Developed by qualified and leading educators in their field, #thinkingMath@onSponge is an enhanced learning resource designed to complement schools’ textbooks and workbooks on solving word problems. #thinkingMath@onSponge incorporates both thinking and procedural learning (the core aspects of problem sum solving) to aid students to conquer problem sums.

To ensure that students attain qualitative understanding of problem statements, they are taken through the process of understanding the context of the problem and shown alternative solutions to solve it. An example of a problem sum with alternative solutions is shown below.

**Question:**
At a recent walk-a-thon event, the ratio of male to female participants was 5:3. There were twice as many men as boys and there were twice as many women as girls. Given that there were 25 more boys than girls at the walk-a-thon event, how many participants were there altogether?

**Answer:**

<table>
<thead>
<tr>
<th></th>
<th>male</th>
<th>3 men</th>
<th>5 boys</th>
</tr>
</thead>
<tbody>
<tr>
<td>female</td>
<td>2</td>
<td>3</td>
<td>5 girls</td>
</tr>
</tbody>
</table>

**Difference between boys and girls**

\[
\begin{array}{c}
\text{Boys} \\
\frac{5}{2} \\
\text{Girls} \\
\frac{3}{2} \\
\end{array}
\]

\[
\begin{align*}
\text{Total boys} &= \frac{5}{2} \\
\text{Total girls} &= \frac{3}{2} \\
\text{Total} &= \frac{5}{2} + \frac{3}{2} = 5 \\
\end{align*}
\]

\[
\begin{align*}
\text{Difference} &= 25 \\
25 &= \frac{5}{2} - \frac{3}{2} = 5 \\
\end{align*}
\]

Charlene enjoyed the Conquer #thinkingMath workshops very much and has benefited her in solving all her problem sums. She found the coach’s explanation of the various #thinkingMath strategies very easy to understand and was able to apply what she was taught. She is also able to learn the concepts and together we are able to solve more complicated problems. onSponge #thinkingMath Conquer Problem Sums book has also helped us understand the various strategies, enabling us to solve problem sums more easily.

- Tan Siew Cin, parent

My P5 son started lessons since July 2010 with a tutor referred through onSponge. He enjoys the Math lessons and has gained confidence in solving problem sums which he would have struggled in the past. Apart from the tuition support, I am thankful for the onSponge online forum where parents and students can post their problem sums by seeking assistance from the onSponge community. The solutions provided showed that the team of onSponge put in tremendous efforts particularly in providing detailed steps to help reinforce the learning process for us. Thank you onSponge and keep up the good work!

- Jasmine Goh, parent

Visit www.onsponge.com – A parenting & learning community for family, parents, educators and tutors interested in the nurturing and development of learners of primary.
Solutions

Note: In all solutions, U represents Units

Chapter 1 Whole Numbers

Unit 1.1 – More than/Less Than

Qn 1

A

<table>
<thead>
<tr>
<th>1 unit</th>
<th>84</th>
<th>3 units</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 unit</td>
<td>84</td>
<td>96</td>
</tr>
</tbody>
</table>

2 units = 84 + 96 = 180
1 unit = 180 ÷ 2 = 90
Total number of shells in Box A at first = 90 + 96 = 186

Qn 2

X

<table>
<thead>
<tr>
<th>1 unit</th>
<th>18</th>
<th>24</th>
</tr>
</thead>
</table>

Y

<table>
<thead>
<tr>
<th>1 unit</th>
<th>18</th>
<th>42</th>
</tr>
</thead>
</table>

2 units = 18 + 42 = 60
1 unit = 60 ÷ 2 = 30
Total number of sweets in Container X at first = 30 + 18 + 24 = 72

Qn 3

Tan

<table>
<thead>
<tr>
<th>1 unit</th>
<th>15</th>
<th>30</th>
</tr>
</thead>
</table>

Krishnan

<table>
<thead>
<tr>
<th>1 unit</th>
<th>15</th>
</tr>
</thead>
</table>

1 unit = 15 + 30 + 15 = 60
Number of muffins Mrs Tan had at first = 1 unit + 45 = 60 + 45 = 105

Qn 4

Jerry

| 20 | 40 |

Tommy

| 20 | 40 |

1 unit = $20 + $40 + $20 = $80
Jerry at first = 1 unit + $60 = $80 + $60 = $140

Unit 1.2 – More Than/Less Than (External Unchanged)

Qn 1

Camp A

<table>
<thead>
<tr>
<th>3 units</th>
</tr>
</thead>
</table>

Camp B

<table>
<thead>
<tr>
<th>1 unit</th>
</tr>
</thead>
</table>

2 units = 12 + 64 = 76
1 unit = 76 ÷ 2 = 38
Total number of adults in Campsite A at first = 3 units = 3 x 38 = 114

Qn 2

Janice

<table>
<thead>
<tr>
<th>1 unit</th>
<th>12</th>
<th>48</th>
</tr>
</thead>
</table>

Daniel

<table>
<thead>
<tr>
<th>1 unit</th>
<th>12</th>
</tr>
</thead>
</table>

3 units = 12 + 48 = 60
1 unit = 60 ÷ 3 = 20
Number of chocolate Janice had at first = 4 units = 4 x 20 = 80

Qn 3

Dennis

<table>
<thead>
<tr>
<th>1 unit</th>
<th>30</th>
<th>120</th>
</tr>
</thead>
</table>

Jean

<table>
<thead>
<tr>
<th>1 unit</th>
</tr>
</thead>
</table>

3 units = 30
1 unit = 15
Dennis at first = 1 unit + 150 = 15 + 150 = 165

Qn 4

Melvin

<table>
<thead>
<tr>
<th>1 unit</th>
<th>$20</th>
<th>$240</th>
</tr>
</thead>
</table>

Ramesh

<table>
<thead>
<tr>
<th>1 unit</th>
</tr>
</thead>
</table>

1 unit = $20
Amount of money Melvin had at first = 1 unit + $260 = $20 + $260 = $280

Unit 1.3 – Equal Stage (Beginning/End)

Qn 1

Boys

<table>
<thead>
<tr>
<th>1 unit</th>
<th>8</th>
</tr>
</thead>
</table>

Girls

| 4 |

2 units = 8 + 4 = 12
1 unit = 12 ÷ 2 = 6
Number of boys at first = 1 unit + 8 = 6 + 8 = 14

Visit the forum page at www.onSponge.com for more challenging problem sums.
Qn 2
Rauf

<table>
<thead>
<tr>
<th>1 unit</th>
<th>36</th>
</tr>
</thead>
</table>

Kenneth

<table>
<thead>
<tr>
<th>1 unit</th>
<th>30</th>
</tr>
</thead>
</table>

2 units = 36 – 6
30 = 30
1 unit = 30 ÷ 2 = 15

Number of cards each had at first = 15 + 36 = 51

Qn 3
Oranges

<table>
<thead>
<tr>
<th>1 unit</th>
<th>25</th>
</tr>
</thead>
</table>

Apples

<table>
<thead>
<tr>
<th>1 unit</th>
<th>1 unit</th>
</tr>
</thead>
</table>

3 units + 25 = 115
3 units = 115 – 25 = 90
1 unit = 90 ÷ 3 = 30

Number of oranges at first = 1 unit + 25 = 30 + 25 = 55

Qn 4
End
Rakesh

<table>
<thead>
<tr>
<th>1 unit</th>
<th>24</th>
</tr>
</thead>
</table>

Xijie

<table>
<thead>
<tr>
<th>1 unit</th>
<th>24</th>
</tr>
</thead>
</table>

2 units + 84 = 216
2 units = 132
1 unit = 132 ÷ 2 = 66
Rakesh at first = 66

Unit 1.4 – Constant Difference Between Individuals

Qn 1

<table>
<thead>
<tr>
<th>Difference in age = 30 years</th>
</tr>
</thead>
</table>

Mr Tan

<table>
<thead>
<tr>
<th>5 units</th>
<th>30</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 unit</td>
<td>30 ÷ 5 = 6</td>
</tr>
</tbody>
</table>

Mr Tan’s age when son was 6 = 6 units
= 6 × 6
= 36

Number of years ago = 40 – 36
= 4

Qn 2

Now
Ismal

<table>
<thead>
<tr>
<th>1 unit</th>
<th>24</th>
</tr>
</thead>
</table>

Son

<table>
<thead>
<tr>
<th>1 unit</th>
<th>24</th>
</tr>
</thead>
</table>

2 units = 24
1 unit = 24 ÷ 2 = 12

Qn 3 (Cont.)
Some time ago
Ismal

<table>
<thead>
<tr>
<th>1 unit</th>
<th>24</th>
</tr>
</thead>
</table>

Son

<table>
<thead>
<tr>
<th>24 yrs</th>
</tr>
</thead>
</table>

3 units = 24
1 unit = 24 ÷ 3 = 8

Number of years ago = 12 – 8 = 4

Qn 3
Difference at first = 180 – 120 = 60

End
Girls

<table>
<thead>
<tr>
<th>60</th>
</tr>
</thead>
<tbody>
<tr>
<td>30</td>
</tr>
</tbody>
</table>

No. of pupils who left midway = (120 – 30) × 2
= 90 × 2
= 180

Qn 4
Difference between the number of adults and children = 123

End
Adults

<table>
<thead>
<tr>
<th>123</th>
</tr>
</thead>
</table>

Children

<table>
<thead>
<tr>
<th>Difference</th>
</tr>
</thead>
<tbody>
<tr>
<td>3 units</td>
</tr>
<tr>
<td>1 unit</td>
</tr>
</tbody>
</table>

Difference = 123
1 unit = 123 ÷ 3 = 41

Adults in the end = 1 unit = 41

Qn 5
End
Calvin = 48
Daniel = 2 × 48 = 96

Difference = 48

At first
Daniel

<table>
<thead>
<tr>
<th>48</th>
</tr>
</thead>
</table>

Calvin

<table>
<thead>
<tr>
<th>48</th>
</tr>
</thead>
</table>

2 = 48
= 24

Daniel at first = 3 × 24 = 72

Qn 6
Difference at first = $140 – $92 = $48

In the end
Luke

<table>
<thead>
<tr>
<th>$48</th>
</tr>
</thead>
</table>

Isaac

<table>
<thead>
<tr>
<th>$48</th>
</tr>
</thead>
</table>

+hinkingMath@onSponge™
### Unit 1.5 – Number of Units x Value of Units

#### Qn 1

<table>
<thead>
<tr>
<th>Number of vehicles (units)</th>
<th>Number of wheels</th>
<th>Total value (wheels)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Motorbikes 4</td>
<td>2</td>
<td>8u</td>
</tr>
<tr>
<td>Cars 1</td>
<td>4</td>
<td>(\frac{4u}{12u})</td>
</tr>
</tbody>
</table>

12 units = 720
1 unit = \(\frac{720}{12}\) = 60
Total number of cars = 1 unit
= \(1 \times 60\)
= 60

#### Qn 2

<table>
<thead>
<tr>
<th>Number of Animals (units)</th>
<th>Number of legs</th>
<th>Total unit (legs)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Chicken 2</td>
<td>2</td>
<td>4u</td>
</tr>
<tr>
<td>Horses 1</td>
<td>4</td>
<td>(\frac{4u}{8u})</td>
</tr>
</tbody>
</table>

8 units = 288
1 unit = \(\frac{288}{8}\) = 36
Total number of chickens = 2 units
= \(2 \times 36\)
= 72

#### Qn 3

<table>
<thead>
<tr>
<th>Number of items (units)</th>
<th>Cost of 1 item ($)</th>
<th>Total unit ($)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Plates 3</td>
<td>12</td>
<td>36u</td>
</tr>
<tr>
<td>Bowls 1</td>
<td>7</td>
<td>(\frac{7u}{43u})</td>
</tr>
</tbody>
</table>

43 units = 430
1 unit = \(\frac{430}{43}\) = 10
(a) Total number of plates bought = 3 units
= \(3 \times 10\)
= 30 plates
(b) Difference in the amount of money spent = $29 units
= \(29 \times 10\)
= $290

#### Qn 4

<table>
<thead>
<tr>
<th>No. of students</th>
<th>No. of packet per student</th>
<th>Total packet</th>
</tr>
</thead>
<tbody>
<tr>
<td>Girls 3</td>
<td>3</td>
<td>9 units</td>
</tr>
<tr>
<td>Boys 1</td>
<td>5</td>
<td>5 unit</td>
</tr>
</tbody>
</table>

Total amount = 5 units + 9 units
= 14 units
14 units = 350
1 unit = \(\frac{350}{14}\) = 25

#### Qn 5

<table>
<thead>
<tr>
<th>Units</th>
<th>Value ($)</th>
<th>Total unit ($)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Adults 4</td>
<td>7</td>
<td>28u</td>
</tr>
<tr>
<td>Children 1</td>
<td>4</td>
<td>(\frac{4u}{32u})</td>
</tr>
</tbody>
</table>

32 units = 960
1 unit = \(\frac{960}{32}\) = 30
Number of adults = 4 units
= \(4 \times 30\)
= 120

#### Qn 6

<table>
<thead>
<tr>
<th>No.</th>
<th>Value ($)</th>
<th>Total value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Bolster 3</td>
<td>25</td>
<td>75 units</td>
</tr>
<tr>
<td>Pillow 3</td>
<td>50</td>
<td>150 units</td>
</tr>
</tbody>
</table>

