**P6 Solutions**

In all solutions, \( u \) represents units and \( p \) represents parts.

### Chapter 1 Recap of EPSS Primary 5

#### Answer to Unit 1.1

**Question 1**

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

**Summary**

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

Total = \( 10u + 15u \)

\( = 25u \)

\( 25u = 1000 \)

\( 1u = 1000 \div 25 \)

\( = 40 \)

\( 12u = 12 \times 40 \)

\( = 480 \)

Daniel’s contribution was \$480.\]

**Question 2**

\[
\begin{align*}
A : & \quad C \\
3^{12} : & \quad 2^{12} \\
30 : & \quad 20 \\
M : & \quad W \\
1^{6} : & \quad 4^{6} \\
6 : & \quad 24 \\
A : & \quad B : \quad G : \quad C \\
9 : & \quad 11 : \quad 20
\end{align*}
\]

**Summary**

\[
\begin{align*}
M : & \quad W : \quad B : \quad G \\
6 : & \quad 24 : \quad 9 : \quad 11
\end{align*}
\]

Difference (W and B) = \( 24u – 9u \)

\( = 15u \)

\( 15u = 75 \)

\( 1u = 75 \div 15 \)

\( = 5 \)

Total = \( 30u + 20u \)

\( = 50u \)

\( 50u = 50 \times 5 \)

\( = 250 \)

There are **250 people** in the tour group.

#### Answer to Unit 1.2

**Question 1**

\[
\begin{align*}
G : & \quad V+F \\
3^{2} : & \quad 5^{2} \\
21 : & \quad 35 \\
A+B : & \quad Diff \\
7^{12} : & \quad 5^{12} \\
21 : & \quad 39 \\
Diff : & \quad A : \quad C : \quad Diff \\
3^{12} : & \quad 7^{12} \\
21 : & \quad 28 \\
7 : & \quad 7 : \quad 14
\end{align*}
\]

**Summary**

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

\( 7u = 77 \)

\( 1u = 77 \div 7 \)

\( = 11 \)

Total = \( 3u + 7u + 7u \)

\( = 17u \)

\( 17u = 17 \times 11 \)

\( = 187 \)

The total area of the figure is **187 cm\(^2**.\]

**Question 2**

\[
\begin{align*}
E : & \quad T : \quad Diff \\
3 : & \quad 5 : \quad 2 \\
In 6 years’ time \\
E : & \quad T : \quad Diff \\
2^{2} : & \quad 3^{2} : \quad 1^{2} \\
4 : & \quad 6 : \quad 2
\end{align*}
\]

For more review questions, please visit [www.onsponge.com](http://www.onsponge.com)
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)

<table>
<thead>
<tr>
<th>Item</th>
<th>Quantity</th>
<th>×</th>
<th>Value ($)</th>
</tr>
</thead>
<tbody>
<tr>
<td>S</td>
<td>4u^3</td>
<td>22</td>
<td>88u</td>
</tr>
<tr>
<td>C</td>
<td>9u^3</td>
<td>12</td>
<td>108u</td>
</tr>
<tr>
<td>Total</td>
<td>16u</td>
<td></td>
<td>196u</td>
</tr>
</tbody>
</table>

(Working)

<table>
<thead>
<tr>
<th>Item</th>
<th>Quantity</th>
<th>×</th>
<th>Value ($)</th>
</tr>
</thead>
<tbody>
<tr>
<td>S</td>
<td>12u</td>
<td>22</td>
<td>264u</td>
</tr>
<tr>
<td>C</td>
<td>90</td>
<td>12</td>
<td>1080u</td>
</tr>
<tr>
<td>Total</td>
<td>33u</td>
<td></td>
<td>1344u</td>
</tr>
</tbody>
</table>

45u = 12u + 90 + 75
33u = 165
1u = 165 ÷ 33
= 5
4u = 4 × 5
= 20
Shelly had 20 figurines at first.

Answer to Unit 1.5

Question 1

<table>
<thead>
<tr>
<th>Items</th>
<th>Quantity</th>
<th>×</th>
<th>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>×</th>
<th>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>Items</th>
<th>Quantity</th>
<th>×</th>
<th>Value ($)</th>
</tr>
</thead>
<tbody>
<tr>
<td>B</td>
<td>3u^2</td>
<td>6u</td>
<td>1260</td>
</tr>
<tr>
<td>Remainder</td>
<td>2u^2</td>
<td></td>
<td>540</td>
</tr>
<tr>
<td>Total</td>
<td>5u^2</td>
<td>(10u)</td>
<td>1800</td>
</tr>
</tbody>
</table>

1u = 210
6u = 210 × 6
= 1260
\( \frac{7}{10} \) of bottle = 1260
\( \frac{1}{10} \) of bottle = 1260 ÷ 7
= 180
\( \frac{3}{10} \) of bottle = 3 × 180
= 540
540 − 210 = 330
Mrs Wong would need to prepare 330 l more to fill up the bottle completely.

There was 100 l of water in Tank Q in the end.
Answer to Unit 1.6

Question 2

Total papers

1st
\[ \frac{3}{8} T + 3 \]

Remainder

24

2nd
\[ \frac{1}{4} R + 3 \]

Left

15

\[ \frac{3}{4} R = 3 + 15 \]

= 18

\[ \frac{1}{4} R = 18 + 3 \]

= 6

\[ \frac{1}{4} R = 6 \times 4 \]

= 24

\[ \frac{3}{8} T = 24 + 3 \]

= 27

\[ \frac{1}{8} T = 27 + 3 \]

= 9

\[ \frac{3}{8} T = 8 \times 9 \]

= 36

Lina used 72 pieces of origami paper.

Question 3

Total flour

5.4 kg (65u)

Cu

30u

Remainder 1

5u^{15} (35u)

Co

2u^{17} (14u)

Remainder 2

3u^{17} (21u)

7u^{13} (21u)

P

2u^{13} (6u)

Left

5u^{15} (15u)

5.4 kg = 5400 g

45u = 5400

1u = 5400 ÷ 45

= 120

15u = 15 × 120

= 1800

1800 g = 1 kg 800 g

There were 1 kg 800 g of flour left in the container.

Answer to Unit 1.7

Question 1

\[ \frac{2}{3} \text{ M} = \frac{3}{5} \text{ F} \]

\[ \frac{4}{5} \text{ M} = \frac{6}{10} \text{ F} \]

\[ M : W \]

9 : 10

Total = 9u + 10u

= 19u

19u = 190

1u = 190 ÷ 19

= 10

Total children = 3u + 4u

= 7u

7u = 7 × 10

= 70

There were 70 children at the engagement party.

Question 2

\[ \frac{9}{10} \text{ S} = \frac{2}{5} \text{ M} \]

\[ \frac{9}{12} \text{ S} = \frac{9}{12} \text{ M} \]

\[ \frac{9}{15} \text{ S} = \frac{3}{5} \text{ C} \]

\[ \frac{9}{16} \text{ S} = \frac{9}{16} \text{ C} \]

10^{44} : 12^{44} : 40 : 45

40 : 48

Summary

S : M : C

40 : 48 : 45

48u = 96

1u = 96 ÷ 48

= 2

Total = 40u + 48u + 45u

= 133u

133u = 133 × 2

= 266

Karen’s total score was 266 marks.
Let's Get Started

2.

At first

\[
\begin{array}{c|c|c}
T & 10u & 32 \\ 
P & 10u & 10 \\
\hline 
\frac{1}{10} & \frac{1}{10} & \frac{1}{10}
\end{array}
\]

\[
\begin{array}{c|c|c}
T & \frac{2}{7} & (10u + 32) \\ 
P & \frac{3}{10} & (3u) \\
\hline 
\frac{7}{10} & \frac{7}{10} & (7u)
\end{array}
\]

In the end

\[
\begin{array}{c|c|c}
T & 5u & 16 \\ 
P & 5u & 16 8 \\
\hline 
7u & \\
\end{array}
\]

3.

In the end

\[
\begin{array}{c|c|c|c}
R & 3u & 15 \\ 
G & 3u & \\
\hline 
\frac{1}{10} & \frac{1}{10} & \\
\end{array}
\]

\[
\begin{array}{c|c|c|c}
R & \frac{3}{4} & (3u + 15) \\ 
G & \frac{3}{10} & (3u) \\
\hline 
\frac{7}{4} & \frac{7}{10} & (7u) \\
\frac{10}{10} & (10u)
\end{array}
\]

At first

\[
\begin{array}{c|c|c|c}
R & 10u & 2u & 60 \\ 
G & 10u & \\
\hline 
\frac{1}{10} & \frac{1}{10} & \\
\end{array}
\]

4.

At first

\[
\begin{array}{c|c|c|c}
K & 40u & \\ 
L & 40u & \\
\hline 
\frac{5}{5} & \frac{5}{5}
\end{array}
\]

\[
\begin{array}{c|c|c|c}
K & \frac{5}{8} & (40u) \\ 
L & \frac{5}{8} & (16u) \\
\hline 
\frac{7}{8} & \frac{7}{8} & (35u) \\
\frac{7}{8} & \frac{7}{8} & (24u)
\end{array}
\]

In the end

\[
\begin{array}{c|c|c|c}
K & 24u & 220 \\ 
L & 24u & \\
\hline 
\frac{7}{5} & \frac{7}{5} & \\
\end{array}
\]

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

\[
\begin{array}{c|c|c|c}
C & \frac{3}{7} & (15u + 24) \\ 
L & \frac{5}{7} & (15u) \\
\hline 
\frac{6}{7} & \frac{6}{7} & (12u)
\end{array}
\]

In the end

\[
\begin{array}{c|c|c|c}
C & 5u & 8 \\ 
L & 5u & 8 20 \\
\hline 
12u & \\
\end{array}
\]

\[
7u = 8 + 20 \\
= 28 \\
1u = 28 ÷ 7 \\
= 4 \\
10u + 16 = 10 × 4 + 16 \\
= 56
\]

56 cars cleared the gantry.

