Gillian in the end = 3u + 80
    = 3 × 85 + 80
    = 335
(b) Gillian had $335 in the end.

Question 43

At first

<table>
<thead>
<tr>
<th></th>
<th>H</th>
<th>J</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>50u</td>
<td>50u</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

\[
\begin{array}{|c|c|c|}
\hline
\text{At first (1)} & \text{Change} & \text{End (1)} \\
\hline
H & 50u + 20 (\frac{1}{7}H) & \text{Gave} \\
   & 20u + 20 (\frac{1}{7}H) & 30u + 30 (\frac{1}{7}H) \\
J & 50u & \text{Received} \\
   & 20u + 20 & 70u + 20 \\
\hline
\end{array}
\]

End (1)

<table>
<thead>
<tr>
<th></th>
<th>H</th>
<th>J</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>44u</td>
<td>34</td>
</tr>
<tr>
<td></td>
<td></td>
<td>6</td>
</tr>
</tbody>
</table>

\[
\begin{array}{|c|c|c|}
\hline
\text{At first (2)} & \text{Change} & \text{End (2)} \\
\hline
H & 30u + 30 & \\
   & \text{Received} & 14u + 4 \\
   & 14u + 4 (\frac{1}{7}J) & 44u + 34 \\
J & 70u + 20 (\frac{1}{7}J) & \text{Gave} \\
   & 14u + 4 (\frac{1}{7}J) & 56u + 16 (\frac{1}{7}J) \\
\hline
\end{array}
\]

End (2)

<table>
<thead>
<tr>
<th></th>
<th>H</th>
<th>J</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>44u</td>
<td>12u</td>
</tr>
<tr>
<td></td>
<td></td>
<td>16</td>
</tr>
</tbody>
</table>

12u = 34 + 6 − 16
   = 24
1u = 24 ÷ 12
   = 2
Helena at first = 50u + 50
    = 50 × 2 + 50
    = 150
Helena had $150 at first.

Question 44

No. of qns answered = 30 − 4
   = 26

\[
\begin{array}{|c|c|c|c|}
\hline
\text{Correct} & \text{Wrong} & \text{Total} \\
\hline
26 \times 3 = 78 & 0 \times 2 = 0 & 78 \text{ (deduct)} \\
25 \times 3 = 75 & 1 \times 2 = 2 & 73 \text{ (deduct)} \\
18 \times 3 = 54 & 8 \times 2 = 16 & 38 \\
\hline
\end{array}
\]

Diff between the total marks = 78 − 38
   = 40
Difference between 1 correct and 1 wrong = 78 − 73
   = 5
No. of qns answered wrongly = 40 ÷ 5
   = 8
No. of qns answered correctly = 26 − 8
   = 18
Tony answered 18 questions correctly.

Question 45

Case 1:

Sharifah 800 cookies

\[
\begin{array}{|c|c|}
\hline
\text{left} & \text{cookies left} \\
\hline
S & D \\
6 & 3 \\
2^{12} & 1^{12} \\
4 & 2 \\
\hline
\end{array}
\]

Increase of 3u

3u = 1700 − 800
   = 900
1u = 900 ÷ 3
   = 300
Sharifah = 4u + 800
    = 4 × 300 + 800
    = 2000

Check

Sharifah = 1u + 1700
    = 1 × 300 + 1700
    = 2000
No. of boxes = 2000 ÷ 50
    = 40
Sharifah baked 40 boxes of cookies.

Case 2:

Sharifah 1700 cookies

\[
\begin{array}{|c|c|}
\hline
\text{left} & \text{cookies left} \\
\hline
S & D \\
3 & 6 \\
2^{12} & 1^{12} \\
4 & 2 \\
\hline
\end{array}
\]

Increase of 3u

\[
\begin{array}{|c|c|}
\hline
\text{left} & \text{cookies left} \\
\hline
S & D \\
3 & 6 \\
2^{12} & 1^{12} \\
4 & 2 \\
\hline
\end{array}
\]

Check

Sharifah = 1u + 1700
    = 1 × 300 + 1700
    = 2000
No. of boxes = 2000 ÷ 50
    = 40
Sharifah baked 40 boxes of cookies.

Question 46

At first

<table>
<thead>
<tr>
<th>(Actual)</th>
<th>Apples</th>
<th>Oranges</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>2u^{-7}</td>
<td>3u^{-3}</td>
</tr>
<tr>
<td>Change</td>
<td>−20^{-7}</td>
<td>+30^{-3}</td>
</tr>
</tbody>
</table>

End

| 3p^{-7} | 7p^{-3} |
Answer to Chapter 9

Question 46 (Cont.)

<table>
<thead>
<tr>
<th>(Working)</th>
<th>Apples</th>
<th>Oranges</th>
</tr>
</thead>
<tbody>
<tr>
<td>At First</td>
<td>14u</td>
<td>9u</td>
</tr>
<tr>
<td>Change</td>
<td>-140</td>
<td>+90</td>
</tr>
<tr>
<td>End</td>
<td>21p</td>
<td>21p</td>
</tr>
</tbody>
</table>

Work model from end

\[ 5u = 140 + 90 \]
\[ = 230 \]
\[ 1u = 230 \div 5 \]
\[ = 46 \]

Apples at first = \( 2u - 20 \)
\[ = 2 \times 46 - 20 \]
\[ = 72 \]

Oranges at first = \( 3u \)
\[ = 3 \times 46 \]
\[ = 138 \]

Farmer Sam has **72 apples** in the crate.
While every care has been taken to compile this answer booklet, errors may still arise in the course of compilation and production. If you notice any error, kindly write to feedback@onsponge.com so that we can review it.