(a) No. of pillows = 3 units
= \(3 \times 4\)
= 12
(b) Difference in amount spent = 125 units
= \(125 \times 4\)
= $500

### Chapter 2 Fractions

#### Unit 2.1 – Part-whole Relationship (Type 1)

#### Qn 1

<table>
<thead>
<tr>
<th>(b) Difference in amount spent = 125 units</th>
</tr>
</thead>
<tbody>
<tr>
<td>(a) No. of pillows = 3 units</td>
</tr>
<tr>
<td>(b) Difference in amount spent = 125 units</td>
</tr>
</tbody>
</table>

#### Qn 2

<table>
<thead>
<tr>
<th>(b) Difference in amount spent = 125 units</th>
</tr>
</thead>
<tbody>
<tr>
<td>(a) No. of pillows = 3 units</td>
</tr>
<tr>
<td>(b) Difference in amount spent = 125 units</td>
</tr>
</tbody>
</table>

#### Qn 3

<table>
<thead>
<tr>
<th>(b) Difference in amount spent = 125 units</th>
</tr>
</thead>
<tbody>
<tr>
<td>(a) No. of pillows = 3 units</td>
</tr>
<tr>
<td>(b) Difference in amount spent = 125 units</td>
</tr>
</tbody>
</table>

#### Qn 4

<table>
<thead>
<tr>
<th>(b) Difference in amount spent = 125 units</th>
</tr>
</thead>
<tbody>
<tr>
<td>(a) No. of pillows = 3 units</td>
</tr>
<tr>
<td>(b) Difference in amount spent = 125 units</td>
</tr>
</tbody>
</table>

#### Qn 5

<table>
<thead>
<tr>
<th>(b) Difference in amount spent = 125 units</th>
</tr>
</thead>
<tbody>
<tr>
<td>(a) No. of pillows = 3 units</td>
</tr>
<tr>
<td>(b) Difference in amount spent = 125 units</td>
</tr>
</tbody>
</table>

Visit the forum page at [www.onSponge.com](http://www.onSponge.com) for more challenging problem sums.
Qn 3 (Cont.)
(b) Difference of total $= \frac{4}{56} of total - \frac{8}{56} of total
= \frac{4}{56} of total = $16
\frac{1}{56} of total = $16 \div 4
= $4
Total = 56 \times $4
= $224

Qn 4
\frac{1}{2} muffins
\frac{1}{3} cakes
1 muffin cost = 1 unit
1 cake cost = 3 units
5 muffins cost = 5 \times $1 = $5
Total muffins = $5 \times 6
= $30
\frac{3}{5} total = 15 units
\frac{1}{5} total = 5 units
\frac{5}{5} total = 25 units
= 25

Qn 5
\frac{2}{5} wife
\frac{3}{5} remain
\frac{1}{5} ($1200)
2 \frac{3}{5} remainder = $1200
1 \frac{3}{5} remainder = $600
Remainder = $1800
\frac{3}{5} total
$1 total = $1800 \div 3
= $600
Total = $600 \times 5
= $3000

Qn 6
\frac{1}{3} boys
\frac{2}{3} girls
\frac{1}{3} don't swim
\frac{2}{3} swim
1 \frac{1}{2} \times \frac{2}{3} = \frac{4}{5}
1 \frac{3}{4} \times \frac{3}{5} = \frac{15}{20}
2 \frac{3}{5} \times \frac{6}{10} = \frac{18}{50}
2 \frac{2}{3} \times \frac{4}{5} = \frac{8}{15}
Total swimmers,
\frac{3}{5} + \frac{4}{5} \rightarrow 490
\frac{7}{15} total = 490
\frac{1}{15} total = 70
Total = 70 \times 15
= 1050

Unit 2.2 – Part-whole Relationship (Type 2)
Qn 1
$740
\frac{4}{5} of total
\frac{1}{5} of total
Since \frac{4}{5} of total = 1 unit, \frac{1}{5} of total = 4 units
$740 = 1 unit \rightarrow \frac{4}{5} of total
Salary = $740 \times 5
= $3700

Qn 2
$36
\frac{5}{6} of total
\frac{1}{6} of total
Since \frac{5}{6} of total = 1 unit, \frac{1}{6} of total = 5 units
\frac{2}{6} of total = $36
\frac{1}{6} of total = $36 \div 2
= $18
Total = 18 \times 6
= $108

Qn 3
$450
\frac{7}{9} of total
\frac{2}{9} of total
1 \frac{7}{9} of total = $450
\frac{2}{9} of total = $4050

Qn 4
$84
\frac{2}{3} of total
\frac{1}{3} of total
1 \frac{2}{3} of total = 3 units
\frac{2}{3} of total = 6 units
4 units = $84
1 unit = $84 \div 4
= $21
At first = 9 units
= 9 \times $21
= $189
Qn 5

Since \( \frac{1}{4} \) of total = 2

\( \frac{3}{4} \) of total = 6

3 = 15

Total 8 = 8 \times 5 = 40

Qn 6

Since \( \frac{1}{3} \) of total = 2 units, \( \frac{1}{2} \) of total = 6 units

5 units = 150

1 unit = 150 \div 5 = 30

Total = 8 units

= 8 \times 30

= 240

There were 240 participants.

**Unit 2.3 – Part-whole Relationship (Type 3)**

Qn 1

\( \frac{1}{5} \) of total + $4 (game cartridge)

Total

\( \frac{1}{3} \) remainder + $8 (comics)

\( \frac{2}{5} \) remainder = $8 = $24

\( \frac{1}{3} \) of remainder = $16

Remainder = $16 \times 3 = $48

\( \frac{4}{5} \) of total – $4 = $48

\( \frac{4}{5} \) of total = $52

\( \frac{1}{5} \) of total = $52 \div 4

= $13

Total = $13 \times 5 = $65

Qn 2

1 of total + $40 (present)

Total

\( \frac{3}{4} \) of total – $40

\( \frac{2}{5} \) of remainder + $45 (resource books)

(remainder)

\( \frac{3}{5} \) of remainder = $75 + $45 \rightarrow $120

\( \frac{1}{5} \) of remainder = $120 \div 3 \rightarrow $40

Remainder = 5 units \rightarrow 5 \times $40 \rightarrow $200

\( \frac{3}{4} \) of total – $40 = $200

\( \frac{1}{5} \) of total = $240

Remainder = $240 \div 3

= $80

Total = $80 \times 4

= $320

Qn 3

1 of total + 3 (badminton)

Total

\( \frac{3}{4} \) of total – 3

(football)

\( \frac{1}{2} \) of remainder = 25 – 3

= 22

\( \frac{1}{3} \) of remainder = 22 \div 2

= 11

Remainder = 3 units

= 3 \times 11

= 33

\( \frac{3}{4} \) of total – 3 = 33

\( \frac{3}{4} \) of total = 36

\( \frac{1}{4} \) of total = 36 \div 3

= 12

Total = 4 units

= 4 \times 12

= 48

Qn 4

1 of total + $5 (CD)

Total

\( \frac{2}{5} \) of remainder + $12 (magazines)

(remainder)

\( \frac{3}{5} \) of remainder = $24 + $12

= $36

\( \frac{1}{5} \) of remainder = $36 \div 3

= $12

Visit the forum page at www.onSponge.com for more challenging problem sums.
Qn 4 (Cont.)

Remainder = 5 units
\[ \frac{5}{6} \text{ of total} = 5 \text{ units} \]
\[ \frac{5}{6} \times 12 = 60 \]

Total
\[ \frac{1}{5} \text{ of total} = 6 \text{ units} \]
\[ 6 \times 13 = 78 \]

Unit 2.4 – Equal Fractions

Qn 1

\[ \frac{3}{5} \text{ of Chelsia's money} = \frac{5}{6} \text{ of Brian's money} \]
\[ \frac{15}{20} \text{ of Chelsia's money} = \frac{15}{18} \text{ of Brian's money} \]

Chelsia’s money = 20 units
Brian’s money = 18 units
Difference = 20 units – 18 units
= 2 units
2 units = $24
1 unit = $24 ÷ 2
= $12
Total of Chelsia’s and Brian’s money = 38 units
= 38 x $12
= $456

Qn 2

Amount Left

\[ \frac{3}{7} \text{ of Ema’s money} = \frac{3}{7} \text{ of Keng Wee’s money} \]
Ema’s money = 4 units
Keng Wee’s money = 7 units
Difference = 7 units – 4 units
= 3 units
3 units = $360
1 unit = $360 ÷ 3
= $120
Keng Wee’s money = 7 units
= 7 x $120
= $840

Qn 3

\[ \frac{3}{5} \text{ Boys} = \frac{4}{7} \text{ Girls} \]
\[ \frac{12}{20} \text{ Boys} = \frac{12}{21} \text{ Girls} \]

Boys = 20 units
Girls = 21 units
Difference = 1 unit
= 65
Total no. of students in the end = 24 x 65
= 1560

Qn 4

Left amount

Rasidah = \[\frac{2}{5}\] Chai Seng = \[\frac{1}{7}\]
\[ \frac{1}{7} \text{ Chai Seng} = \frac{1}{2} \times \frac{2}{5} \text{ Rasidah} \]
\[ \frac{1}{7} \text{ Chai Seng} = \frac{1}{7} \times \frac{2}{5} \text{ Rasidah} \]
Chai Seng = 7 units
Rasidah = 5 units
Difference = 2 units
2 units = $48
1 unit = $24
Total (Rasidah) at first = 5 units
= 5 x $24
= $120

\[ \frac{1}{7} \text{ Plasmas} = \frac{1}{2} \times \frac{2}{5} \text{ Plasma} \]
\[ \frac{1}{7} \text{ Plasma} = \frac{1}{7} \times \frac{2}{5} \text{ Plasmas} \]
Plasma = 2 units
1 unit = $24
Total (Plasmas) at first = 2 units
= 2 x $24
= $48

Page 6
Qn 5
Number of cookies Left
Chocolate = 1 \text{ unit} \quad \text{Vanilla} = 1 \text{ unit}
1 \text{ unit} of Chocolate = \text{Twice} \times \frac{1}{3} \text{ of Vanilla}
1 \text{ unit} of Chocolate = 2 \times \frac{1}{3} \text{ of Vanilla}
Chocolate = 4 \text{ units}
Vanilla = 3 \text{ units}
Total = 4 \text{ units} + 3 \text{ units} = 7 \text{ units}
7 units = 280
1 unit = \frac{280}{7} = 40
Number of chocolate cookies given away = 3 \text{ units}
= 3 \times 40 = 120

Unit 2.5 – Repeated Identity

Qn 1
Banana = 1 \text{ unit} \times 3 = 3 \text{ units}
Chocolates = 5 \text{ units} \times 3 = 15 \text{ units}
Banana = 3 \text{ units}
Chocolates = 15 \text{ units}
Blueberry = 1 \text{ unit}

Qn 2
Siti = 2 \text{ unit} \times 4 = 8 \text{ units}
Joel = 7 \text{ units} \times 4 = 28 \text{ units}
Melvin = 3 \text{ units} \times 4 = 12 \text{ units}
Joel = 4 \text{ unit} \times 4 = 28 \text{ units}
Difference between Melvin and Siti = 21 \text{ units} \times 8 \text{ units} = 13 \text{ units}
13 units = 39
1 unit = 3
Total number of sweets shared at first = 57 \text{ units}
= 57 \times 3 = 171

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Qn 1 (Cont.)