Question 2

At first

\[
\begin{array}{c|c|c|c}
B & 40u & 112 \\ 
G & 40u & \\
\hline 
\frac{5}{5} & \frac{5}{5}
\end{array}
\]

\[
\begin{array}{c|c|c|c}
B & \frac{5}{9} & (40u + 112) \\ 
G & \frac{5}{9} & (16u) \\
\hline 
\frac{2}{9} & \frac{2}{9} & (25u + 70) \\
\frac{7}{9} & \frac{7}{9} & (15u + 42)
\end{array}
\]

In the end

\[
\begin{array}{c|c|c|c}
B & 15u & 27 & 15 \\ 
G & 24u & \\
\hline 
\frac{7}{5} & \frac{7}{5} & \\
\end{array}
\]
Answer to Advanced Model Drawing (More than/Less than)

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

\[
\begin{array}{c|c|c}
& C & J \\
\hline
C & 36u & 45 \\
J & 36u & \end{array}
\]

\[
\begin{array}{c|c|c}
& C & J \\
\hline
\frac{3}{5} (36u + 45) & \frac{5}{5} (20u + 25) & \frac{4}{5} (16u + 20) \\
J & \frac{1}{4} (36u) & \frac{1}{4} (9u) & \frac{1}{4} (27u) \\
\end{array}
\]

Sold

\[
\begin{array}{c|c|c}
& C & J \\
\hline
C & 9u & 66 & 25 \\
J & 9u & \end{array}
\]

20u – 9u = 11u
11u = 66
1u = 66 ÷ 11
= 6
Total (end) = 16u + 20 + 27u
= 43u + 20
43u + 20 = 43 × 6 + 20
= 278
crossword puzzle books and jigsaw puzzles remained

278 crossword puzzle books and jigsaw puzzles remained in total.

Question 4

In the end

\[
\begin{array}{c|c}
& T \\
\hline
T & 12u & 30 \\
S & 12u & \end{array}
\]

35u = 155 – 50
= 105
1u = 105 ÷ 35
= 3
T (at first) = 20 × 3 + 50
= 110
T (left) = \frac{7}{10} × 110
= 77
77 table lamps remained.

Answer to Advanced Model Drawing (Equal stage at first)

Question 1

At first

\[
\begin{array}{c|c}
& D \\
\hline
D & 7u \\
Y & 7u \\
H & 7u \\
\end{array}
\]

In the end

\[
\begin{array}{c|c|c}
& D & 200 \\
\hline
D & 7u & 2u \\
Y & 5u & 2u \\
H & 5u & \end{array}
\]

2u = 300 – 74
= 226
1u = 226 ÷ 2
= 113
D (end) = 7 × 113 – 200
= 591
Deanna had $591 in the end.

Question 2

At first

\[
\begin{array}{c|c}
& Y \\
\hline
Y & 25u \\
M & 25u \\
F & 25u \\
\end{array}
\]

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

Question 2 (Cont.)

In the end

\[
\begin{array}{c|c|c|c|c}
Y & 10u & 15u & \hline
M & 7u & 18u & \hline
F & 48 & & \end{array}
\]

\[10u + 7u + 25u = 78 + 48\]
\[42u = 126\]
\[1u = 126 \div 42\]
\[= 3\]
\[25u = 25 \times 3\]
\[= 75\]

Each of them received 75 pins at first.

Answer to Advanced Model Drawing (Equal Stage End)

Question 1

In the end

\[
\begin{array}{c|c|c|c|c|c|c}
D & 15u & \hline
W & 15u & \hline
S & 15u & \end{array}
\]

At first

\[
\begin{array}{c|c|c|c|c|c|c}
D & 56 & \hline
W & 15u & 5u & \hline
S & 15u & 9u & \end{array}
\]

\[15u + 15u + 15u + 5u + 9u = 298 + 56\]
\[59u = 354\]
\[1u = 354 \div 59\]
\[= 6\]
\[D (at first) = 15 \times 6 - 56\]
\[= 34\]

Davis had 34 cards at first.

Question 2

In the end

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

At first

\[
\begin{array}{c|c|c|c|c|c|c}
I & 20u & 8u & \hline
D & 252 & & \hline
S & & 222 & \hline
R & 28u & 7u & \end{array}
\]

Answer to Advanced Model Drawing (Equal Stage End)

Question 2 (Cont.)

\[28u = 252\]
\[1u = 252 \div 28\]
\[= 9\]

Total (at first) = \[20u + 252 + 252 + 222 + 35u\]
\[= 20 \times 9 + 726 + 35 \times 9\]
\[= 1221\]

They made 1221 balloons altogether at first.

Answer to Advanced Model Drawing (Repeated Items)

Question 1

\[
\begin{array}{c|c|c|c|c}
K & 1u & 72 & \hline
C & 3u & 216 & \hline
S & 3u & & \end{array}
\]

\[\frac{3}{25}\] of total = 3u
\[\frac{1}{25}\] of total = 1u
\[\frac{25}{25}\] of total = 25u

\[25u - 3u - 3u - 1u = 216 + 72\]
\[18u = 288\]
\[1u = 288 \div 18\]
\[= 16\]
\[25u = 25 \times 16\]
\[= 400\]

There are 400 buns in the bakery shop.

Question 2

\[
\begin{array}{c|c|c|c|c|c|c}
H & 2u & 6 & 23 & \hline
R & 2u & 6 & & \hline
B & 2u & 6 & 15 & \hline
N & 2u & & & \end{array}
\]

\[5u = 6 + 15 + 6 + 23\]
\[= 50\]
\[1u = 50 \div 5\]
\[= 10\]
\[2u + 6 = 2 \times 10 + 6\]
\[= 26\]

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

Question 1

At first

\[
\begin{array}{c|c|c}
\text{B} & \text{10u} & 200 \\
\text{K} & \text{10u} & \\
\end{array}
\]

<table>
<thead>
<tr>
<th>At first</th>
<th>Change</th>
<th>End</th>
</tr>
</thead>
<tbody>
<tr>
<td>B</td>
<td>( \frac{10}{10} (10u + 200) )</td>
<td>( \frac{7}{10} (7u + 140) )</td>
</tr>
<tr>
<td>K</td>
<td>( 10u )</td>
<td>( + (3u + 60) )</td>
</tr>
</tbody>
</table>

In the end

\[
\begin{array}{c|c|c|c}
\text{B} & \text{7u} & 126 & 14 \\
\text{K} & \text{13u} & 14 & 46 \\
\end{array}
\]

\[
\begin{align*}
13u - 7u &= 126 \\
6u &= 126 \\
1u &= 126 \div 6 \\
&= 21 \\
3u + 60 &= 3 \times 21 + 60 \\
&= 123 \\
\text{123 people} &\text{ had moved to Kusu Beach.}
\end{align*}
\]

Question 2

At first

\[
\begin{array}{c|c|c}
\text{A} & \text{12u} & 48 \\
\text{B} & \text{12u} & \\
\end{array}
\]

<table>
<thead>
<tr>
<th>At first</th>
<th>Change</th>
<th>End</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>( \frac{12}{12} (12u + 48) )</td>
<td>( \frac{7}{12} (7u + 28) )</td>
</tr>
</tbody>
</table>

In the end

\[
\begin{array}{c|c|c|c}
\text{A} & \text{7u} & 28 & 2 \text{ 18} \text{ 2} \\
\text{B} & \text{7u} & 28 & \\
\end{array}
\]

\[
\begin{align*}
17u - 7u &= 28 + 2 \\
10u &= 30 \\
1u &= 30 \div 10 \\
&= 3 \\
22u + 48 &= 24 \times 3 + 48 \\
&= 120 \\
\text{There are 120 children} &\text{ altogether in both campsites.}
\end{align*}
\]

Question 3

At first

\[
\begin{array}{c|c|c}
\text{L} & \text{5u} & \\
\text{M} & \text{5u} & 2400 \\
\end{array}
\]

Answer to Advanced Model Drawing (Internal Transfer)

Question 3 (Cont.)