Amount of water at first = 1 unit
= 300 ml

Increase in water = 2 units
= 2 \times 300 ml
= 600 ml

Qn 2

Before

Children : 3 units \times 2 = 6 units
Adults : 5 units \times 2 = 10 units

After

Children : 2 units \times 3 = 6 units
Adults : 3 units \times 3 = 9 units

Decrease in adults = 1 unit
= 125
Number of children = 6 units
= 6 \times 125
= 750

Qn 3

Boys : 2 units \times 3 = 6 units
Girls : 3 units \times 3 = 9 units

Boys : 3 units \times 2 = 6 units
Girls : 5 units \times 2 = 10 units

Increase in girls = 4
No. of students in the end = 16 \times 4
= 64

Qn 4

Before

Pear : 1 unit \times 4 = 4 units
Kiwi : 2 units \times 4 = 8 units

If given away

Pear : 4 units
Kiwi : 5 units

Decrease in number of Kiwi fruit = 8 units - 5 units = 3 units
3 units = 12
1 unit = 12 \div 3
= 4
Total number of fruits = 12 units
= 12 \times 4
= 48

Qn 5

At first

Team A 6 units \times 7 = 42 units
Team B 7 units \times 7 = 49 units

End

Team A 7 units \times 6 = 42 units
Team B 8 units \times 6 = 48 units

Difference in members in Team B = 2 (1 unit)
Number of members in Team A = 42 units
= 42 \times 2
= 84

Qn 6

Syrup : Water
1 unit$^2$ : 2 units$^2$ = 2 units: 4 units

Syrup : Water
2 units$^6$ : 5 units$^6$ = 200 ml (1 unit)
Increase in water = 800 ml
Amount of water at first = 4 \times 200
= 800 ml

Unit 2.7 – Unchanged Total

Qn 1

At first

Boys : 2 units \times 4 = 8 units
Girls : 5 units \times 4 = 20 units

End

Boys : 1 unit \times 7 = 7 units
Girls : 3 units \times 7 = 21 units

Number of students transferred = 3
Total number of students at first = 28 \times 3
= 84

Qn 2

At first

Teck Seng : 3 units \times 4 = 12 units
Wilson : 4 units \times 4 = 16 units

End

Teck Seng : 1 unit \times 7 = 7 units
Wilson : 3 units \times 7 = 21 units

Total number of stickers = 28 units
28 units = 140
1 unit = 140 \div 28
= 5

Number of stickers transferred = 12 units - 7 units
= 5 units
= 5 \times 5
= 25

Qn 3

After 3 days

Fixed : 1 unit \times 5 = 5 units
Unfixed : 3 units \times 5 = 15 units

After 1 week

Fixed : 2 units \times 4 = 8 units
Unfixed : 3 units \times 4 = 12 units

Transfer : 3 units = 30
1 unit = 30 \div 3
= 10

Total pieces of puzzle = 20 units
= 20 \times 10
= 200

Qn 4

After 1 hour

Answered : 1 unit \times 5 = 5 units
Unanswered : 1 unit \times 5 = 5 units

After 20 minutes

Answered : 4 units \times 2 = 8 units
Unanswered : 1 unit \times 2 = 2 units

Transfer : 3 units = 18
1 unit = 6

Total questions in quiz = 10 units
= 10 \times 6
= 60

Qn 5

Terry : 1 unit \times 7 = 7 units
Chelsia + Dave : 3 units \times 7 = 21 units
Chelsia : 2 units \times 4 = 8 units
Terry + Dave : 5 units \times 4 = 20 units
On 5 (Cont.)
Terry : Chelsea : Dave
7 units : 8 units : 13 units
Difference between Terry and Dave
6 units = $24
1 unit = $4
Cost of present 28 units = 28 x $4
= $112

On 6
Benson + Daryl 3 units x 5 = 15 units
Jean 1 unit x 5 = 5 units
Daryl + Jean 3 units x 4 = 12 units
Benson 2 units x 4 = 8 units
Benson : Daryl : Jean
8 units : 7 units : 5 units
Difference between Benson and Jean
3 units = $36
1 unit = $12
Total sum shared = 20 units
= 20 x $12
= $240

Unit 2.8 – Constant Difference
On 1
At first
Boys 1 unit x 3 = 3 units
Girls 2 units x 3 = 6 units
Difference 1 unit x 3 = 3 units
End
Boys 2 units
Girls 5 units
Difference 3 units
Decrease 1 unit = 3
Total number of children in the end = 7 units
= 7 x 3
= 21

On 2
Present
John 1 unit x 2 = 2 units
Sister 4 units x 2 = 8 units
Difference 3 units x 2 = 6 units
John 3 units x 3 = 9 units
Sister 5 units x 3 = 15 units
Difference 2 units x 3 = 6 units
Increase each 7 units = 14
1 unit = 14 + 7
= 2
John’s age now = 2 units
= 2 x 2
= 4

On 3
Present
Mira = 8 years old
Father = 44 years old
Difference = 36 years old
Future
Mira = 1 unit
Father = 3 units
Difference = 2 units

On 3 (Cont.)
2 units = 36
1 unit = 36 + 2
1 = 18 (Mira’s age in the future)
Number of years = 18 – 8
= 10
Mira will be 1/3 as old as her father in 10 years’ time.

On 4
At first
Jenny 1 unit x 2 = 2 units
Daryl 2 units x 2 = 4 units
Difference 1 unit x 2
End
Jenny = 1 unit
Daryl = 3 units
Difference = 2 units
Decrease each 1 unit = 12
Jenny in the end 1 unit = 12

On 5
At first
Shop A = 68 kg
Shop B = 128 kg
Difference = 60 kg
End
Shop A = 2 units
Shop B = 5 units
Difference = 3 units
3 units = 60 kg
1 unit = 20 kg
Shop A (end) = 2 units
= 40 kg
Shop A (sold) = 68 kg – 40 kg
= 28 kg
Total sold = 28 kg x 2
= 56 kg

On 6
Square 2 unit x 4 = 8 units
Rectangle 5 units x 4 = 20 units
Difference 3 units x 4
Unshaded square 1 unit x 3 = 3 units
Unshaded rect 5 units x 3 = 15 units
Difference 4 units x 3
Decrease each 5 units = 40 cm²
1 unit = 8 cm²
Total area of figure
= 3 units + 15 units + 5 units
= 23 units
= 23 x 8 cm²
= 184 cm²

Unit 2.9 – Number of Units x Value of Units
On 1
Number of units x Value of units (stickers)
Boys 2 x 4 = 8
Girls 1 x 5 = 5
13 units = 1105
1 unit = 1105 / 13
= 85
Total number of girls 1 unit = 1 x 85
= 85

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Page 10

Qn 2
Red : Yellow : Red : Green
1 unit² : 3 units² : 2 units : 5 units

No. × value = Total weight
Red
2 units × 10 = 20 units
Yellow
6 units × 15 = 90 units
Green
5 units × 20 = 100 units
Total
210 g units
= 9150 g
1 unit
= 15 g

Total green marbles = 5 × 15
= 75

Qn 3

\[ \frac{2}{5} \] (\$5 each)

Total
\[ \frac{1}{3} \] ($4 each)

\[ \frac{1}{3} \] ($3 each)

(remainder)

No. (units) × Value ($) = Total unit ($)=
8 units × 5 = 40 units
1 units × 4 = 4 units
3 units × 3 = 9 units
53 units = 318
1 unit = 318 ÷ 53
= 6

Total number of people = 12 × 6
= 72

Qn 4

1 \frac{1}{3} walk-a-jog

\[ \frac{1}{4} = \frac{5}{20} \]

3 \frac{3}{5} soccer

\[ \frac{3}{4} × \frac{3}{4} = \frac{9}{16} \]

2 \frac{2}{5} basketball

(Remainder)

No. units × value(points) = Total unit points(
Walk-a-jog
5 units × 6 = 30 units
Soccer
9 units × 5 = 45 units
Basketball
6 units × 4 = 24 units
Total
99 units = 4950
1 unit = 50

Total students = 20 units
= 20 × 50
= 1000

Qn 5

\[ \frac{1}{20} \] ct = \[ \frac{2}{3} \] 50 ct

\[ \frac{2}{20} \] ct = \[ \frac{2}{3} \] 50 ct

20 ct : 50 ct
6 units : 3 units

\[ \frac{50}{1} = \frac{500}{50} \]

Total coins = 6 units + 3 units + 5 units
= 14 units
= 14 × 3
= 42

Qn 6

\[ \frac{1}{4} \] adults
\[ \frac{1}{5} = \frac{5}{20} \]

3 \frac{2}{5} boys
\[ \frac{3}{4} = \frac{6}{20} \]

(Remainder)

\[ \frac{3}{5} \] girls
\[ \frac{3}{5} = \frac{9}{20} \]

No. × value = Total coupons=
Adults
5 units × 5 coupons = 25 units
Boys
6 units × 4 coupons = 24 units
Girls
9 units × 3 coupons = 27 units
Total
76 units = 1520
1 unit = 20

Total adults
5 units = 5 × 20
= 100

Chapter 3 Ratio
Unit 3.1 – Part-whole Relationship

Qn 1

\[ \frac{1}{4} \] (men)

\[ \frac{1}{4} = \frac{4}{16} \]

\[ \frac{1}{3} \] (women)
\[ \frac{3}{4} × \frac{1}{4} = \frac{3}{16} \]

\[ \frac{3}{4} \] (children)
\[ \frac{3}{4} = \frac{9}{16} \]

(Remainder)

Difference in the number of children and men
\[ \frac{9}{16} - \frac{4}{16} \]
\[ = \frac{5}{16} \]

\[ \frac{5}{16} \] of total = 150
\[ = 10 \]

\[ \frac{1}{16} \] of total = 150 + 5
\[ = 30 \]

Total number of visitors = 16 units
\[ = 16 × 30 \]
\[ = 480 \]
Qn 2

Since \( \frac{1}{6} \) of total = 2 units, \( \frac{5}{6} \) of total = 10 units

7 units = $490
1 unit = \( \frac{490}{7} \) = $70
Total salary = 12 units
= 12 \times $70
= $840

Qn 3

Hock Kee Krishnan

Since \( \frac{1}{5} \) of total = 3 units, \( \frac{4}{5} \) of total = 12 units
11 units = 88
1 unit = \( \frac{88}{11} \) = 8
Total number of sweets at first
= 15 \times 8
= 120

Qn 4

Swee Hoon : Sharon : Raj
3 : 4 : 4

Total number of stamps
= 12u + 4u + 5u
= 21u
21u = 147
1u = \( \frac{147}{21} \) = 7
Difference between Swee Hoon and Raj
= 12u - 5u
= 7u
= 7 \times 7
= 49

Qn 5

Difference between bus and private transport
= \( \frac{14}{35} \) - \( \frac{12}{35} \)
= \( \frac{2}{35} \)

Unit 3.2 – Repeated Identity

Qn 1

Swee Hoon : Sharon : Raj
3^4 : 1^4 : 4

Swee Hoon : Sharon : Raj
12 : 4

Total number of stamps
= 12u + 4u + 5u
= 21u
21u = 147
1u = \( \frac{147}{21} \) = 7
Difference between Swee Hoon and Raj
= 12u - 5u
= 7u
= 7 \times 7
= 49

Qn 5 (Cont.)

Difference between bus and private transport
= \( \frac{14}{35} \) - \( \frac{12}{35} \)
= \( \frac{2}{35} \)

Total number of students
= 35 units
= 35 \times 90
= 3150
Qn 3
Unshaded Sq : Shaded sq
3 units : 4 units

Shaded rec : Unshaded rect
2 units\(^2\) : 7 units\(^2\)

Shaded area 4 units = 16 cm\(^2\)
1 unit = 4 cm\(^2\)
Area of figure = 3 units + 4 units + 14 units
= 21 units
= 21 x 4
= 84 cm\(^2\)

Qn 4
Jacintha : Isabel
2 units : 1 unit
Jacintha : Evelyn
1 unit\(^3\) : 4 units\(^2\)

Difference between Evelyn and Isabel
7 units = 63
1 unit = 9
Total = 11 units
11 x 9 = 99

Qn 5
20-cent : 50-cent : $1
5\(^{3}\) : 3\(^{3}\) : 3\(^{1}\)
15 : 9

20-cent : 50-cent : $1
5\(^{3}\) : 3\(^{3}\) : 3\(^{1}\)
15 : 9

Total = 15 units + 9 units + 10 units
= 34 units

34 units = 102
1 unit = 102 + 34
= 3

Total value = (15 units x $0.20) + (9 units x $0.50) + (10 units x $1)
= (15 x 3 x $0.20) + (9 x 3 x $0.50) + (10 x 3 x $1)
= $9 + $13.50 + $30
= $52.50

Unit 3.3 – External Unchanged

Qn 1
At first
Male : Female
2\(^{3}\) : 7\(^{4}\)
8 units : 28 units

8 units : 7 units
28 units : 28 units

Difference in the number of men
= 8 units – 7 units
= 1 unit

1 unit = 12
Total number of passengers on MRT train at first
= 36 units
= 36 x 12
= 432

Qn 2
At first
20-cent : 50-cent
3 : 11

20-cent : 50-cent
3 : 11

3 units : 11 units
3 units : 9 units

Qn 2 (Cont.)
Decrease in 50-cent coins = 11 units – 9 units
= 2 units

2 units = 8
1 unit = 8 + 2
= 4

Total amount of money in the end
= (3 units x $0.20) + (9 units x $0.50)
= (3 x 4 x $0.20) + (9 x 4 x $0.50)
= $2.40 + $18
= $20.40

Qn 3
At first
Pears : Apples
3 units : 4 units

End
Pears : Apples
1 unit\(^3\) : 2 units\(^3\)

3 units : 6 units
Increase in apples = 2 units
2 units = 12
1 unit = 6
Total = 7 units
7 units = 7 x 6
= 42

Qn 4
At first
20-cent : $1
4 : 1

20-cent : $1
2\(^2\) : 1\(^2\)

4 units : 1 unit
2 units : 2 units

Increase in $1 coins = 2 units – 1 unit
= 1 unit

1 unit = 8
Amount of money at first
= (4 units x $0.20) + (1 unit x $1)
= (4 x 8 x $0.20) + (1 x 8 x $1)
= $5.60 + $8
= $14.40

Qn 5
At first
Team X : Team Y
5 : 6

End
Team X : Team Y
5\(^{2}\) : 6\(^{2}\)

5 units : 6 units
4 units : 4 units

Decide in Team X = 5 units – 4 units
= 1 unit

1 unit = 6
Total number of members in Team Y = 6 units
= 6 x 6
= 36

Unit 3.4 – Unchanged Total

Qn 1
At first
Boys : Girls Total
3 : 5 : 8 units

End
Boys : Girls Total
3\(^2\) : 1\(^2\) : 4 units

3 units : 5 units : 8 units
6 units : 2 units : 8 units
Qn 1 (Cont.)
Change in number of boys = 6 units – 3 units
3 units = 15
1 unit = 15 ÷ 3
= 5
Number of boys on the bus at first = 3 units
= 3 × 5
= 15