At first

\[
\begin{array}{c|c|c|c}
\text{L} & \frac{5}{5} (5u + 2400) & \frac{1}{5} (3u + 1440) & \frac{2}{5} (2u + 960) \\
\text{M} & 5u & + (3u + 1440) & 8u + 1440 \\
\end{array}
\]

2nd change

\[
\begin{array}{c|c|c|c}
\text{L} & 2u + 960 & + (2u + 360) & 4u + 1320 \\
\text{M} & \frac{1}{4} (8u + 1440) & \frac{1}{4} (2u + 360) & \frac{2}{4} (6u + 1080) \\
\end{array}
\]

In the end

\[
\begin{array}{c|c|c|c}
\text{L} & 4u & 52 & 1080 & 188 \\
\text{M} & 4u & 52 & 1080 & \\
\end{array}
\]

\[
\begin{align*}
2u &= 52 \\
1u &= 52 \div 2 \\
&= 26 \\
3u + 1440 &= 3 \times 26 + 1440 \\
&= 1518 \\
\text{Lynette transferred \$1518} &\text{ to Michelle.}
\end{align*}
\]

Question 4

At first

\[
\begin{array}{c|c|c}
\text{H} & \text{5u} & 45 \\
\text{L} & \text{5u} & \\
\end{array}
\]

<table>
<thead>
<tr>
<th>At first</th>
<th>Change</th>
<th>End</th>
</tr>
</thead>
<tbody>
<tr>
<td>H</td>
<td>( \frac{5}{5} (5u + 45) )</td>
<td>( \frac{1}{5} (1u + 9) )</td>
</tr>
<tr>
<td>L</td>
<td>5u &amp; + (1u + 9) &amp; 6u + 9</td>
<td></td>
</tr>
</tbody>
</table>

2nd Change

\[
\begin{array}{c|c|c|c}
\text{H} & 4u + 36 & + (4u + 6) & 8u + 42 \\
\text{L} & \frac{2}{5} (6u + 9) & \frac{2}{5} (4u + 6) & \frac{2}{5} (2u + 3) \\
\end{array}
\]

In the end

\[
\begin{array}{c|c|c|c}
\text{H} & 2u & 3 & 27 & 42 \\
\text{L} & 2u & 3 & \\
\end{array}
\]

\[
\begin{align*}
6u &= 3 + 27 \\
&= 30 \\
1u &= 30 \div 6 \\
&= 5 \\
1u + 9 &= 5 + 9 \\
&= 14 \\
\text{Mrs Hagen gave Letilia 14 dumplings.}
\end{align*}
\]
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): \[1 \times 3 - 1 = 2\]
Test (Figure 2): \[2 \times 3 - 1 = 5\]
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

Let’s 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)

<table>
<thead>
<tr>
<th>Figure no.</th>
<th>Pattern to find (No. of squares)</th>
<th>Pattern to find (No. of circles)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>[1 \times 2]</td>
<td>[1 \times 4 + 2]</td>
</tr>
<tr>
<td>2</td>
<td>[2 \times 2]</td>
<td>[2 \times 4 + 2]</td>
</tr>
<tr>
<td>3</td>
<td>[3 \times 2]</td>
<td>[3 \times 4 + 2]</td>
</tr>
<tr>
<td>4</td>
<td>[4 \times 2]</td>
<td>[4 \times 4 + 2 = 18]</td>
</tr>
<tr>
<td>5</td>
<td>[5 \times 2]</td>
<td>[5 \times 4 + 2 = 22]</td>
</tr>
</tbody>
</table>
(b) Unique term (No. of circles) = Figure no. \[\times 4 + 2\]

Let’s Practise 3.1

Question 1

(a)

<table>
<thead>
<tr>
<th>Figure no.</th>
<th>No. of triangles</th>
<th>Total no. of dots</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>2</td>
<td>10</td>
</tr>
<tr>
<td>2</td>
<td>4</td>
<td>14</td>
</tr>
<tr>
<td>3</td>
<td>6</td>
<td>18</td>
</tr>
<tr>
<td>4</td>
<td>8</td>
<td>22</td>
</tr>
<tr>
<td>5</td>
<td>10</td>
<td>26</td>
</tr>
</tbody>
</table>

Answer to Unit 3.1

Question 1 (Cont.)

(b) Unique term (No. of triangles) = Figure no. \[\times 2\]
No. of triangles in Figure 83 = \[83 \times 2\] = 166
(c) Unique term (Total no. of dots) = Figure no. \[\times 4 + 6\]
Working backwards
Figure no. \[\times 4 = 282 - 6\] = 276
Figure no. = \[276 ÷ 4\] = 69
There will be 282 dots in Figure 69.

Question 2

(a)
(b) (i) 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. \[\times 3 + 2\]
\[C = 19 \times 3 + 2\] = 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
Figure no. \[\times 5 = 131 - 1\] = 130
Figure no. = \[130 ÷ 5\] = 26
The figure number formed is Figure 26.

Question 4

(a)
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>
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<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) | Figure no. | No. of dots | Pattern to find no. of dots |
---|------------|-------------|-----------------------------|
| 1 | 2          | 1² + 1      |
| 2 | 5          | 2² + 1      |
| 3 | 10         | 3² + 1      |
| 4 | 17         | 4² + 1      |
| 5 | 26         | 5² + 1      |

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

Let's Practise 3.2

Question 1

<table>
<thead>
<tr>
<th>Figure no.</th>
<th>Number of dots</th>
<th>Pattern to find number of dots</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>1</td>
<td>1 x 1</td>
</tr>
<tr>
<td>2</td>
<td>4</td>
<td>2 x 2</td>
</tr>
<tr>
<td>3</td>
<td>9</td>
<td>3 x 3</td>
</tr>
<tr>
<td>4</td>
<td>16</td>
<td>4 x 4</td>
</tr>
<tr>
<td>5</td>
<td>(a)</td>
<td>5 x 5</td>
</tr>
<tr>
<td>...</td>
<td></td>
<td></td>
</tr>
<tr>
<td>(b)</td>
<td>81</td>
<td></td>
</tr>
</tbody>
</table>

(a) No. of dots (Figure 5) = 5 x 5
   = 25
(b) Figure no. = √81
    = 9
(c) Figure no. = √16
    = 16

Question 2

(a) 

(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
Answer to Unit 3.2

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></td>
</tr>
</tbody>
</table>

No. of shaded rectangles = \(16 \times 3 – 1\)
= 47

(b) Working backwards
Figure no. \times 3 = 722 + 1
= 723
Figure no. = 723 + 3
= 241

There will be 728 shaded rectangles in Figure 241.

(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></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 cm².

Question 4 (Cont.)

(c) Unique term (No. of shaded squares) = Figure no.

Working backwards
No. of unshaded squares = 1225 \div 25
= 49
= 7²

Fig. no. 8.

(d) No of shaded squares = 65
No of unshaded squares = (65 – 1)²
= 4096

Perimeter
= 5 (64 + 64 + 32 + 32 + 31 + 33 + 1 + 1 + 1 + 1)
= 1300

The perimeter of the figure in Pattern 65 is 1300 cm.

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 = (10 \times 10) – (8 \times 8)
= 36

(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
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 \( \frac{(\text{Figure no} \times \text{Figure no} + 1)}{2} \).

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 \( \frac{(\text{Figure no} \times \text{Figure no} + 1)}{2} \).
   (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
   \( \sqrt{3080} \approx 55 \)
   Test 1: 54 \times 55 = 2970
   Test 2: 55 \times 56 = 3080
   There are 1035 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 \div 10 = 153
   \( \frac{\text{Figure no} \times \text{Figure no} + 1}{2} = 153 \)
   Figure no. x (Figure no. + 1) = 306
   \( \sqrt{306} = 17.49286 \)

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 22
   = 484
   There are 484 triangles in Figure 22.
(b) Unique terms: \( \frac{\text{Figure no} \times \text{Figure no} + 1}{2} \)
(c) 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) = \( \frac{\text{Figure no} \times \text{Figure no} – 1}{2} \)
   Working backwards
   \( \sqrt{2485} = 49.74 \)
   Test 1: 49 \times 49 = 2401
   Test 2: 50 \times 50 = 2500
   There will be 2485 unshaded triangles in Figure 70.

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

\[ 741 \times 2 = 1482 \]
\[ \sqrt{1482} \approx 38 \]
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

(a) No. of blocks at Layer 12 = \( (12 - 1) \times 2 \)
= 22
Number on the extreme right of Layer 12
= 1 + (2 + 4 + 6 + ... + 22)
= 1 + 2(1 + 2 + 3 + ... + 11)
= 1 + 2[\frac{(11 + 1)}{2} \times 11]
= 133

(b) No. of blocks at Layer 68
= (68 – 1) \times 2
= 134
Number on the extreme right of Layer 68
= 1 + (2 + 4 + 6 + ... + 134)
= 1 + 2(1 + 2 + 3 + ... + 67)
= 1 + 2[\frac{(67 + 1)}{2} \times 67]
= 4557

(c) 1261 – 1 = 1260
\[ 1260 \div 2 = 630 \]
\[ \frac{\text{Fig no.}}{2} \times (\text{Fig no.} + 1) = 630 \]
(Fig No.) \times (Fig No. + 1) = 1260
\[ \sqrt{1260} = 35.4973 \]
Test: 35 \times 36 = 1260
35 + 1 = 36
In Layer 36, the number 1261 will be on the extreme right of the layer.

(d) Working backwards

\[ 2163 \div 2 = 1081 \]
\[ \frac{\text{Fig no.}}{2} \times (\text{Fig no.} + 1) = 1081 \]
(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
2071 + 1 = 2072
The number on the extreme left of the layer is 2072.

Chapter 4

Circles

Answer to Unit 4.1

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
\[ = \frac{1}{4} \pi \times 5 \text{ cm} \times 5 \text{ cm} - \frac{1}{2} \times 5 \text{ cm} \times 5 \text{ cm} \]
\[ = 7 \text{ cm}^2 \]

Let’s Learn 4.1

Ask Yourself
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 cm^2.

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
\[ = 24 \text{ cm} \times 24 \text{ cm} - \pi \times 12 \text{ cm} \times 12 \text{ cm} \]
\[ = 123 \text{ cm}^2 \]
The area of unshaded Region Q is 123 cm^2.