Qn 2
At first
A : B Total
5 : 7 12 units
Change in number of pieces fixed = 5 units – 4 units
= 1 unit
1 unit = 20
Total number of pieces in the puzzle = 20 units
= 20 × 20
= 400

Qn 3
At first
Fixed : Unfixed Total
1st : 4th 5 units 12 units 20 units
Change in the number of pieces fixed = 5 units – 4 units
= 1 unit
1 unit = 20
Total number of pieces in the puzzle = 20 units
= 20 × 20
= 400

Qn 4
First hour
Answered : Unanswered Total
2nd : 3rd 5 units 12 units 20 units
After another half an hour
Answered : Unanswered Total
1st : 2nd 4 units 20 units 24 units
Change in number of questions = 15 units – 8 units
= 7 units
7 units = 14
1 unit = 14 ÷ 7
= 2
Total number of questions = 20 units
= 20 × 2
= 40

Qn 5
A + C + D
T + C + D
16
10

\{ \begin{align*}
T &= 3 \text{ units} \\
C + D &= 5 \text{ units} \\
C &= 3 \text{ units} \\
D &= 7 \text{ units}
\end{align*} \}

\begin{align*}
A : T : C : D \\
\text{4 units} : 6 \text{ units} : 3 \text{ units} : 7 \text{ units}
\end{align*}

Qn 5 (cont.)
Difference between A and C = 3 units
3 units = $12
1 unit = $4
Cost of present = 20 units
= 20 × $4
= $80

Unit 3.5 – Constant Difference
Qn 1
At first
Rakesh : Smith Difference
A : B : Total
1st : 3rd : 4th 3 units
Change = 3 units
6 units 8 units 2 units

In the end
Rakesh : Smith Difference
A : B : Total
1st : 3rd : 4th 2 units
Change = 2 units
1 unit 3 units 2 units

Difference = 6 units – 1 unit
= 5 units
5 units = 2000
1 unit = 2000 ÷ 5
= $400
Mr Rakesh’s salary = 6 units
= 6 × $400
= $2400

Qn 2
At first
Jeremy : Aunt Difference
1st : 2nd : 3rd 1 unit
Change = 1 unit
4 units 5 units 3 units

In the end
Jeremy : Aunt Difference
1st : 2nd : 3rd 1 unit
Change = 1 unit
6 units 9 units 3 units

Age difference = 6 units – 1 unit
= 5 units
5 units = 25
1 unit = 25 ÷ 5
= 5
Jeremy’s age now = 1 × 5
= 5

Qn 3
At first
Joanne : Elizabeth Difference
1st : 2nd : 3rd 1 unit
Change = 1 unit
3 units 6 units 3 units

End
Joanne : Elizabeth Difference
1st : 2nd : 3rd 1 unit
Change = 1 unit
2 units 5 units 3 units

Change in allowance = 3 units – 2 units
= 1 unit
1 unit = $4
Joanne’s allowance at first = 3 units
= 3 × $4
= $12

Qn 4
At first
Shop X Difference
Shop Y
Shop X 120 kg 2 units
165 kg 5 units
Difference 45 kg 3 units

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Qn 4 (Cont.)
3 units = 45 kg
1 unit = 45 kg ÷ 3
= 15 kg
Amount of flour in Shop X in the end = 2 units
= 2 × 15
= 30 kg
Amount of flour sold in both Shop X and Shop Y
= (120 kg – 30 kg) × 2
= 180 kg

Qn 5
At first
Square 1 unit x 5 (5 units)
Rectangle 3 units x 5 (15 units)
Difference 2 units x 5 (10 units)

End
Unshaded Square 2 units x 2 (4 units)
Unshaded Rectangle 7 units x 2 (14 units)
Difference 5 units x 2 (10 units)

Decrease each
Area of square = 5 × 20
= 100 cm²
Length = 10 cm

Qn 6
Present
Kim : Daughter Difference
5 units : 2 units 3 units
10 units 4 units 6 units
4 years ago
Kim : Daughter Difference
3 units : 1 unit 2 units
9 units 3 units 6 units
Difference in their ages = 10 units – 9 units = 1 unit
1 unit = 4
Present age of Mrs Kim = 10 units
= 10 × 4
= 40
6 years from now, Mrs Kim will be 46 years old.

Unit 3.6 – Number of Units x Value of Units
Qn 1
Number Value Total unit
(units) (g) (g)
Cars 5 × 4 = 20 units
Lorries 2 × 4 = 8 units
Motorbikes 4 × 2 = 8 units
Total number of wheels = 36 units
36 units = 864
1 unit = 864 ÷ 36
= 24
Number of motorbikes in the carpark = 4 units
= 4 × 24
= 96

Qn 2
Number Value Total
(units) ($) ($) (dollars)
Adults 2 × 6 = 12
Boys 3 × 5 = 15
Girls 5 × 4 = 20
Total sum of money = 47 units
47 units = 705
1 unit = 705 ÷ 47
= 15

Qn 2 (Cont.)
Difference between the number of boys and girls
= 5 units – 3 units
= 2 units
= 2 × 15
= 30

Qn 3
Difference in cost = 1 unit → $3
Cost of 1 plate = 3 units → $9
Cost of 1 cup = 2 units → $6

<table>
<thead>
<tr>
<th>No. (units)</th>
<th>×</th>
<th>Value</th>
<th>Total sales</th>
</tr>
</thead>
<tbody>
<tr>
<td>Plates</td>
<td>3</td>
<td>$9</td>
<td>$27 units</td>
</tr>
<tr>
<td>Cups</td>
<td>5</td>
<td>$6</td>
<td>$30 units</td>
</tr>
<tr>
<td>Total</td>
<td></td>
<td>$57</td>
<td>$2850</td>
</tr>
</tbody>
</table>

(a) No. of plates sold in 1st month
= 3 units
= 3 × 50
= 150
(b) Items sold = 4 total
7 total = 8 units
= 8 × 50
= 400
3 total items left = 300

Qn 4
Number Value Total unit
(units) (g) (g)
Flour 8 × 300 = 2400
Sugar 2 × 200 = 400
Butter 1 × 300 = 300
Total mass = 3100 units
3100 units = 24 800
1 unit = 24 800 ÷ 3100
= 8
Number of packets of sugar used = 2 units
= 2 × 8
= 16

Qn 5
Number Value Total unit
(units) (points) (points)
Red 3 × 2 = 6
Green 1 × 5 = 5
Blue 4 × 3 = 12
Total points = 23 units
23 units = 184
1 unit = 184 ÷ 23
= 8
Total number of balls collected = 8 units
= 8 × 8
= 64

Qn 6
Number Value Total unit
(units) (wheels) (wheels)
Cars 3 × 4 = 12
Bikes 5 × 2 = 10
Tricycles 2 × 3 = 6
Total number of wheels = 28 units
28 units = 840
1 unit = 840 ÷ 28
= 30
Number of cars parked = 90
Unit 3.7 – External Changed (Model)

Qn 1
Value of 10 pieces of 50-cents coins = $5
Number of 20-cent coins = $5 ÷ $0.20 = 25

\[
\begin{array}{c|c|c}
20\text{-cent} & 50\text{-cent} & \times 5 \\
\hline
3\text{ units} & 4\text{ units} & +25 \\
7\text{ parts} & 5\text{ parts} & -10 \\
\end{array}
\]

\[
\begin{array}{c|c|c}
20\text{-cent} & 50\text{-cent} & \times 7 \\
\hline
15\text{ units} & 28\text{ units} & +125 \\
35\text{ parts} & 35\text{ parts} & -70 \\
\end{array}
\]

20ct
15 units 125
28 units

50ct
7 parts 5 parts

13 units = 125 + 70 = 195
1 unit = 195 ÷ 13 = 15

Sum of money at first
= (3 units × $0.20) + (4 units × $0.50)
= (3 × 15 × $0.20) + (4 × 15 × $0.50)
= $9 + $30
= $39

Qn 2
Boys : Girls
\[
\begin{array}{c|c|c|c}
\text{Boys} & \text{Girls} & \times 3 & \times 5 \\
\hline
\text{(actual)} & & -5 & \\
5\text{ parts} & 3\text{ parts} & & \\
\end{array}
\]

Boys
3 units 15 25

Girls
5 units

2 units = 40
1 unit = 40 ÷ 2 = 20

Actual
Boys = 1 unit + 5 = 20 + 5 = 25
Girls = 20

Qn 3
Chocolate Banana
\[
\begin{array}{c|c|c|c|c}
\text{Chocolate} & \text{Banana} & \times 2 & \times 3 & \\
\hline
5\text{ units} & 2\text{ units} & -10 & -20 & \\
3\text{ parts} & 2\text{ parts} & 2\text{ parts} & 6\text{ parts} & 6\text{ parts} \\
\end{array}
\]

Chocolate
10 units

Banana
6 units 12 20

4 units = 32
1 unit = 32 ÷ 4 = 8

Number of chocolate muffins in the end
= 5 units – 10
= (5 × 8) – 10
= 30

Qn 4
Jason Sister
\[
\begin{array}{c|c|c|c|c}
\text{Jason} & \text{Sister} & \times 3 & \times 4 & \\
\hline
3\text{ units} & 4\text{ units} & +19 & +57 & \\
4\text{ parts} & 3\text{ parts} & +2 & +8 & \\
\end{array}
\]

Jason
9 units 57
16 units 12 parts

Sister
16 units 8
12 parts

Qn 4 (Cont.)
Jason Sister
\[
\begin{array}{c|c|c|c}
\text{Jason} & \text{Sister} & 7\text{ units} & 1\text{ unit} \\
\hline
9\text{ units} & 16\text{ units} & 57 & 2\text{ kg} \\
12\text{ parts} & 12\text{ parts} & +8 & \\
\end{array}
\]

7 units = 57 – 8 = 49
1 unit = 49 + 7 = 7

Number of stickers Jason had at first
= 3 units
= 3 × 7 = 21

Qn 5
Red Blue
\[
\begin{array}{c|c|c|c|c}
\text{Red} & \text{Blue} & \times 3 & \times 2 & \\
\hline
3\text{ units} & 2\text{ units} & +5 & +15 & \\
2\text{ parts} & 3\text{ parts} & +20 & +40 & \\
\end{array}
\]

Red
9 units 15

Blue
4 units 40

6 parts

5 units = 25
1 unit = 25 ÷ 5 = 5

Total number of marbles at first
= 5 units
= 5 × 5 = 25

Qn 6
Daryl Bernard
\[
\begin{array}{c|c|c|c|c}
\text{Daryl} & \text{Bernard} & \times 7 & \times 6 & \\
\hline
2\text{ units} & 3\text{ units} & +10 & +40 & \\
7\times 6\text{ parts} & 7\text{ parts} & -5 & -40 & \\
\end{array}
\]

Daryl
14 units 70
18 units

Bernard
14 units 30

42 parts

Chapter 4 Average
Unit 4.1 – Averaging Out

Qn 1
Total mass (4 brothers) = 75 kg × 4 = 300 kg
Other 2 brothers’ mass = 300 kg – 72 kg – 66 kg = 162 kg

3\text{rd} brother
1 unit
2 kg

4\text{th} brother
1 unit

\[
\begin{array}{c|c|c}
\text{3rd brother} & \text{4th brother} & \text{2 kg} \\
\hline
1\text{ unit} & 1\text{ unit} & \\
162\text{ kg} – 2\text{ kg} & 2 & = 80\text{ kg} \\
\end{array}
\]

The mass of my other 2 brothers are 80 kg and 82 kg respectively.

Visit the forum page at www.onSponge.com for more challenging problem sums.
Qn 2
Average number of children per household

\[ \frac{(0 \times 50) + (1 \times 20) + (2 \times 50) + (3 \times 40)}{50 + 20 + 50 + 40} = \frac{240}{160} = 1.5 \]

Qn 3
Average number of sweets received by each child

\[ \frac{(2 \times 10) + (4 \times 10) + (6 \times 35) + (8 \times 15)}{10 + 40 + 35 + 15} = \frac{510}{100} = 5.1 \]

Unit 4.2 – Two Averages
Qn 1
Total height of six students = 125 cm \times 6
= 750 cm
Total height of five students = 120 cm \times 5
= 600 cm
Height of the sixth student = 750 cm – 600 cm
= 150 cm

Qn 2
Total of first set = 124 \times 2
= 248
Total of next set = 262 \times 2
= 524
Total of 4 numbers = 248 + 524
= 772
Average of four numbers = \frac{722}{4} = 193

Qn 3
Total mass of 12 children = 33 kg \times 12
= 396 kg
Total mass of 18 children = 36 kg \times 18
= 648 kg
Total mass of 30 children = 648 kg + 396 kg
= 1044 kg
Average mass of 30 children = \frac{1044 kg + 30 kg}{30} = 34.8 kg

Unit 4.3 – Average with Unknown Quantity
Qn 1
$12 – $9 = $3
For each plate to increase from $8 to $9, the increase per plate → $1

Number of plates she bought at first = \frac{3}{1} = 3

Qn 2
75 kg – 48 kg = 27 kg
For each boy to increase from 45 kg to 48 kg, increase per boy = 3 kg
Number of boys in the group = 27 kg ÷ 3 kg
= 9

Qn 3
Difference in Gareth’s results = 13 + 5
= 18
Difference in average score = 90 – 87
= 3
Total people involved = 18 ÷ 3
= 6
Excluding Gareth himself, he had 5 good friends.