Question 3
Perimeter of shaded region
\[ = \frac{3}{2} \times 2 \times 3.14 \times 12 \text{ cm} + 36 \text{ cm} + 24 \text{ cm} + 36 \text{ cm} \]
\[ = 209.04 \text{ cm} \]
The perimeter of the shaded region is 209.04 cm.
Question 3 (Cont.)

Area of shaded region
\[ = 24 \text{ cm} \times 36 \text{ cm} - \frac{1}{2} \times 3.14 \times 12 \text{ cm} \times 12 \text{ cm} \]
\[ = 185.76 \text{ cm}^2 \]
The area of the shaded region is \(185.76 \text{ cm}^2\).

Question 4

Area of shaded part
\[ = 2 \times \left( \frac{1}{4} \times \pi \times 5 \text{ cm} \times 5 \text{ cm} - \frac{1}{2} \times 5 \text{ cm} \times 5 \text{ cm} \right) \]
\[ = 14 \text{ cm}^2 \]
The area of the shaded part is \(14 \text{ cm}^2\).

Question 5

Area of shaded region
\[ = 7 \times \left[ \left( \frac{1}{4} \times \pi \times 20 \text{ cm} \times 20 \text{ cm} \right) - \left( \frac{1}{2} \times 20 \text{ cm} \times 20 \text{ cm} \right) \right] \]
\[ = 700\pi - 1400 \text{ cm}^2 \]
Area of unshaded regions
\[ = \pi \times (20 \text{ cm} \times 20 \text{ cm}) - (700\pi - 1400) \]
\[ = 457 \text{ cm}^2 \]
The area of the shaded region is \(457 \text{ cm}^2\).

Question 6

Perimeter of large semicircle
\[ = \left( \frac{1}{2} \times \pi \times 36 \right) + 36 \]
\[ = 18(\pi + 2) \]
Perimeter of small semicircle
\[ = \left( \frac{1}{2} \times \pi \times 12 \right) + 12 \]
\[ = 6(\pi + 2) \]
Perimeter of large semicircle : Perimeter of small semicircle
\[ = \frac{18(\pi + 2)}{6(\pi + 2)} = 3 : 1 \]
Area of the large semicircle
\[ = \frac{1}{2} \times \pi \times 18^2 \]
\[ = 162\pi \]
Area of small semicircle
\[ = \frac{1}{2} \times \pi \times 6^2 \]
\[ = 18\pi \]
Area of the large semicircle : Area of the small semicircle
\[ = \frac{162\pi}{18\pi} = 9 : 1 \]

Question 7

Diameter of small circle = 16 cm
Diameter of medium circle = 32 cm
Area of shaded region
\[ = \pi \times 32 \text{ cm} \times 32 \text{ cm} - 2 \times \pi \times 8 \text{ cm} \times 8 \text{ cm} - \pi \times 16 \text{ cm} \times 16 \text{ cm} \]
\[ = 640\pi \text{ cm}^2 \]
The area of the shaded region is \(640\pi \text{ cm}^2\).
Answer to Unit 4.2

**Question 2 (Cont.)**

Area of small circles
\[
\frac{22}{7} \times 7 \text{ cm} \times 7 \text{ cm} \times 7 = 1078 \text{ cm}^2
\]
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 = \(1 \frac{1}{4} \times \frac{22}{7} \times 7 \text{ cm} \times 7 \text{ cm} \)
\[
= 192.5 \text{ cm}^2
\]
The area of the figure is \(192.5 \text{ cm}^2\).

Perimeter of figure = \(1 \frac{1}{4} \times 2 \times \frac{22}{7} \times 7 \text{ cm} + 14 \text{ cm} \)
\[
= 69 \text{ cm}
\]
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} + 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
\[
= 432 \text{ cm}^2 - (\frac{1}{12} \times 3.14 \times 18 \text{ cm} \times 18 \text{ cm}) + 6 \text{ cm} \times 6 \text{ cm}
= 213.66 \text{ cm}^2
\]
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
\[
= \frac{1}{2} \times 3.14 \times 5 \text{ cm} \times 5 \text{ cm} - \frac{1}{2} \times 6 \text{ cm} \times 8 \text{ cm}
= 15.25 \text{ cm}^2
\]
Area of shaded parts in semicircles ABC and CDE
\[
= \frac{1}{2} \times 3.14 \times 3 \text{ cm} \times 3 \text{ cm} + \frac{1}{2} \times 3.14 \times 4 \text{ cm} \times 4 \text{ cm} - 15.25 \text{ cm}^2
= 24 \text{ cm}^2
\]
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 cm − 2 cm
   = 3 cm
   The length OL is 3 cm.
(b) Area of shaded triangle = \(\frac{1}{2} \times 4 \text{ cm} \times 3 \text{ cm}\)
   = 6 cm²
   Area of shaded \(\frac{3}{4}\) circle = \(\frac{3}{4} \pi \times 5 \text{ cm} \times 5 \text{ cm}\)
   = 18.75π cm²
   Area of shaded parts = 6 cm² + 18.75π cm²
   ≈ 64.9 cm²
   The area of the shaded parts is 64.9 cm².

Question 4
Area of the shaded parts
= \(\frac{1}{2} \pi \times (9)^2 + 2 \times \frac{1}{2} \times 9 \times 9\)
= 208.2857 cm²
= 208.3 cm²

Question 5
A + B = 110 cm²
A + B + C = 180 cm²
C = 180 – 110
   = 70 cm²
B + C + D = 130 cm²
B + D = 130 – 70
   = 60 cm²
The area of shaded parts is 60 cm².

Question 6
Area of the shaded part
= \(\left(\frac{1}{2} \times 7.5 \times 12\right) + \left[\left(\frac{1}{4} \pi \times (7.5)^2\right) - \left(\frac{1}{2} \times 7.5 \times 7.5\right)\right]\)
= 45 + 16.0536
= 61.05 cm²
The area of shaded parts is 61.05 cm².

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 (4π - 8) cm²
= (16π - 32) cm²
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 – 16π) cm²
Area of shaded parts
= 16π – 32 + (96 – 16π)
= 64 cm²
The total area of the shaded parts is 64 cm².

Answer to Chapter 4 Review Questions

Question 8
Area of shaded parts
= \(32 \times 16 – 8\left[\left(\frac{1}{4} \times 3.14 \times 8^2\right) - \left(\frac{1}{2} \times 8 \times 8\right)\right]\)
= 512 – 8 \times 18.24
= 366.08
The total area of the shaded parts is 366.08 cm².

Chapter 5 Speed

Answer to Unit 5.1

Let's Get Started 5.1

1. (a) Distance = 90 × 2
   = 180
   Distance travelled for the first part of her journey was 180 km.
(b) Total distance = 3 × 180
   = 540
   The total distance of her journey was 540 km.
(c) Time taken = 5 h – 2 h
   = 3 h
   Distance travelled = 540 – 180
   = 360
   Speed = 360 ÷ 3
   = 120
   Jaime’s speed for the last part of the journey was 120 km/h.
(d) Average speed for whole journey = 540 ÷ 7
   = 77\frac{1}{2}
   Jaime’s average speed for the whole journey was 77\frac{1}{2} km/h.

2. (a) \(\frac{1}{4}\) Total = 300 km
   \(\frac{1}{4}\) Total = 300 km ÷ 3
   = 100 km
   \(\frac{1}{4}\) Total = 4 × 100 km
   = 400 km
   Town A and Town B is 400 km apart.
(b) Time taken = 100 ÷ 80
   = 1\frac{1}{4}
   He took 1\frac{1}{4} 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
\[
\begin{align*}
\text{1/5 Total} & = 2.6 \text{ km} \\
\text{3/5 Total} & = 2.6 \times 3 \\
& = 7.8 \text{ km} \\
\text{Time taken for 2/5 of journey} & = 7.8 ÷ 12 \\
& = \frac{13}{20} \text{ (h)} \\
& = 39 \text{ (min)} \\
\text{Time taken for 1/5 of remaining journey} & = 2.6 ÷ 13 \\
& = \frac{1}{5} \text{ (h)} \\
& = 12 \text{ (min)}
\end{align*}
\]

Time taken = 39 + 12 + 15
   = 66
Alice took 1 hr 6 min to complete the whole journey.

Question 3
1st part of journey = \(\frac{3}{20}\) of Total
2nd part of journey = \(\frac{2}{5}\) of Total
3rd part of journey = \(1 - \frac{2}{5} - \frac{3}{20}\)
   = \(\frac{1}{20}\) (of Total)

\[
\begin{align*}
\text{2/20 Total} & = 84 \text{ km} \\
\text{1/20 Total} & = 84 \div 7 \\
& = 12 \text{ km} \\
\text{5/20 Total} & = 5 \times 12 \text{ km} \\
& = 60 \text{ km} \\
\text{Speed for last part of journey} & = 60 ÷ 1 \\
& = 60
\end{align*}
\]

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 × \(\frac{1}{2}\) h
   = 29.5 km
Distance (middle part) = 352 km – 126 km – 29.5 km
   = 196.5 km
Time take (last part) = 126 km ÷ 72 km/h
   = \(\frac{1}{2}\) 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 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 × \(\frac{2}{5}\) h
   = 2.4 km
Total distance = 2.4 km × 2
   = 4.8 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 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 = \( \frac{544}{(64 + 72)} \) = 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 = \( \frac{100}{4} \times \frac{1}{4} \) = 25 km

Distance lorry travelled in 15 min = \( \frac{80}{4} \times \frac{1}{4} \) = 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 = \( \frac{217.5}{(80 + 65)} \) = 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 \times 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 \times 4 h = 280 km

Distance Bill covered at 3 p.m. = 440 km – 280 km = 160 km

Bill’s speed = 160 km ÷ 4 h = 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 = \( \frac{120}{4} \times 8 \) = 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**

**Let’s Learn 5.3**

**Ask Yourself**

1. Distance travelled is the common/the same.

**Let’s Practise 5.3**

**Question 1**

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

4 – 3 = 1

1u = 30

4u = 30 \times 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**

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

60 mins = 54 km

1 min = \( \frac{54}{60} \)

20 mins = \( \frac{54}{60} \times 20 \) = 18

1u = 18 km
Answer to Unit 5.3

Question 2 (Cont.)
7u = 7 \times 18 \text{ km}
= 126 \text{ km}

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

2 \text{ h after 06 20} = 08 20
Ben will overtake John at 08 20.