Qn 4
Difference in Jean’s score = 20 – 4
= 16
Difference in average score = 80 – 78
= 2
Number of people involved = 16 ÷ 2
= 8
Excluding herself, Jean had 7 friends.

Qn 5
Total marks deducted = 96 \times 2
= 192
Since 2 students left the class, besides the average of 60 marks lost, the loss will be re-distributed to the rest of the classmates such that each pupil student drop from an average of 60 marks to 58 marks.
192 – (2 \times 60) = 192 – 120
= 72
72 ÷ 2 = 36
Number of students at first = 36 + 2 (left) = 38

Qn 6
Total score = 58.5 \times 80
= 4680
Using Guess and Check,

\begin{tabular}{|c|c|c|}
\hline
\textbf{Male} & \textbf{Female} & \textbf{Total} \\
\hline
40 \times 56 = & 2240 & 40 \times 64 = 2560 & 4800 \\
45 \times 56 = & 2520 & 35 \times 64 = 2240 & 4760 \\
55 \times 56 = & 3080 & 25 \times 64 = 1600 & 4680 \\
\hline
\end{tabular}

Number of male singers = 55

Qn 7
Difference in the individual score = 18 + 9
= 27
Difference in average score = 85 – 82
= 3
No. of pupils in the group = 27 ÷ 3
= 9

Qn 8
Total = 75 \times 4
= 300
Chinese + Mathematics = 300 – 62 – 79
= 159
(a) Smallest difference = 80 – 79
= 1
(b) Biggest difference = 89 – 70
= 19

Qn 9
Total distance = 8.50 \times 4
= 34 m
Ukraine + Germany = 34 m – 8.95 m – 7.35 m
= 17.7 m
(a) Smallest difference = 9 m – 8.7 m
= 0.3 m
(b) Biggest difference = 9.7 m – 8 m
= 1.7 m

Unit 4.4 – Average with Repeated Identity
Qn 1
Total (A + B) = 78 \times 2
= 156
Total (B + C) = 74 \times 2
= 148
Total (A + C) = 80 \times 2
= 160
Qn 1 (Cont.)
Total (2A + 2B + 2C) = 156 + 148 + 160
= 464
A + B + C → 464 + 2 = 232
Calvin’s score = 232 - 156
= 76
Alan’s score = 232 - 148
= 84
Bernard’s score = 232 - 160
= 72

Qn 2
Total of John + Henry = $2400 x 2
= $4800
Total of Henry + Bernard = $3000 x 2
= $6000
Difference between John and Bernard
= 2 units
= $(6000 - 4800)
= $1200
1 unit = $600
John = 5 × $600
= $3000
Henry’s salary = $4800 – $3000
= $1800

Qn 3
Total of Clara + Joan = $80 x 2
= $160
Total of Clara + Melissa = $115 x 2
= $230
Difference between Joan’s share and Melissa’s share
= 9 units – 4 units
= 5 units
5 units = $230 – $160
= $70
1 unit = $70 ÷ 5
= $14
Amount paid by Melissa = 9 units
= 9 × $14
= $126
Cost of present = $126 + $160
= $286

Qn 4
Total (Benson + Ryan) = 450 x 2
= 900
Total (Benson + Joseph) = 240 x 2
= 480
Difference between Ryan and Joseph
= 5 units – 2 units
= 3 units
3 units = 900 – 480
= 420
1 unit = 420 ÷ 3
= 140
Ryan = 5 units
= 5 × 140
= 700
Benson = 900 – 700
= 200

Qn 5 (Cont.)
Twice the total of Amos + Bernard + Chelsia
= $5200 + $8400 + $5600
= $19 200
Total amount = $19 200 ÷ 2
= $9600
Average of A + B + C = $9600 ÷ 3
= $3200

Chapter 5 Rate

Unit 5.1 Rate Involving One Object

Qn1
1 minute → 6 plates
45 minutes → $125 ÷ 5
= $25
Cost of present = $126 + $160
= $286

Qn 2
3 days → 1 house
1 day → 36 ÷ 3 = 12 houses
36 days → 1 ÷ 36 = 12 houses

Qn 3
8 notebooks → $7.20
1 notebook → $7.20 ÷ 8
= $0.90
14 notebooks → 14 × $0.90 = $12.60

Qn 4
6 litres → 54 km
1 litre → 54 km ÷ 6 = 9 km
18 litres → 18 × 9 = 162 km

Qn 5
5 lessons → $125
1 lesson → $125 ÷ 5
= $25
16 lessons → 16 × $25
= $400

Qn 6
In a day, Johnny paint \( \frac{1}{8} \) house, Alan paint \( \frac{1}{10} \) house
Together, they paint \( \frac{1}{8} + \frac{1}{10} = \frac{5}{40} + \frac{4}{40} = \frac{9}{40} \) house

\( \frac{9}{40} \) house take both 1 day, \( \frac{1}{40} \) house take both \( \frac{1}{9} \) day

The whole house will take both \( \frac{40}{9} \) days = \( 4 \frac{4}{9} \) days.

Unit 5.2 – Rate Involving Two Different Objects

Qn 1
In an hour,
Janice travels \( \frac{1}{2} \) of the distance of Town A to Town B and
Joel travels \( \frac{1}{3} \) of the distance of Town B to Town A.
Together, they travel \( \frac{1}{2} + \frac{1}{3} = \frac{3}{6} + \frac{2}{6} = \frac{5}{6} \) of the distance of A to B

When both meet, they would have travelled the total distance between Town A and Town B.

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Qn 1 (Cont.)
5
6
of the distance of Town A to Town B takes both of them in 1 hour.
1
6
of the distance of Town A to Town B takes both of them in
1
5
hour.
To cover the distance between Town A and Town B, both of them would take
5
6
hour = 1
5
hours.

Qn 2
In 1 hour, Johnny can paint 1
6
house
Together, Johnny and Ramesh can paint 1
3
house
Ramesh alone can paint 1
3
6
house take Ramesh 1 day
Whole house will take Ramesh 6 days.

Qn 3
In 1 day, John and Rauf build 1
4
of the model train, Rauf and Sean build 1
3
of the model train and John and Sean build 1
6
of the model train.
Together (John, Rauf and Sean) build

\[
\frac{1}{4} + \frac{1}{6} + \frac{1}{3} = \frac{9}{12} = \frac{3}{4}
\]

of the model train.
John, Rauf and Sean build
\[
\frac{3}{8}
\]
of the model train in 1 day
\[
\frac{1}{8}
\]
of the model train in 1 day
\[
\frac{8}{3}
\]
of the model train in 8 days = 2\frac{2}{3} days.

Unit 5.3 – Rate Involving Three Different Objects
Qn 1
In an hour, 1st pipe fills 1
6
of the pool, 2nd pipe fills 1
8
of the pool. Together, they fill

\[
\frac{4}{24} + \frac{3}{24} = \frac{7}{24}
\]
of the pool.
In 2 hours, 1st and 2nd pipes fill
\[
\frac{14}{24}
\]
of the pool, left
\[
\frac{10}{24}
\]
of the pool.
In 1 hour, 3rd pipe drains
\[
\frac{1}{12}
\]
of the pool.
In 1 hour with 3 pipes turned on, he can fill

\[
\frac{7}{24} - \frac{1}{12} = \frac{7}{24} - \frac{2}{24} = \frac{5}{24}
\]
of the pool.

Qn 1 (Cont.)
Remaining time needed = 2 hours more since 1 hour can fill
5
24
of the pool and gap is
10
24
of the pool.

Total time needed = 2 + 2

= 4 hours

Qn 2
In an hour, 1st tap fills 1
4
tank, 2nd tap fills 1
3
tank
In 1 hour, both fill

\[
\frac{1}{4} + \frac{1}{3} = \frac{3}{12} + \frac{4}{12} = \frac{7}{12}
\]
tank
Left = \frac{5}{12} tank
In 1 hour, 3rd tap drains 1
2
tank
With 1st and 3rd taps turned on →

\[
\frac{1}{4} - \frac{1}{2} = \frac{1}{4}
\]
tank was drained
Time taken to completely drain tank = \frac{1}{3} hours

Chapter 6 Angles I
Unit 6.1 – Angles on a Straight Line
Qn 1
\[
\angle x = 180^\circ - 54^\circ - 78^\circ = 48^\circ
\]

Qn 2
\[
\angle x = 180^\circ - 98^\circ - 42^\circ = 40^\circ
\]

Qn 3
80° – 60° = 120°
8 units = 120°
1 unit = 15°
\[
\angle y = 5 units = 5 \times 15^\circ = 75^\circ
\]
\[
\angle x = 3 units = 3 \times 15^\circ = 45^\circ
\]

Qn 4
Total = 9 units = 180°
1 unit = 20°
\[
\angle x = 3 units = 3 \times 20^\circ = 60^\circ
\]
\[
\angle y = 4 units = 4 \times 20^\circ = 80^\circ
\]
\[
\angle z = 2 units = 2 \times 20^\circ = 40^\circ
\]

Qn 5
Total = 6 units = 180°
1 unit = 30°
\[
\angle x = 2 units = 2 \times 30^\circ = 60^\circ
\]
\[
\angle y = 3 units = 3 \times 30^\circ = 90^\circ
\]
\[
\angle z = 1 units = 1 \times 30^\circ = 30^\circ
\]
Unit 6.2 – Vertically Opposite Angles

Qn 1
\[ \angle y = 25^\circ \text{ (vertically opposite } \angle) \\
\angle x = 50^\circ \text{ (vertically opposite } \angle) \]

Qn 2
\[ \angle y + 45^\circ = 125^\circ \text{ (vertically opposite } \angle) \\
\angle y = 125^\circ - 45^\circ \text{ (vertically opposite } \angle) \\
\quad = 80^\circ \]

Qn 3
\[ x + y = 120^\circ \text{ (vertically opposite } \angle) \\
3 \text{ units } = 120^\circ \\
1 \text{ unit } = 40^\circ \\
x = 2 \times 40^\circ \\
y = 1 \times 40^\circ \]

Qn 4
\[ x + y = 180^\circ \text{ (on straight line)} \\
3 \text{ units } = 60^\circ \\
1 \text{ unit } = 20^\circ \\
x = 2 \times 20^\circ \\
y = 20^\circ \]

Qn 5
\[ x = 32^\circ \\
y = 180^\circ - x - 74^\circ \\
\quad = 180^\circ - 32^\circ - 74^\circ \\
\quad = 74^\circ \text{ (on a straight line)} \]

Qn 6
\[ x = 42^\circ \text{ (vertically opposite } \angle) \\
y = 180^\circ - 83^\circ - 42^\circ \\
\quad = 55^\circ \text{ (on a straight line)} \]

Qn 7
\[ x + y + 94^\circ = 180^\circ \text{ (on a straight line)} \\
x = 180^\circ - 84^\circ \\
\quad = 96^\circ \\
4 \text{ units } = 96^\circ \\
1 \text{ unit } = 24^\circ \\
x = 3 \times 24^\circ \\
y = 1 \times 24^\circ \\
y = x = 72^\circ \text{ (vertically opposite } \angle) \]

Unit 6.3 – Alternate, Corresponding & Interior Angles

Qn 1
\[ \angle BFC = 130^\circ \text{ (corresponding } \angle) \\
\angle y = 180^\circ - 130^\circ \\
\quad = 50^\circ \text{ (on a straight line)} \\
\angle EFC = 130^\circ - 75^\circ \\
\quad = 55^\circ \\
\angle ECF = 180^\circ - 55^\circ - 112^\circ \\
\quad = 13^\circ \\
x = 180^\circ - 13^\circ - 130^\circ \\
\quad = 37^\circ \text{ (sum of } \angle \text{s in a } \triangle) \]

Qn 2
\[ x + 20^\circ = 82^\circ - 35^\circ \text{ (alternate } \angle) \\
x + 30^\circ = 47^\circ \\
\angle x = 47^\circ - 20^\circ \\
\quad = 27^\circ \]

Qn 3
\[ \angle z = 180^\circ - 56^\circ - 34^\circ \\
\quad = 90^\circ \text{ (on a straight line)} \\
2x = 180^\circ - 34^\circ - 90^\circ \text{ (alternate } \angle) \\
\quad = 56^\circ \\
x = 28^\circ \\
y = 180^\circ - 90^\circ \text{ (alternate } \angle) \\
\quad = 90^\circ \\
y = 38^\circ \]

Qn 4
\[ 180^\circ - 58^\circ = 122^\circ \text{ (interior } \angle) \\
\angle BCP = 122^\circ + 29^\circ \\
\quad = 151^\circ \text{ (alternate } \angle) \]

Qn 5
\[ 180^\circ - 135^\circ = 45^\circ \text{ (corresponding } \angle) \\
x = 105^\circ - 45^\circ \\
\quad = 60^\circ \text{ (alternate } \angle) \\
y = 180^\circ - 60^\circ \\
\quad = 120^\circ \text{ (on a straight line)} \]