Question 3

Common distance

\begin{array}{c|c}
T_L & T_F \\
28 & 16 \\
7 & 4
\end{array}

\begin{array}{c|c}
S_L & S_F \\
4 & 7
\end{array}

Difference (Speed) = 7u - 4u = 3u

3u = 24
1u = 24 ÷ 3 = 8
4u = 4 \times 8 = 32

(a) Linda’s speed was 32 \text{ m/min}.
Distance of the race = 32 \text{ m/min} \times 28 \text{ min}
= 896 \text{ m}

(b) The distance of the race is 896 \text{ m}.

Question 4

Common distance

\begin{array}{c|c}
S_A & S_B \\
4 & 5
\end{array}

\begin{array}{c|c}
T_A & T_B \\
5 & 4
\end{array}

5u = 6 \text{ (h)}
1u = 6 ÷ 5 = 1.2 \text{ (h)}
4u = 4 \times 1.2 = 4.8 \text{ (h)}
Time difference = 5 \text{ h} - 4 \text{ h} 48 \text{ min}
= 12 \text{ min}

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

Question 5

(a) 7 a.m. to 7.12 a.m. = 12 mins
Distance travelled by Jaycee = 100 \times 12
= 1200 \text{ m}

Distance travelled by Delroy = 1200 + 240 = 1440 \text{ m}
Delroy’s speed = \frac{1440}{12} = 120 \text{ m/min}
Delroy’s speed was 120\text{m/min}.

(b) Common distance

\begin{array}{c|c|c|c|c}
\text{Speed} & \text{Time} & \text{J} : \text{D} & \text{J} : \text{D} \\
100 : 120 & 6 : 5 & 5 : 6
\end{array}

1u = 40
5u = 40 \times 5 = 200

Distance of the race = 200 \times 120
= 24 000 \text{ m}
= 24 \text{ km}

Answer to Chapter 5 Review Questions

Question 1

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

(b) 67.2 \times 1.5 = 100.8 \text{ km}
84 + 100.8 + 56 = 240.8 \text{ km}
Time taken by Mr Lim = \frac{240.8}{56} = 4h 18 \text{ min}
4h 18 \text{ 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} \text{ h}

70 \times \frac{8}{3} = \frac{560}{3} \text{ km}
350 - 35 - \frac{560}{3} = \frac{385}{3} \text{ km}
\frac{385}{3} + 45 = \frac{520}{3} \text{ km}
Bill’s speed = \frac{520}{3} \times \frac{8}{3}
= 65 \text{ km/h}
Bill’s speed was 65 \text{ km/h}.

(b) 70 + 65 = 135
Time taken to meet = \frac{350 - 35}{135}
= \frac{7}{3} \text{ h}
= 2 \frac{1}{3} \text{ h}
2 \frac{1}{3} \text{ h after 11.30 am}
= 1.50 \text{ 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

\[
60 \times 2 = 120 \\
120 + 25 = 145 \\
5u = 145 \text{ km} \\
1u = 145 \div 5 = 29 \text{ km} \\
7u = 7 \times 29 \text{ km} = 203 \text{ km}
\]

Time taken to travel from Town X to Town Y = \[
\frac{203}{60} \text{ h} = 3\frac{23}{60} \text{ h} = 3 \text{ h} 23 \text{ mins}
\]

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 \times 3 = 75 km

10 km = 1 h
75 km = \[
\frac{75}{10} \times 75 = 7.5 \text{ h}
\]

It took Mr Cheong 7.5 hours to complete the journey.

(b) Mr Soon’s speed = \[
\frac{450}{75} + 10 = 70 \text{ km/h}
\]

Time taken by Mr Soon = \[
\frac{450}{75} = 6 \frac{2}{5} \text{ h} = 6 \text{ h} 26 \text{ mins}
\]

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

Question 6

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

Time taken for the 1st 36 km = \[
\frac{36}{108} = \frac{1}{3} \text{ h}
\]

Question 6 (Cont.)

Time taken for the remaining 24 km = \[
\frac{24}{72} = \frac{1}{3} \text{ h}
\]

Total time taken = \[
\frac{1}{3} + \frac{1}{3} = \frac{2}{3} \text{ h} = 40 \text{ mins}
\]

40 mins before 1.20 pm = 12.40 pm

(b) Average speed of the van = \[
\frac{36 + 24}{75/3} = 90 \text{ km/h}
\]

Chapter 6 Simultaneous

Answer to Unit 6

Let’s Get Started

2. \[
\frac{1}{4} C + \frac{1}{10} L = 26 \\
\frac{4}{4} C + \frac{10}{10} L = 140
\]

3. \[
\frac{1}{2} S1 + \frac{1}{4} S2 = 130 \\
\frac{2}{2} S1 + \frac{4}{4} S2 = 360
\]

Let’s Learn

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

Let’s Practise

Question 1

\[
\frac{1}{5} B + \frac{1}{4} F = 32 \text{ ...(1)} \\
\frac{5}{5} B + \frac{5}{4} F = 130 \text{ ...(2)}
\]

Multiply (1) by 5,
\[
\frac{5}{5} B + \frac{5}{4} F = 160 \text{ ...(3)}
\]

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

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

Question 2

\[
\begin{align*}
\frac{2}{7}C + \frac{3}{10}S &= 68 \ldots(1) \\
\frac{4}{7}C + \frac{6}{10}S &= 231 \ldots(2)
\end{align*}
\]
Multiply (1) by 10 and (2) by 3,

\[
\begin{align*}
\frac{21}{7}C + \frac{30}{10}S &= 680 \ldots(3) \\
\frac{21}{7}C + \frac{33}{10}S &= 693 \ldots(4)
\end{align*}
\]

(4) – (3),

\[
\frac{1}{7}C = 693 - 680 = 13
\]

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

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 (Cont.)

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

Chapter 7

Pie Chart

Let’s Get Started

1. Durian = \frac{135}{300} \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 ÷ 3

= 200

Total = 10 x 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 x 850

= 5100

Savings a year = 47.5\% x 5100 x 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 = \( 1 - \frac{2}{20} - \frac{3}{10} - \frac{1}{10} \)

= \( \frac{9}{20} \)

\( \frac{9}{20} \) of the people who attended the event were boys.

(b) \( \frac{2}{20} \) Total = 180

\( \frac{1}{20} \) Total = 180 ÷ 9

= 20

\( \frac{2}{20} \) Total = 20 x 20

= 400

400 people attended the event last December.

(c) 80\% = 400

1\% = 400 ÷ 80

= 5

100\% = 5 x 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\% ÷ 5

= 5\%

3u = 3 x 5\%

= 15\%

50\% = 80

1\% = 80 ÷ 50

= 1.6

15\% = 15 x 1.6

= 24

24 Tiramisu cakes were sold.

Question 6

(a) 25\% = \( \frac{16}{4} + \frac{1}{4} \)

= \( \frac{30}{4} \)

100\% = 4 x 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.
3. Let Michelle’s number of sweets be $x$.

**Think Further**

1. The solution changes to the following:
   - Michelle = 8$m$ sweets
   - Total no. of sweets eaten = $4m + 8m$
     
   $$= 12m$$

   $$\text{Average} = \frac{12m}{3}$$

   $$= 4m$$

   Both girls ate an average of $4m$ sweets.

**Let's Practise**

**Question 1**

Total no. of pencils = $10 + p + 3p$

$$= 10 + 4p$$

Average = $\frac{10+4p}{3}$

The girls bought an average of $\frac{10+4p}{3}$ pencils.

#### Answer to Chapter 8

**Question 2**

<p>| | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>K</td>
<td>5x</td>
</tr>
<tr>
<td>A</td>
<td>5x</td>
</tr>
</tbody>
</table>

Total mass = $5x$ kg + $(5x + 7)$ kg

$$= (10x + 7)$$ kg

Average mass = $\frac{10x+7}{2}$ kg.

Their average mass was $\frac{10x+7}{2}$ kg.

**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**

Let the number of stamps Ursula has be $x$.

<p>| | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>U</td>
<td>x</td>
</tr>
<tr>
<td>K</td>
<td>x x x</td>
</tr>
<tr>
<td>C</td>
<td>x x x 8</td>
</tr>
</tbody>
</table>

- $7x + 8 = 71$
  
  $$7x = 71 – 8$$
  
  $$x = 63$$
  
  $$= 9$$

(a) Ursula has **9** stamps.

- $3x + 8 = 3 \times 9 + 8$
  
  $$= 35$$

(b) Calissa has **35** stamps.

**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.
Answer to Chapter 8 (Cont.)

Question 7
Let Weiqi’s age be $x$ years old.

<table>
<thead>
<tr>
<th></th>
<th>R</th>
<th>W</th>
<th>N</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>$x$</td>
<td>$x$</td>
<td>$x$</td>
</tr>
</tbody>
</table>

$3x + x + x - 4 = 21$
$5x - 4 = 21$
$5x = 25$
$x = 5 + 5 = 5$

Natalie = $5 - 4 = 1$
Natalie is 1 year old.

Question 8
Perimeter (units) = $3u + 2u + 3u + 2u$
$= 10u$

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

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

Question 9

<table>
<thead>
<tr>
<th></th>
<th>N</th>
<th>P</th>
<th>R</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>$4h$</td>
<td>$4h$</td>
<td>$4h$</td>
</tr>
<tr>
<td></td>
<td>$4h$</td>
<td>$4h$</td>
<td>$15$</td>
</tr>
</tbody>
</table>

$20h + 15 = 115$
$20h = 115 - 15 = 100$
$h = \frac{100}{20} = 5$
$8h = 8 \times 5 = 40$

Peter has 40 magnets.

Question 10
Saleha’s age now = $3p + 5$
Melanie’s age now = $\frac{3p + 5}{4}$

Melanie’s age in 3 years’ time = $\left(\frac{3p+5}{4} + 3\right)$

(a) Melanie will be $\left(\frac{3p+5}{4} + 3\right)$ in 3 years’ time.

Melanie’s age in 8 years’ time = $\left(\frac{3p+5}{4} + 13\right)$

Saleha’s age in 8 years’ time = $3p + 13$

Total ages = $\frac{3p + 5}{4} + 13 + 3p + 13$
$= \frac{3p + 5}{4} + 52 + \frac{12p}{4} + \frac{52}{4}$
$= \frac{15p + 109}{4}$

(b) Their total ages in 8 years’ time is $\frac{15p + 109}{4}$.

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>$1^3$ : $3^3$</td>
<td>3 : 1</td>
</tr>
<tr>
<td>3 : 9</td>
<td></td>
</tr>
</tbody>
</table>

$8u = 400 - 80 = 320$
$1u = 320 ÷ 8 = 40$

$9u + 80 = 9 \times 40 + 80 = 440$

There are 440 pears at the stall.

Question 2

At first

<table>
<thead>
<tr>
<th>C : J : A</th>
<th>C : J : A</th>
</tr>
</thead>
<tbody>
<tr>
<td>2:6:9</td>
<td>7:15:21</td>
</tr>
<tr>
<td>4:12:18</td>
<td>8:6</td>
</tr>
</tbody>
</table>

Difference = $7u - 4u = 3u$
$3u = 90$
$1u = 90 ÷ 3 = 30$

Total (in the end) = $7u + 15u + 21u$
$= 43u$

$43u = 43 \times 30 = 1290$

The 3 girls have $1290 now.

Question 3

Case 1: Scott → $16 to Omera

<table>
<thead>
<tr>
<th>S</th>
<th>O</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>2</td>
<td>6</td>
<td>8</td>
</tr>
</tbody>
</table>

Case 2: Omera → $23 to Scott

<table>
<thead>
<tr>
<th>S</th>
<th>O</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>5</td>
<td>3</td>
<td>8</td>
</tr>
</tbody>
</table>

Case 1

<table>
<thead>
<tr>
<th>3u</th>
<th>3u</th>
</tr>
</thead>
<tbody>
<tr>
<td>$16$</td>
<td></td>
</tr>
</tbody>
</table>

Case 2

<table>
<thead>
<tr>
<th>3u</th>
</tr>
</thead>
<tbody>
<tr>
<td>$23$</td>
</tr>
</tbody>
</table>

Gap $39$

$3u = 39$
$1u = 39 ÷ 3 = 13$
Omera = $6u - 16$
$= 6 \times 13 - 16$
Omera has $62.

Answer to Chapter 9 (Cont.)

Question 4

Commission received for first 100 jerseys
= 100 × 20
= $2000

Commission earned from the remaining jerseys sold
= 2828 – 2000
= $828

No. of jerseys sold for the $828 commission
= 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>x</th>
<th>Value ($)</th>
<th>Total value ($)</th>
</tr>
</thead>
<tbody>
<tr>
<td>$5-stamps (Arun)</td>
<td>1u</td>
<td>5</td>
<td></td>
<td>5u</td>
</tr>
<tr>
<td>$2-stamps (Kavita)</td>
<td>1u + 30</td>
<td>2</td>
<td></td>
<td>2u + 60</td>
</tr>
<tr>
<td>Total</td>
<td>2u + 30</td>
<td></td>
<td></td>
<td>7u + 60</td>
</tr>
</tbody>
</table>

$5 stamps

$2 stamps

3u = 60 + 180
= 240
1u = 240 ÷ 3
= 80

Arun has 80 stamps.

Question 6

2-m : 3-m
1² : 3²
2 : 6

Incorrect

<table>
<thead>
<tr>
<th>Items</th>
<th>Quantity</th>
<th>x</th>
<th>Value (Marks)</th>
<th>Total value (Marks)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Correct answer</td>
<td>2u</td>
<td>2</td>
<td>1</td>
<td>4u</td>
</tr>
<tr>
<td>(2-mark qn)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Correct answer</td>
<td>6u</td>
<td>3</td>
<td>18</td>
<td>18u</td>
</tr>
<tr>
<td>(3-mark qn)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Total</td>
<td>8u</td>
<td></td>
<td>22</td>
<td>22u</td>
</tr>
</tbody>
</table>

22u = 176
1u = 176 ÷ 22
= 8

Total attempt = 8u
= 8 × 8
= 64

Question 7

<table>
<thead>
<tr>
<th>A (now)</th>
<th>R (before)</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>3</td>
<td>1</td>
<td>4</td>
</tr>
</tbody>
</table>

A (before) : R (now) : Total
1² : 1² : 2²
2 : 2 : 4

Total current age = 5u
= 30
1u = 30 ÷ 5
= 6

A now = 3u
= 3 × 6
= 18

(c) Alda is 18 years old now.

Question 8

<table>
<thead>
<tr>
<th>Item</th>
<th>Total pizzas</th>
</tr>
</thead>
<tbody>
<tr>
<td>F</td>
<td></td>
</tr>
<tr>
<td>C</td>
<td></td>
</tr>
<tr>
<td>A</td>
<td></td>
</tr>
</tbody>
</table>

Remainder 1

Remainder 2

Remainder 3

 Difference = 2u
2u = 2 × 6
= 12

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

Remainder 1

Remainder 2

Remainder 3

Unanswered questions = 75 – 64
= 11

11 questions were left unanswered.
Althea bought 21 pizzas.

Question 9

<table>
<thead>
<tr>
<th>(Actual)</th>
<th>P</th>
<th>W</th>
</tr>
</thead>
<tbody>
<tr>
<td>At first</td>
<td>3u</td>
<td>4u</td>
</tr>
<tr>
<td>Change</td>
<td>-18</td>
<td>-10</td>
</tr>
<tr>
<td>End</td>
<td>3p</td>
<td>5p</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>(Working)</th>
<th>P</th>
<th>W</th>
</tr>
</thead>
<tbody>
<tr>
<td>At first</td>
<td>15u</td>
<td>12u</td>
</tr>
<tr>
<td>Change</td>
<td>-90</td>
<td>-30</td>
</tr>
<tr>
<td>End</td>
<td>15p</td>
<td>15p</td>
</tr>
</tbody>
</table>

\[ 3u = 90 - 30 = 60 \]
\[ 1u = 60 ÷ 3 = 20 \]
\[ 3u = 3 \times 20 = 60 \]

There are 60 pink meringues in the jar.

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{3}{5} ) A = 48</td>
<td>( \frac{5}{2} ) A = 80</td>
</tr>
<tr>
<td>Shop B</td>
<td>( \frac{5}{10} ) B = 36</td>
<td>( \frac{7}{10} ) B = 84</td>
<td>( \frac{12}{10} ) B = 120</td>
</tr>
<tr>
<td>Total</td>
<td>( 32 + 36 = 68 )</td>
<td>( 48 + 84 = 132 )</td>
<td>( 80 + 120 = 200 )</td>
</tr>
<tr>
<td>End</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Shop A</td>
<td>( \frac{2}{5} ) A</td>
<td>( \frac{3}{5} ) A</td>
<td>( \frac{5}{2} ) A</td>
</tr>
<tr>
<td>Shop B</td>
<td>( \frac{7}{25} ) B</td>
<td>( \frac{18}{25} ) B</td>
<td>( \frac{25}{25} ) B</td>
</tr>
<tr>
<td></td>
<td>68</td>
<td>132</td>
<td>200</td>
</tr>
</tbody>
</table>

\[ \frac{2}{5} \text{ A} + \frac{7}{25} \text{ B} = 68 \] \[ (1) \times 3 \]
\[ \frac{1}{5} \text{ A} + \frac{15}{25} \text{ B} = 132 \] \[ (2) \times 2 \]
\[ \frac{6}{5} \text{ A} + \frac{36}{25} \text{ B} = 204 \] \[ (3) \]
\[ \frac{6}{5} \text{ A} + \frac{36}{25} \text{ B} = 264 \] \[ (4) \]
\[ (4) - (3) \]
\[ \frac{15}{25} \text{ B} = 60 \]
\[ \frac{18}{25} \text{ B} = 4 \]
\[ \frac{18}{25} \text{ B} = 72 \]

Difference = 84 - 72 = 12

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

Question 11

<table>
<thead>
<tr>
<th>Passing point</th>
<th>O</th>
</tr>
</thead>
<tbody>
<tr>
<td>Car</td>
<td>170 km/h</td>
</tr>
<tr>
<td>Bus</td>
<td>70 km/h</td>
</tr>
<tr>
<td>Distance bus covered in 3 h = 3 h × 70 km/h = 210 km</td>
<td></td>
</tr>
<tr>
<td>Distance bus covered from where they passed each other to H = 210 + 170 = 380</td>
<td></td>
</tr>
<tr>
<td>Speed of car = 380 ÷ 4 = 95</td>
<td></td>
</tr>
<tr>
<td>Distance between two towns = 7 h × 95 km/h = 665 km</td>
<td></td>
</tr>
</tbody>
</table>

The distance between the 2 towns is 665 km.