Qn 6
\[ y = 37^\circ \text{ (on a straight line)} \\
360^\circ - 37^\circ - 265^\circ = 38^\circ \\
x = 38^\circ + 37^\circ \\
\quad = 75^\circ \text{ (on a straight line)} \]

Qn 7
\[ \angle BDE = 50^\circ \text{ (on a straight line)} \\
\angle p = 50^\circ + 25^\circ \text{ (bisector)} \\
\angle BGD = 180^\circ - 105^\circ = 75^\circ \\
\angle q = 180^\circ - 75^\circ - 25^\circ = 80^\circ \text{ (on a straight line)} \]

Qn 8
\[ \angle BEG = 60^\circ \text{ (on a straight line)} \\
\angle x = 60^\circ + 2 \text{ (bisector)} \\
\angle z = 180^\circ - 30^\circ \\
\quad = 150^\circ \text{ (on a straight line)} \\
y = 180^\circ - 30^\circ - 55^\circ \\
\quad = 95^\circ \]

Unit 6.4 – Isosceles Triangle

Qn 1
\[ \angle CBE = 85^\circ \text{ (isosceles } \triangle) \\
\angle CAD = 180^\circ - 85^\circ - 85^\circ = 10^\circ \text{ (sum of } \angle \text{s in a } \triangle) \\
\angle FBA = 180^\circ - 85^\circ \\
\quad = 95^\circ \text{ (on a straight line)} \\
\angle BFA = 180^\circ - 95^\circ - 10^\circ \\
\quad = 75^\circ \text{ (on a straight line)} \\
\angle m = 180^\circ - 75^\circ \\
\quad = 105^\circ \text{ (on a straight line)} \]

Qn 2
\[ \angle ABC = \angle ACB = 180^\circ - 110^\circ = 70^\circ \text{ (on a straight line)} \\
\angle XBA = 180^\circ - 70^\circ \\
\quad = 110^\circ \text{ (on a straight line)} \\
\angle a = 180^\circ - 45^\circ - 110^\circ = 25^\circ \text{ (on a straight line)} \]

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Chapter 7 Angles II (Closed Figures)

Unit 7.1 – Interior and Exterior Angles Within a Triangle

Qn 1
\[ \angle x = 125^\circ - 70^\circ = 55^\circ \text{ (2 interior } \angle \text{ = 1 exterior } \angle) \]

Qn 2
\[ \angle y = 142^\circ - 65^\circ = 77^\circ \text{ (2 interior } \angle \text{ = 1 exterior } \angle) \]

Qn 3
\[ \angle z = 34^\circ + 42^\circ = 76^\circ \text{ (2 interior } \angle \text{s = 1 exterior } \angle) \]
\[ \angle y + 56^\circ = 76^\circ \text{ (2 interior } \angle \text{s = 1 exterior } \angle) \]
\[ \angle y = 20^\circ \]

Qn 4
\[ \angle y = 42^\circ + 54^\circ = 96^\circ \text{ (2 internal } \angle \text{s = 1 external } \angle) \]
\[ 180^\circ - 96^\circ = 84^\circ \]
\[ \angle x = 180^\circ - 84^\circ - 20^\circ = 76^\circ \]

Qn 5
\[ \angle a + \angle b + 20^\circ = \angle c + \angle d + 20^\circ = 180^\circ \text{(sum of } \angle \text{s in } \triangle \text{)} \]
\[ \angle a + \angle b + \angle c + \angle d = (180^\circ \times 2) - 20^\circ - 20^\circ = 360^\circ - 40^\circ = 320^\circ \]

Qn 6
\[ 60^\circ + 60^\circ = 120^\circ \]
\[ 180^\circ - 110^\circ - 20^\circ = 50^\circ \]
\[ \angle x = 180^\circ - 100^\circ - 70^\circ = 10^\circ \text{ (sum of } \angle \text{s in } \triangle \text{)} \]

Qn 7
\[ \angle WUV = \angle b + \angle d \text{ (2 internal } \angle \text{s = 1 external } \angle) \]
\[ \angle UWV = \angle a + \angle c \text{ (2 internal } \angle \text{s = external } \angle) \]
\[ \angle a + \angle b + \angle c + \angle d + 20^\circ = 180^\circ \text{ (sum of } \angle \text{s)} \]
\[ \angle a + \angle b + \angle c + \angle d = 160^\circ \]

Qn 8
\[ \angle a + \angle b + \angle c + \angle d + \angle e + \angle f = (180^\circ \times 3) - 180^\circ = 360^\circ \text{ since the sum of } \angle \text{ of } \triangle RSV = 180^\circ \]

Qn 9
\[ \angle PQS = 80^\circ - 34^\circ = 46^\circ \]
\[ 2 = 73^\circ \text{ (isosceles } \triangle \text{)} \]
\[ \angle x = 180^\circ - 73^\circ - 15^\circ = 92^\circ \text{ (sum of } \angle \text{s in } \triangle \text{)} \]
\[ \angle PTR = 180^\circ - 92^\circ = 88^\circ \]
\[ \angle y = 34^\circ + 88^\circ = 122^\circ \text{ (2 interior } \angle \text{s = 1 exterior } \angle) \]

Unit 7.2 – Angle Properties Within A Rhombus

Qn 1
\[ \angle DAB = 180^\circ - 30^\circ - 30^\circ = 120^\circ \text{ (sum of } \angle \text{s in a } \triangle \text{)} \]
\[ \angle x = \frac{120^\circ}{2} = 60^\circ \]
Qn 2
\[ \angle QPB = 180^\circ - 114^\circ = 66^\circ \]
(a) \[ \angle QPR = \frac{66^\circ}{2} = 33^\circ \]
(b) \[ \angle QCB = 96^\circ \]
(c) \[ \angle RSC = 180^\circ - 84^\circ - 33^\circ = 63^\circ \]

Qn 3
\[ \angle ADC = 180^\circ - 130^\circ = 50^\circ \]
\[ \angle x = \frac{50^\circ}{2} = 25^\circ \]

Qn 4
\[
180^\circ - 45^\circ - 90^\circ - 30^\circ = 15^\circ \\
\angle x = 15^\circ
\]

Qn 5
\[ \angle FBE = 90^\circ \]
(a) \[ \angle BFE = \angle DFC = 180^\circ - 90^\circ - 35^\circ = 55^\circ \]
\[ \angle DBF = 45^\circ \]
(b) \[ \angle BDP = 65^\circ - 45^\circ = 10^\circ \]

Qn 6
\[ \angle x = 180^\circ - 108^\circ = 72^\circ \] (interior \(\angle\)s)
\[ 180^\circ - 90^\circ - 47^\circ = 43^\circ \]
\[ \angle y = 43^\circ \] (alternate \(\angle\)s)

Qn 7
\[ \angle FBD = 180^\circ - 70^\circ - 45^\circ = 65^\circ \]
\[ \angle x = 65^\circ + 20^\circ = 85^\circ \]
\[ \angle BDE = 180^\circ - 65^\circ = 115^\circ \]
\[ 70^\circ + \angle y = 115^\circ \] (2 internal \(\angle\)s = 1 external \(\angle\))
\[ \angle y = 115^\circ - 70^\circ = 45^\circ \]

Qn 8
\[ \angle x = 180^\circ - 105^\circ + 20^\circ = 55^\circ \]
\[ \angle y = 55^\circ + 20^\circ + 20^\circ = 95^\circ \] (2 interior \(\angle\)s = 1 exterior \(\angle\))

Qn 9
BD diagonal, bisector \(\rightarrow\) \(\angle y = \angle 2x\)
\[ \angle ADC = 180^\circ - 110^\circ = 70^\circ \] (interior \(\angle\))
\[ \angle y = \angle 2x = 180^\circ - 110^\circ = 70^\circ \] (sum of \(\angle\)s in a \(\triangle\))
\[ \angle x = \frac{70^\circ}{2} = 35^\circ \]

Qn 10
\[ \angle DAO = 45^\circ \] (diagonal of square)
\[ \angle DAE = 180^\circ - 90^\circ - 60^\circ = 30^\circ \] (sum of \(\angle\)s)
\[ \angle y = 45^\circ - 30^\circ = 15^\circ \]
\[ \angle x = 15^\circ + 90^\circ = 105^\circ \] (2 internal \(\angle\)s = 1 external \(\angle\))

Unit 7.3 – Angles Properties Within a Parallelogram
Qn 1
\[ \angle y = 60^\circ \] (alternate \(\angle\))
\[ \angle x = 180^\circ - 35^\circ - 70^\circ - 60^\circ = 15^\circ \] (sum of \(\angle\)s in a \(\triangle\))
\[ \angle z = \angle x + \angle y = 60^\circ + 15^\circ = 75^\circ \] (2 interior \(\angle\)s = 1 exterior \(\angle\))

Qn 2
\[ \angle x = 25^\circ \] (alternate \(\angle\))
\[ \angle y = 42^\circ + 25^\circ = 67^\circ \] (2 internal \(\angle\)s = 1 external \(\angle\))
\[ \angle z = 180^\circ - 80^\circ - 42^\circ - 25^\circ = 33^\circ \] (sum of \(\angle\)s)

Qn 3
\[ \angle RSU = 180^\circ - 88^\circ = 92^\circ \] (corresponding \(\angle\))
(a) \[ \angle SRU = 180^\circ - 92^\circ = \frac{2}{2} = 44^\circ \] (isosceles \(\triangle\))
(b) \[ \angle PSR = 360^\circ - 144^\circ - 92^\circ = 124^\circ \]

Unit 7.4 – Angle Properties Within A Trapezium
Qn 1
\[ \angle CDB = 180^\circ - 120^\circ = 30^\circ \]
\[ \frac{2}{2} = 30^\circ \] (isosceles \(\triangle\))
(a) \[ \angle BDE = 78^\circ - 30^\circ = 48^\circ \]
(b) \[ \angle BEA = 78^\circ \] (corresponding \(\angle\))
\[ \angle EBC = 180^\circ - 120^\circ = 60^\circ \] (interior \(\angle\))
\[ \angle EBA = 130^\circ - 60^\circ = 70^\circ \]
\[ \angle BAE = 180^\circ - 78^\circ - 70^\circ = 32^\circ \] (sum of \(\angle\)s in a \(\triangle\))

Qn 2
\[ 180^\circ - 118^\circ = 62^\circ \] (on straight line)
\[ \angle y = 180^\circ - 84^\circ - 62^\circ = 34^\circ \] (sum of \(\angle\)s)
\[ \angle x = \angle y = 34^\circ \] (alt. \(\angle\))

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Qn 3
\[
\angle DAB = 180^\circ - 86^\circ = 94^\circ \\
\angle ABD = \frac{180^\circ - 94^\circ}{2} = 43^\circ \\
\angle y = 180^\circ - 88^\circ - 43^\circ = 49^\circ \text{ (interior } \angle s) \\
\angle x = 180^\circ - 86^\circ = 94^\circ \text{ (interior } \angle s)
\]

Qn 4
\[
\angle y = 90^\circ - 48^\circ = 42^\circ \text{ (2 interior } \angle s = 1 \text{ exterior } \angle)
\]

Qn 5
\[
\angle BFC = 54^\circ \text{ (alternate } \angle) \\
\text{(a) } \angle t = 180^\circ - 57^\circ - 54^\circ = 69^\circ \\
\text{(b) } \angle y = 69^\circ - 54^\circ = 15^\circ \\
\text{(c) } \angle BAF = 54^\circ \text{ (isosceles } \triangle) \\
\text{ } \angle x = 180^\circ - 54^\circ - 54^\circ = 72^\circ \text{ (sum of isosceles } \angle) \\
\text{(d) } \angle u = \angle \triangle \text{CBE} = 57^\circ \text{ (alternate } \angle)
\]

Chapter 8 Area of Triangle

Unit 8.1 – Area of Triangle

Qn 1

<table>
<thead>
<tr>
<th>Height = AB</th>
<th>Height = AF</th>
</tr>
</thead>
<tbody>
<tr>
<td>12 cm</td>
<td>16 cm</td>
</tr>
</tbody>
</table>

Qn 2

<table>
<thead>
<tr>
<th>Base = 12 cm</th>
<th>Height = 16 cm</th>
</tr>
</thead>
<tbody>
<tr>
<td>4 cm</td>
<td>7 cm</td>
</tr>
</tbody>
</table>

Qn 3

<table>
<thead>
<tr>
<th>Base = 5 cm</th>
<th>Height = 20 cm</th>
</tr>
</thead>
<tbody>
<tr>
<td>14 cm</td>
<td>7 cm</td>
</tr>
</tbody>
</table>

Qn 4

<table>
<thead>
<tr>
<th>Base = 4 cm + 8 cm</th>
<th>Height = 8 cm – 5 cm</th>
</tr>
</thead>
<tbody>
<tr>
<td>12 cm</td>
<td>3 cm</td>
</tr>
</tbody>
</table>

Qn 5

<table>
<thead>
<tr>
<th>Area of (\triangle BCD)</th>
</tr>
</thead>
<tbody>
<tr>
<td>(\frac{1}{2} \times 18 \times 12)</td>
</tr>
<tr>
<td>(\frac{1}{2} \times 8 \times DF)</td>
</tr>
<tr>
<td>DF = 18 \times 8 \div 12 = 12 cm</td>
</tr>
</tbody>
</table>

Qn 6

<table>
<thead>
<tr>
<th>Area of shaded (\triangle BCD)</th>
</tr>
</thead>
<tbody>
<tr>
<td>(\frac{1}{2} \times 20 \times CE)</td>
</tr>
<tr>
<td>(\frac{1}{2} \times 16 \times 15)</td>
</tr>
<tr>
<td>CE = 16 \times 15 \div 20 = 12 cm</td>
</tr>
</tbody>
</table>

Qn 9

<table>
<thead>
<tr>
<th>Area of (\triangle ABC)</th>
</tr>
</thead>
<tbody>
<tr>
<td>(\frac{1}{2} \times 15 \times 20)</td>
</tr>
<tr>
<td>(\frac{1}{2} \times 30 \times BD)</td>
</tr>
<tr>
<td>BD = 15 \times 20 \div 30 = 10 cm</td>
</tr>
</tbody>
</table>

Qn 10

<table>
<thead>
<tr>
<th>Area of shaded (\triangle ABC)</th>
</tr>
</thead>
<tbody>
<tr>
<td>(\frac{1}{2} \times 12 \times AB)</td>
</tr>
<tr>
<td>(\frac{1}{2} \times 28 \times 18)</td>
</tr>
<tr>
<td>AB = 28 \times 18 \div 12 = 42 cm</td>
</tr>
</tbody>
</table>

Unit 8.2 – Finding the Area of a Triangle in Unit Squares

Qn 1

(a) Triangle
\(= (6 \times 6) - (\frac{1}{2} \times 4 \times 2) - (\frac{1}{2} \times 6 \times 2) - (\frac{1}{2} \times 2 \times 3) = 36 cm^2 - 4 cm^2 - 6 cm^2 - 4 cm^2 = 14 cm^2\)

(b) Triangle
\(= (6 \times 6) - (\frac{1}{2} \times 4 \times 6) - (\frac{1}{2} \times 3 \times 4) = 36 cm^2 - 12 cm^2 - 12 cm^2 = 12 cm^2\)

Qn 2

(a) Triangle
\(= (4 \times 6) - (\frac{1}{2} \times 6 \times 1) - (\frac{1}{2} \times 3 \times 4) - (\frac{1}{2} \times 4 \times 2) = 24 cm^2 - 3 cm^2 - 6 cm^2 - 4 cm^2 = 11 cm^2\)

(b) Triangle
\(= (6 \times 5) - (\frac{1}{2} \times 6 \times 2) - (\frac{1}{2} \times 6 \times 3) = 30 cm^2 - 6 cm^2 - 9 cm^2 = 15 cm^2\)

Qn 3

(a) Shaded
\(= (6 \times 6) - (\frac{1}{2} \times 4 \times 2) - (\frac{1}{2} \times 3 \times 2) - (\frac{1}{2} \times 3 \times 1) - (\frac{1}{2} \times 4 \times 2) = 36 cm^2 - 4 cm^2 - 3 cm^2 - 1.5 cm^2 - 4 cm^2 = 23.5 cm^2\)

(b) Shaded
\(= (6 \times 6) - (\frac{1}{2} \times 5 \times 4) - (4 \times 2) - (\frac{1}{2} \times 2 \times 2) - (\frac{1}{2} \times 6 \times 1) = 36 cm^2 - 10 cm^2 - 8 cm^2 - 2 cm^2 - 3 cm^2 = 13 cm^2\)

Qn 4

(a) Area of rectangle = 6 cm \times 5 cm = 30 cm^2

Area of Region A = \(\frac{1}{2} \times 6 cm \times 1 cm = 3 cm^2\)
Qn 4 (Cont.)

Area of Region B = \( \frac{1}{2} \times 5 \text{ cm} \times 3 \text{ cm} \)
= 7.5 cm²

Area of region C = \( \frac{1}{2} \times 2 \text{ cm} \times 3 \text{ cm} \)
= 3 cm²

Shaded area = 30 cm² – 3 cm² – 7.5 cm² – 3 cm²
= 16.5 cm²

(b) Area of rectangle = 6 cm × 6 cm
= 36 cm²

Area of Region A = \( \frac{1}{2} \times 4 \text{ cm} \times 2 \text{ cm} \)
= 4 cm²

Area of Region B = \( \frac{1}{2} \times 2 \text{ cm} \times 3 \text{ cm} \)
= 3 cm²

Area of region C = \( \frac{1}{2} \times 6 \text{ cm} \times 3 \text{ cm} \)
= 9 cm²

Shaded area = 36 cm² – 9 cm² – 4 cm² – 3 cm²
= 20 cm²

Unit 8.3 – Triangle with Common Base or Height

Qn 1

Area of rectangle = (11 × 8)
= 88 cm²

Area of 3 ∆s
= \( \frac{1}{2} \times 11 \times 3 \) + \( \frac{1}{2} \times 8 \times 8 \) + \( \frac{1}{2} \times 5 \times 3 \)
= 16.5 cm² + 32 cm² + 7.5 cm²
= 56 cm²

Area of shaded triangle = 88 cm² – 56 cm²
= 32 cm²

Qn 2

Area of 1 triangle = \( \frac{1}{2} \times b \times h \)
= \( \frac{1}{2} \times 10 \text{ cm} \times 10 \text{ cm} \)
= 50 cm²

Area of shaded parts = 2 triangles
= 2 × 50 cm²
= 100 cm²

Qn 3

Area of big triangle = \( \frac{1}{2} \times 20 \text{ cm} \times 10 \text{ cm} \)
= 100 cm²

Area of small triangle = \( \frac{1}{2} \times 10 \text{ cm} \times 10 \text{ cm} \)
= 50 cm²

Area of shaded parts = 100 cm² + 50 cm²
= 150 cm²

Qn 4

Area of 1 triangle = \( \frac{1}{2} \times b \times h \)
= \( \frac{1}{2} \times 20 \text{ cm} \times 10 \text{ cm} \)
= 100 cm²

Area of shaded parts = 2 triangles
= 2 × 100 cm²
= 200 cm²

Qn 5

Area of 1 triangle = \( \frac{1}{2} \times b \times h \)
= \( \frac{1}{2} \times 10 \text{ cm} \times 10 \text{ cm} \)
= 50 cm²

Area of shaded parts = 2 triangles
= 2 × 50 cm²
= 100 cm²

Qn 6

\( \triangle \text{DEC is } \frac{1}{4} \text{ of square ABCD.} \)

\( \triangle \text{CBF is } \frac{1}{4} \text{ of square ABCD.} \)

\( \triangle \text{AEF is } \frac{1}{8} \text{ of square ABCD.} \)

Shaded triangle = 1 – \( \frac{1}{4} \) – \( \frac{1}{4} \) – \( \frac{1}{8} \)
= \( \frac{3}{8} \) square ABCD
= \( \frac{3}{8} \times 48 \text{ cm}² \)
= 18 cm²

Qn 7

Area of shaded triangle = \( \frac{1}{2} \times 7 \times 5 \)
= 17.5 cm²

Unit 8.4 – Triangles with Common Bases

Qn 1

Area of shaded parts = \( \frac{1}{2} \times 20 \text{ cm} \times 6 \text{ cm} \)
= 60 cm²

Qn 2

Area of shaded parts = \( \frac{1}{2} \times 20 \text{ cm} \times 12 \text{ cm} \)
= 120 cm²

Qn 3

Since the 2 ∆s share the same base AC
BE : DF = Area of \( \triangle \text{ABC} \) : Area of \( \triangle \text{ADC} \)
= 1 : 3

Difference in area = shaded part
= 2 units

2 units = 64 cm²
1 unit = 32 cm²
\( \frac{1}{2} \times AC \times BE = 32 \text{ cm}² \)
\( \frac{1}{2} \times AC \times 4 = 32 \text{ cm}² \)
AC = 32 cm² ÷ 2 cm
= 16 cm

Qn 4

Since the two ∆s share the same base, AC
BE : DF = Area of \( \triangle \text{ABF} \) : Area of \( \triangle \text{ADC} \)
= 1 : 4
Qn 4 (Cont.)
Difference in area = shaded part
= 3 units
3 units = 48 cm²
1 unit = 16 cm²
\[ \frac{1}{2} \times AC \times BE = 16 \text{ cm}^2 \]
\[ \frac{1}{2} \times AC \times 2 \text{ cm} = 16 \text{ cm}^2 \]
AC = 16 cm

Qn 5
Since the 2 \( \Delta \)s share the same base BD
AE : FC = 5 : 3
Area of \( \Delta ABD \) : Area of \( \Delta BCD \)
Area of \( \Delta ABD \) = 30 cm² : 18 cm²
Entire quadrilateral = 30 cm² + 18 cm²
= 48 cm²

Qn 6
Area of shaded region
\[ = \left( \frac{1}{2} \times 8 \times 20 \right) + \left( \frac{1}{2} \times 12 \times 25 \right) \]
\[ = 80 \text{ cm}^2 + 150 \text{ cm}^2 \]
\[ = 230 \text{ cm}^2 \]

Qn 7
Area of shaded parts
\[ = \left( \frac{1}{2} \times 18 \times 10 \right) + \left( \frac{1}{2} \times 12 \times 10 \right) \]
\[ = 90 \text{ cm}^2 + 60 \text{ cm}^2 \]
\[ = 150 \text{ cm}^2 \]

Qn 8
5 units = 30 cm
1 unit = 6 cm
AB = 1 unit = 6 cm
DE = 4 units = 24 cm
Area of shaded parts
\[ = \left( \frac{1}{2} \times 24 \times 10 \right) + \left( \frac{1}{2} \times 6 \times 10 \right) \]
\[ = 120 \text{ cm}^2 + 30 \text{ cm}^2 \]
\[ = 150 \text{ cm}^2 \]

Unit 8.5 – Composite Figures Involving Triangles
Qn 1
Area of 1 triangle = \( \frac{1}{2} \times 12 \text{ cm} \times 8 \text{ cm} \)
= 48 cm²
Area of figure = 48 cm² \( \times 5 \)
= 240 cm²

Qn 2
Area of 1 triangle = \( \frac{1}{2} \times 12 \text{ cm} \times 10 \text{ cm} \)
= 60 cm²
Area of 8 triangles = 60 cm² \( \times 8 \)
= 480 cm²

Qn 3
Area of 1 triangle = \( \frac{1}{2} \times 10 \text{ cm} \times 8 \text{ cm} \)
= 40 cm²
Area of figure = 40 cm² \( \times 6 \)
= 240 cm²

\[ P + R = \frac{1}{2} \text{ rectangle ABCD} \]
\[ = Q + S \]
\[ S = 24 \text{ cm}^2 + 45 \text{ cm}^2 - 20 \text{ cm}^2 \]
\[ = 49 \text{ cm}^2 \]

Qn 5
Figure 1, Perimeter = \((21 \text{ cm} - 5 \text{ cm} - 5 \text{ cm}) \times 4 \)
= 44 cm
Figure 2, Perimeter = \(21 \text{ cm} \times 2 \)
= 42 cm

Chapter 9 Percentage
Unit 9.1 – Percentage Increase
Qn 1
20% of original \( \rightarrow 85 \)
100% of original \( \rightarrow 5 \times 85 = 425 \)

Qn 2
100% of original \( \rightarrow 1800 \)
1% of original \( \rightarrow 1800 \div 100 = 18 \)
15% of original \( \rightarrow 18 \times 15 = 270 \)

Qn 3
At first
Girls \( \rightarrow 40% \)
Boys \( \rightarrow 60% \)
Bernard \( \rightarrow 70% \)
Self \( \rightarrow 30% \)
Wife \( \rightarrow 10% \)
 Difference \( \rightarrow 40% \) of the sum = $120
1% of the sum \( \rightarrow $120 \div 100 = $1 \)
30% of total \( \rightarrow 30 \times $1 = $30 \)
60% of total \( \rightarrow 60 \times $1 = $60 \)
70% of total \( \rightarrow 70 \times $1 = $70 \)
80% of total \( \rightarrow 80 \times $1 = $80 \)
90% of total \( \rightarrow 90 \times $1 = $90 \)

Qn 4
20% of his salary \( \rightarrow $800 \)
1% of his salary \( \rightarrow $800 \div 20 = $40 \)
100% of his salary \( \rightarrow $800 \times 100 = $8000 \)

Qn 5
20% of his salary \( \rightarrow $800 \)
1% of his salary \( \rightarrow $800 \times 20 = $40 \)
100% of his salary \( \rightarrow $800 \times 100 = $8000 \)

Qn 6
30% of boys \( \rightarrow 30% \) of total + 36
1% of boys \( \rightarrow 1% \) of total + 1.2
100% of total \( \rightarrow 12 \times 100 = 120 \)
Boys at first \( \rightarrow 120 + 120 = 240 \)

Unit 9.2 – Multiplication in Percentage
Qn 1
Janice \( \rightarrow 120% \)
David \( \rightarrow 100% \)
Decrease in Janice’s savings \( \rightarrow 20% \) of 120%
\[ = \frac{1}{5} \times 120% = 24\% \]
196% \( \rightarrow $980 \)
1% \( \rightarrow $5 \)
Janice’s savings at first \( \rightarrow 120\% \)
\( \rightarrow 120 \times $5 = $600 \)

Qn 2
Income
100% \( \begin{cases} \text{Wife} & \rightarrow 30\% \text{ of total} \\ \text{Self} & \rightarrow 70\% \end{cases} \)
Income
120% \( \begin{cases} \text{Wife} & \rightarrow \frac{30}{100} \times 120\% = 36\% \\ \text{Self} & \rightarrow 120\% - 36\% = 84\% \end{cases} \)
Qn 2 (Cont.)