Question 12

<table>
<thead>
<tr>
<th>C</th>
<th>4u</th>
<th>63</th>
</tr>
</thead>
<tbody>
<tr>
<td>W</td>
<td>4u</td>
<td></td>
</tr>
<tr>
<td>B</td>
<td>3u</td>
<td></td>
</tr>
</tbody>
</table>

\[ \frac{1}{3} \text{ of total} = 4u \]
\[ \text{Total} = 20u \]
\[ 20u - 11u = 63 \]
\[ 9u = 63 \]
\[ 1u = 63 ÷ 9 = 7 \]
\[ 20u = 20 \times 7 = 140 \]

There were 140 muffins in the box altogether.

Question 13

<table>
<thead>
<tr>
<th>Case 1: Sarah 360 muffins left</th>
<th>Case 2: Sarah 72 muffins left</th>
</tr>
</thead>
<tbody>
<tr>
<td>S : J</td>
<td>S : J</td>
</tr>
<tr>
<td>25 : 50</td>
<td>50 : 25</td>
</tr>
<tr>
<td>1 : 2</td>
<td>2 : 1</td>
</tr>
</tbody>
</table>

Increase of 3u

\[ 3u = 360 - 72 = 288 \]
\[ 1u = 288 ÷ 3 = 96 \]

Sarah = 1u + 360 = 1x 96 + 360 = 456

Check

Sarah = 4u + 72 = 4 × 96 + 72 = 456

Sarah baked 456 muffins.
Answer to Chapter 9

Question 14

Total cost of pairs of boots = 5152
Total cost of pairs of sneakers = 5152 + 266
= 5418

<table>
<thead>
<tr>
<th>Items</th>
<th>Units</th>
<th>Value ($)</th>
<th>Total value ($)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Boots</td>
<td>2u</td>
<td>?</td>
<td>5152</td>
</tr>
<tr>
<td>Sneakers</td>
<td>3u</td>
<td>?</td>
<td>5418</td>
</tr>
<tr>
<td>Total</td>
<td>5u</td>
<td></td>
<td>10 570</td>
</tr>
</tbody>
</table>

Cost of 3u of sneakers = 5418
Cost of 1u of sneakers = 5418 ÷ 3
= 1806

Cost of 2u of boots = 5152
Cost of 1u of boots = 5152 ÷ 2
= 2576

1u = 770 ÷ 55
= 14

No. of pairs of sneakers = 3u
= 3 × 14
= 42

Cost of 1 pair of sneaker = 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.
(11.30 a.m. to 1.30 p.m.) = \( \frac{1}{6} \) × 2
= \( \frac{1}{3} \)

Fraction of Candle B left unburnt at 11.30 a.m.
(11.30 a.m. to 1 p.m.) = \( \frac{1}{4} \) × 1.5
= \( \frac{3}{8} \)

\( \frac{2}{3} A = \frac{1}{4} B \)
A : B
9 : 8
1u = 3

Length of Candle A = 9u
= 9 × 3
= 27

The original length of Candle A was 27 cm respectively.

Answer to Chapter 9

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 6 1u 8</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 × 7
= 28

Abigail (in 2031) = 28 + 10
= 38

Abigail will be 38 years old in the year 2031.

Question 17

A : B+C+D : Total
B : A+C+D : Total
C : A+B+D : Total
1 : 20 : 20 : 20
2 : 30 : 30
3 : 40 : 40
1 : 15 : 15
3 : 45 : 45
4 : 60 : 60
1 : 12 : 12
4 : 48 : 48
5 : 60 : 60

Summary

A : B : C : D
20 : 15 : 12 : 13

13u = 78
1u = 78 ÷ 13
= 6

Ali and Bryan = 20u + 15u
= 35u
35u = 35 × 6
= 210

Ali and Bryan have 210 marbles altogether.

Question 18

Common volume

\( \frac{3}{10} R = \frac{3}{4} S \)
\( \frac{3}{10} R = \frac{3}{12} S \)
R : S
10 : 12

Difference = 12u – 10u = 2u
2u = 48
1u = 48 ÷ 2 = 24
10u = 10 × 24 = 240

Height of rectangular tank = 240 ÷ (8 × 6) = 5

The height of the rectangular tank is 5 m.
Answer to Chapter 9

Question 19

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

Question 24

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>Case</th>
<th>5B + 8C ($31)</th>
<th>1 B</th>
<th>5B + 8C ($31)</th>
<th>1C</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>B</td>
<td>1</td>
<td>5</td>
<td>1</td>
<td>8</td>
</tr>
<tr>
<td>C</td>
<td></td>
<td>31</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

5u + 8u = 31 – 5
= 26
13u = 26
1u = 26 ÷ 13
= 2
2u + 1 = 2 × 2 + 1
= 5

There were 138 mini tarts in both boxes at first.

Question 26

\[
\begin{align*}
25 \times 3 &= 75 \\
15 	imes 2 &= 30 \\
6 	imes 5 &= 30 \\
\end{align*}
\]

\[
\begin{align*}
25 - 15 &= 10 \\
25 - 6 &= 19 \\
25 - 5 &= 20 \\
\end{align*}
\]

At first:
30u - 444 = 138

6u = 36
1u = 36 ÷ 6
= 6

Total tarts at first = 15u + 8u
= 23u

Answer to Chapter 9

Question 26 (Cont.)

\[
\begin{align*}
23u &= 23 \times 6 \\
&= 138 \\
\end{align*}
\]

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

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>2/3 (6u)</td>
<td>5/3 (5u)</td>
</tr>
<tr>
<td>(2) J</td>
<td>- 2/5 (6u)</td>
<td>1/5 (6u)</td>
<td>7/5 (12u)</td>
</tr>
<tr>
<td>(1) K</td>
<td>+ 3/9 (9u)</td>
<td>1 (12u)</td>
<td>1 (3u)</td>
</tr>
</tbody>
</table>

Graham ordered 28 gumballs.

Question 28

\[
\begin{align*}
18u + 96 &= 4236 \\
46u &= 4236 - 96 \\
&= 4140 \\
1u &= 4140 ÷ 46 \\
&= 90
\end{align*}
\]
Answer to Chapter 9
Question 28 (Cont.)
General = \[18u + 96\]
= \[18 \times 90 + 96\]
= \[1716\]
Sienna’s monthly general expenses was $1716.

Question 29
At first
\[\frac{5}{8}A\]
\[A\]
\[40u\]
\[80\]
\[\frac{8}{8}Z\]
\[Z\]
\[40u\]

At first
\[\frac{5}{8}A\]
\[A\]
\[40u\]
\[80\]
\[\frac{8}{8}Z\]
\[Z\]
\[40u\]

Spent
End
Zeph
\[\frac{1}{8}(5u)\]
\[\frac{7}{8}(35u)\]
\[\frac{8}{8}(40u)\]
Adelia
\[\frac{1}{5}(16u + 32)\]
\[\frac{1}{5}(24u + 48)\]
\[\frac{1}{5}(40u + 80)\]

11u = 51 + 48
= 99
1u = 99 + 11
= 9
Adelia at first = 40u + 80
= 440
Adelia had $440 at first.

Question 30
In 1 h
Fred = \[\frac{1}{5}\] journey
\[\frac{1}{5} \times 2 = \frac{2}{5}\] journey
William = \[\frac{1}{6}\] journey
\[\frac{1}{6} \times 2 = \frac{1}{3}\] journey

24 - \[\frac{1}{6} + \frac{1}{8}\] = \[\frac{17}{24}\]
24
\[\frac{17}{24}\] journey = 170
\[\frac{1}{24}\] journey = 170 ÷ 17 = 10
\[\frac{1}{24}\] journey = 24 \times 10
= 240
Fred’s speed = 240 ÷ 3
= 80
Fred’s speed was 80 km/h.

Question 29
Sienna’s monthly general expenses was $1716.

Question 30
In 1 h
Fred = \[\frac{1}{5}\] journey
\[\frac{1}{5} \times 2 = \frac{2}{5}\] journey
William = \[\frac{1}{6}\] journey
\[\frac{1}{6} \times 2 = \frac{1}{3}\] journey

24 - \[\frac{1}{6} + \frac{1}{8}\] = \[\frac{17}{24}\]
24
\[\frac{17}{24}\] journey = 170
\[\frac{1}{24}\] journey = 170 ÷ 17 = 10
\[\frac{1}{24}\] journey = 24 \times 10
= 240
Fred’s speed = 240 ÷ 3
= 80
Fred’s speed was 80 km/h.

Question 31
1 group of $72 = $9 (discount)
Amount to pay for every group = $72 - $9
= $63
No. of groups of $63 = $840 ÷ $63
= 13 R $21
13 groups of $63 = 13 \times $9
= $117 (discount)
Amelia was given $117 discount.

Question 32
<table>
<thead>
<tr>
<th>Items</th>
<th>Quantity</th>
<th>×</th>
<th>Value($)</th>
<th>Total value ($)</th>
</tr>
</thead>
<tbody>
<tr>
<td>On time</td>
<td>15u</td>
<td>5</td>
<td>75u</td>
<td>75u</td>
</tr>
<tr>
<td>Late</td>
<td>4u</td>
<td>3.5</td>
<td>14u</td>
<td>14u</td>
</tr>
<tr>
<td>Total</td>
<td>19u</td>
<td></td>
<td>89u</td>
<td>89u</td>
</tr>
</tbody>
</table>

89u = 7298
1u = 7298 ÷ 89
= 82
Late = 4u
= 4 \times 82
= 328
(a) 328 parcels were delivered late.
Difference in cost of 1 parcel = 5 - 3.5 = 1.5
Difference in total cost = 328 \times 1.5 = 492
(b) The company would collect an additional $492.

Question 33
R : P+N
P : N : P + N
5 : 7 : 4
20 : 28
7 : 21 : 28
Summary Ratio
R : N : P
20 : 21 : 7
<table>
<thead>
<tr>
<th>Items</th>
<th>Quantity</th>
<th>×</th>
<th>Value($)</th>
<th>Total($)</th>
</tr>
</thead>
<tbody>
<tr>
<td>R</td>
<td>20u</td>
<td>2</td>
<td>40u</td>
<td></td>
</tr>
<tr>
<td>N</td>
<td>21u</td>
<td>8</td>
<td>168u</td>
<td></td>
</tr>
<tr>
<td>P</td>
<td>7u</td>
<td>4</td>
<td>28u</td>
<td></td>
</tr>
<tr>
<td>Total</td>
<td>48u</td>
<td></td>
<td>236u</td>
<td></td>
</tr>
</tbody>
</table>

236u = 708
1u = 708 ÷ 236
= 3
Total items = 48u
= 48 \times 3
= 144
Sumitha bought 144 items altogether.
Question 34

At first End

<table>
<thead>
<tr>
<th>J :</th>
<th>F : Total</th>
<th>J :</th>
<th>F : Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>3²ⁿ :</td>
<td>1²ⁿ :</td>
<td>4²ⁿ :</td>
<td>1²ⁿ :</td>
</tr>
<tr>
<td>9 :</td>
<td>3 : 12</td>
<td>8 :</td>
<td>4 : 12</td>
</tr>
</tbody>
</table>

1₁u = 77
8₁u = 8 × 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 × 3 + 28
= 121
Total savings = 2 × 121 + 5 × 121
= 847
(b) Both of them would have saved $847 altogether at the end of March.

Question 36

At first

<table>
<thead>
<tr>
<th>A</th>
<th>15₁u</th>
<th>60</th>
</tr>
</thead>
<tbody>
<tr>
<td>C</td>
<td>15₁u</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Gave</th>
<th>End</th>
<th>At first</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>3₁u (3u + 12)</td>
<td>3₁u (12₁u + 48)</td>
</tr>
<tr>
<td>C</td>
<td>5₁u (5u)</td>
<td>3₁u (10₁u)</td>
</tr>
</tbody>
</table>

2₁u = 12 – 6
= 6
1₁u = 6 ÷ 2
= 3
Apples Pie remained = 12₁u + 48
= 12 × 3 + 48
= 84
84 apple pies remained in the end.

Question 37

<table>
<thead>
<tr>
<th>Speed</th>
<th>Time</th>
</tr>
</thead>
<tbody>
<tr>
<td>S₁ :</td>
<td>S₂</td>
</tr>
<tr>
<td>60 :</td>
<td>80</td>
</tr>
<tr>
<td>3 :</td>
<td>4</td>
</tr>
</tbody>
</table>

1₁u of time = 6 + 8
= 14
4₁u of time = 4 × 14
= 56
Time taken to reach on time = 56 – 6
= 50

Check
3₁u of time = 3 × 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 × 56
= 56

Check
Distance = 80 × 42
= 56
(b) The distance between Logan’s office and his house is 56 km.

Question 38

<table>
<thead>
<tr>
<th>Sold</th>
<th>Left</th>
<th>At first</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>3₁u</td>
<td>4₁u</td>
</tr>
<tr>
<td>M</td>
<td>3₂u</td>
<td>22₁u</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Sold</th>
<th>Left</th>
<th>At first</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>3₁u</td>
<td>4₁u</td>
</tr>
<tr>
<td>M</td>
<td>3₂u</td>
<td>22₁u</td>
</tr>
</tbody>
</table>

Left
A = 22 × 5₁u
Q
A = 44 × 5₁u

A : M : A + M
S : A + M
5₁u : 50 : 105
2³⁵ : 3³⁵
70 : 105

Summary
A : M : S
5₁u : 50 : 70
Answer to Chapter 9

Question 38 (Cont.)
Apples and mango strudel left = 88u
88u = 352
1u = 352 ÷ 88
= 4
Strawberry = 70u
= 70 × 4
= 280
(a) There were 280 strawberry strudels.
(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>2/5</td>
<td>3/5</td>
<td>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>1/2</td>
<td>1/2</td>
<td>1/2</td>
</tr>
<tr>
<td></td>
<td>(3u)</td>
<td>(3u)</td>
<td>(6u)</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

Gordon
16 km/h

Julian
16 km/h

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

Question 41

1 bootie = $6.75
Case 1, 6 Booties = 6 × $6.75
= $40.50
Case 2, 4 Booties = 4 × $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 × 11.25 + 46
= 91
Check
6M + 23.5 = 6 × 11.25 + 23.5
= 91
Cassandra has $91.

Question 42

1/4 R = 1/3 G

<table>
<thead>
<tr>
<th>(Actual)</th>
<th>R</th>
<th>G</th>
</tr>
</thead>
<tbody>
<tr>
<td>At first</td>
<td>4u²</td>
<td>3u³</td>
</tr>
<tr>
<td>Change</td>
<td>-206²</td>
<td>+ 80²</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>
</tbody>
</table>

For more review questions, please visit www.onsponge.com
**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>
</tbody>
</table>

<table>
<thead>
<tr>
<th></th>
<th>At first (1)</th>
<th>Change</th>
<th>End (1)</th>
</tr>
</thead>
<tbody>
<tr>
<td>H</td>
<td>50u + 50 (\frac{1}{5}H)</td>
<td>Gave 20u + 20 (\frac{1}{5}H)</td>
<td>30u + 30 (\frac{1}{5}H)</td>
</tr>
<tr>
<td>J</td>
<td>50u</td>
<td>Received 20u + 20</td>
<td>70u + 20</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th></th>
<th>At first (2)</th>
<th>Change</th>
<th>End (2)</th>
</tr>
</thead>
<tbody>
<tr>
<td>H</td>
<td>30u + 30</td>
<td>Received 14u + 4</td>
<td>44u + 34</td>
</tr>
<tr>
<td>J</td>
<td>70u + 20 (\frac{2}{5}J)</td>
<td>Gave 14u + 4 (\frac{2}{5}J)</td>
<td>56u + 16 (\frac{2}{5}J)</td>
</tr>
</tbody>
</table>

End (2)  
<table>
<thead>
<tr>
<th></th>
<th>H</th>
<th>J</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>44u</td>
<td>44u</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

**Question 44 (Cont.)**

Total marks for 26 questions = 34 + (4 × 1)  
= 38

<table>
<thead>
<tr>
<th>Correct</th>
<th>Wrong</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>26 × 3 = 78</td>
<td>0 x 2 = 0 (deduct)</td>
<td>78</td>
</tr>
<tr>
<td>25 × 3 = 75</td>
<td>1 x 2 = 2 (deduct)</td>
<td>73</td>
</tr>
<tr>
<td>18 × 3 = 54</td>
<td>8 x 2 = 16 (deduct)</td>
<td>38</td>
</tr>
</tbody>
</table>

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**

<table>
<thead>
<tr>
<th></th>
<th>Sharifah 800 cookies</th>
<th>Sharifah 1700 cookies</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>left</td>
<td>left</td>
</tr>
<tr>
<td>S</td>
<td>D</td>
<td>S</td>
</tr>
<tr>
<td>6</td>
<td>3</td>
<td>3</td>
</tr>
<tr>
<td>2\times^2</td>
<td>1^2</td>
<td>1</td>
</tr>
</tbody>
</table>

Increase of 3u  
3u = 600  
1u = 1700 − 800  
= 900  
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.

<table>
<thead>
<tr>
<th></th>
<th>Apples</th>
<th>Oranges</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>(Actual)</td>
<td></td>
</tr>
<tr>
<td>At first</td>
<td>2u^7</td>
<td>3u^3</td>
</tr>
<tr>
<td>Change</td>
<td>-20^7</td>
<td>+30^3</td>
</tr>
<tr>
<td>End</td>
<td>3p^7</td>
<td>7p^3</td>
</tr>
</tbody>
</table>
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

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

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 admin@onsponge.com so that we can review it.