Increase in wife’s income → 6% → $240
1% → $40
Income before increase = $100 x 40 = $4000

Qn 3
Salary → 100%
Savings → 45%
Expenditure → 55%
Salary → 80%
Savings → $45 x 80% = 36%
Decrease in savings = 45% - 36% = 9%
9% → $90
1% → $10
Salary at first → 100 x $10 = $1000

Qn 4
Amount of water left → 60% of 60%
3/5 x 60% = 36%
36% → 72 litres
1% → 2 litres
Volume of water the tank can hold → 100% → 100 x 2 = 200 litres

Qn 5
At first
Red : 125%
Blue : 100%
Decrease
Red : 40
125% → 2/5 x 125% = 50%
Increase
Blue : 100% x 100% = 10%
End
Red : 125% - 50% = 75%
Blue : 100% + 10% = 110%
Difference
35% → 70
1% → 2
Number of blue marbles at first → 100%
100% → 200

Qn 6
At first
Muthu : 90%
Esther : 100%
Increase
Muthu : 20
120% x 90% = 18%
Decrease
Esther : 20%
End
Muthu : 90% + 18% = 108%
Esther : 100% - 20% = 80%
Difference
28% → $560
1% → $20
Muthu’s salary in the end → 108%
→ 108 x $20 = $2160

Qn 7

C : M : E : Total
4 : 3 : 8 : 13
12u = 3900
1u = 3900 ÷ 13
= 300
C (at first) = 4 x 300
= 1200
C (increase) = 2/5 x 1200
= 240
E (at first) = 6 x 300
= 1800
M (at first) = 3 x 300
= 900
M (increase) = 3/4 x 900
= 675
E (increase) = 5/6 x 675
= 562.5
Percentage increase = 162.5 x 100%
= 10%

Qn 8

V : N : Total
3 : b : 6 : 5
V : 45 : 7 : 5
15 : 20 : 35
V (new mass) = 7 x 15u
= 21u
N (new mass) = 35u + 21u
= 56u
Change in Nathanial’s mass = 20u + 14u
= 24u
Percentage decrease in Nathanial’s mass
= 56 x 100%
= 30%

Qn 9

New length = 7 x 28 cm
= 56 cm
New breadth = 5/4 x 20 cm
= 25 cm
New perimeter = 25 cm + 30 cm + 35 cm + 30 cm
= 130 cm

Qn 10

New length = 5/4 x 20 cm
= 25 cm
New breadth = 5/4 x 16 cm
= 20 cm
New area = 25 cm x 20 cm
= 500 cm²
Old area = 20 cm x 16 cm
= 320 cm²
Change in area = 500 cm² - 320 cm²
= 180 cm²
Percentage increase = 180 x 100%
= 56.25%
Unit 9.3 – Overlapping Percentage

Qn 1
100% – 10% = 90% (Grade A Math)
80% + 35% = 115% (Grade B Math)
Percentage of students who chose both grades
115% – 90% = 25%
1% → 3
Total number of students → 100% → 3 x 100 = 300

Qn 2
100% – 10% = 90%
70% + 45% = 115%
Percentage of children who went for both rides
115% – 90% = 25%
25% of total = 75
1% of total = 3
Total number of children who did not go for either of the two rides → 10% → 3 x 10 = 30

Qn 3
100% – 5% = 95%
65% + 75% = 140%
Percentage of students who like both table tennis and badminton = 140% – 95% = 45%
45% → 90
1% → 2
Number of students involved → 100% → 100 x 2 = 200

Qn 4
100% – 16% = 84%
82% + 54% = 136%
Percentage of pupils who do not like any of the 2 sports = 136% – 84% = 52%
Number of pupils who enjoyed both swimming and jogging
52
100 x 200
= 104

Unit 9.4 – GST and Annual Interest

Qn 1
107% → $513.60
1% → $513.60 ÷ 107 = $4.80
100% → $4.80 x 100 = $480

Qn 2
7% → $129.50
1% → $129.50 ÷ 7 = $18.50
100% → $18.50 x 100 = $1850

Qn 3
Difference in GST → 7%
7% → = $28
Difference in price without GST → $2000 – $400 = $1600
Cost of dryer without GST → $480
Cost of dryer with GST → 107 x $800 = $856

Qn 4
GST of haversack → $85.60
1% → $85.60 ÷ 107 = $0.80
Price of pants inclusive of GST → $7.70 x 107 = $117.70

Qn 5
Total cost before GST → 4 x $180 = $720
GST → 7 x $720 = $50.40

Qn 6
Total cost without GST → 100% → $2568
1 unit = $2400 + 4
= $600
Cost of laptop without GST = 3 x $600
= $1800
Cost of laptop inclusive of GST = 1.07 x $1800
= $1926

Unit 9.5 – Simple Interest

Qn 1
Interest = 100 x $30000 = $3000
= $2137.50
Total amount = $2137.50 + $30000
= $323750

Qn 2
Simple interest for a year = $1440 ÷ 4
= $360
Original sum = 100 x $360
= $36000

Qn 3
Interest for 4 years → $3000 x 4 x 3
= $360
Total owed to the bank → $4200 + $30000
= $34200

Qn 4
Interest for 3 years → 3 x $30000 = $4200
(Principal amount) 100% → $3360 x 100 = $336000
On 5
(a) 2% → $72
1% → $72 ÷ 2 = $36
100% → $36 × 100 = $3600
(b) Total sum after 4 years → $3600 + $72 × 4 = $3888

On 6
Total amount owed (Mr Krishnan) → 100% + 3.5 × 4 = 114%
Total amount owed (Mr Lim) → 100% + 3% × 4 = 112%
Difference → 114% - 112% = 2%
Amount each borrowed → $100 ÷ 2 = $50

Unit 9.6 - Discount and Percentage Discount

Qn 1
Discounted price of 1 torch = $200 ÷ 25
= $8
Original price of 1 torch = $100 ÷ 10
= $10

Qn 2
Usual price of wallet = $100 × $144
= $180
Discount given to wallet = $180 - $144
= $36
Discount given to handbag = $78 - $36
= $42
Original price of handbag = $42 + $238
= $280
Percentage discount for the handbag = $42 ÷ $280 × 100%
= 15%

Qn 3
Discounted bill without GST = $3888 ÷ $252
= $150
Original bill = $3888 ÷ $252
= $150

Qn 4
100% of usual price = $150
1% of usual price = $150 ÷ 100
= $1.50
90% of usual price = $90 ÷ $1.50
= $135
100% of discounted price = $135
1% of discounted price = $135 ÷ 100
= $1.35
95% of discounted price = $95 ÷ $1.35
= $128.25

Qn 5
Discounted price of 1 muffin = $10 ÷ 5
= $2
Original price of 1 muffin = $10 ÷ $2
= $5

Qn 6
At first,
Sells at 10% discount → sell at 90% of the usual selling price
Sells at 30% discount → sell at 70% of the usual selling price
Difference in the selling price → 20% of selling price
= $30 ÷ $10
20% of selling price → $40
1% of selling price → $2

Visit the forum page at www.onSponge.com for more challenging problem sums.
Qn 5
Chocolate left is equal to twice cheese left
20% chocolate = 2 × 25% cheese
20% chocolate = 50% cheese
\( \frac{1}{3} \) chocolate = \( \frac{1}{3} \) cheese
Total = 7 units
7 units = 350
1 unit = 50
Total chocolate muffins given away
= 4 × 50
= 200

Qn 6
The number of girls left is twice the number of boys left.
70% of girls = 2 × 20% of boys
70% of girls = 40% of boys
\( \frac{7}{10} \) of girls = \( \frac{2}{5} \) of boys
\( \frac{14}{20} \) of girls = \( \frac{14}{35} \) of boys
Boys = 35 units
Girls = 20 units
Difference = 15 units
15 units = 90
1 unit = 90 ÷ 15
= 6
Total students = 35 units + 20 units
= 55 units
55 units ÷ 6
= 330

Unit 9.8 – External Unchanged
Qn 1
At first
Boys : 60% (3 units) x 7 (21 units)
Girls : 40% (2 units) x 7 (14 units)

End
Boys : 70% (7 units) x 3 (21 units)
Girls : 30% (3 units) x 3 (9 units)
Decrease = 5 units
5 units = 5
1 unit = 1
Total number of students in the end = 30 x 1
= 30

Qn 2
At first
Children : 40% (2 units) x 3 (6 units)
Adults : 100% (5 units) x 3 (15 units)

End
Children : 60% (3 units) x 2 (6 units)
Adults : 40% (2 units) x 2 (4 units)
Decrease in adults = 11 units
11 units = 22
1 unit = 2
Total children in the bus = 6 x 2
= 12

Qn 3
At first
Lemons : 30% (3 units)
Others : 70% (7 units)

End
Lemons : 50% (1 unit) x 7 (7 units)
Others : 50% (1 unit) x 7 (7 units)

Qn 3 (Cont.)
Increase = 4 units
4 units = 40
1 unit = 40 ÷ 4
= 10
Number of lemons at first = 3 x 10
= 30

Qn 4
At first
Girls : 40% (2 units) x 3 (6 units)
Boys : 60% (3 units) x 3 (9 units)
End
Girls : 55% (11 units)
Boys : 45% (9 units)
Increase in girls = 5 units
5 units = 20
1 unit = 4
No. of boys at telematch = 9 x 4
= 36

Units 9.9 – Repeated Identity
Qn 1
Ramesh : 130% (13 units) x 3
Arun : 100% (10 units) x 3
\( R : A : J \)
39 : 30 : 65
Ramesh : 60% (3 units)
Jody : 100% (5 units)
Total number of cards
= 39 units + 30 units + 65 cards
= 134 units
134 units = 402
1 unit = 402 ÷ 134
= 3
Number of cards Jody have = 65 units
= 65 x 3
= 195

Qn 2
David : 90% (9 units) x 7
Ian : 100% (10 units) x 7
David : 140% (7 units) x 9
Rauf : 100% (5 units) x 9
\( D : I : R \)
63 : 70 : 45
David : 140% (7 units) x 9
Rauf : 100% (5 units) x 9
Total number of cookies
= 63 units + 70 units + 45 units
= 178 units
178 units = 890
1 unit = 890 ÷ 178
= 5
Number of cookies Ian have = 70 units
= 70 x 5
= 350

Qn 3
Fiona : 125% (5 units) x 9
Helen : 100% (4 units) x 9
\( F : H : D \)
45 : 36 : 50
Fiona : 90% (9 units) x 5
Daniel : 100% (10 units) x 5
Difference between Daniel’s scores and Helen’s score
= 50 units – 36 units
= 14 units
14 units = 28
1 unit = 28 ÷ 14
= 2
Fiona’s score for the test = 45 x 2
= 90
Qn 4

<table>
<thead>
<tr>
<th>Boys</th>
<th>40% (2 units) x 5</th>
</tr>
</thead>
<tbody>
<tr>
<td>Girls</td>
<td>100% (5 units) x 5</td>
</tr>
</tbody>
</table>

\[
A : B = 42 : 10 : 25
\]

<table>
<thead>
<tr>
<th>Adults</th>
<th>120% (6 units) x 7</th>
</tr>
</thead>
<tbody>
<tr>
<td>Children</td>
<td>100% (5 units) x 7</td>
</tr>
</tbody>
</table>

Difference = 42 units - 25 units = 17 units

17 units = 34
1 unit = 2
Total people at the party = 77 units
= 77 x 2
= 154

---

Qn 5

<table>
<thead>
<tr>
<th>Red</th>
<th>75% (3 units) x 4</th>
</tr>
</thead>
<tbody>
<tr>
<td>Blue</td>
<td>100% (4 units) x 4</td>
</tr>
<tr>
<td>Green</td>
<td>80% (4 units) x 3</td>
</tr>
</tbody>
</table>

\[
R : B : G = 12 : 16 : 15
\]

Difference between blue marbles and green marbles = 16 units - 15 units = 1 unit
1 unit = 35
Total number of marbles in the bag = 43 x 35 = 1505

---

Qn 6

<table>
<thead>
<tr>
<th>Shop A</th>
<th>120% (6 units) x 4</th>
</tr>
</thead>
<tbody>
<tr>
<td>Shop B</td>
<td>100% (5 units) x 4</td>
</tr>
<tr>
<td>Shop C</td>
<td>80% (4 units) x 5</td>
</tr>
</tbody>
</table>

\[
A : B : C = 24 : 20 : 25
\]

Total number of log cakes sold = 24 units + 20 units + 25 units = 69 units
69 units = 345
1 unit = 345 + 69 = 5

Difference between C and A = 5
Shop C sold 5 more log cakes than Shop A.

---

Qn 7

\[
Y : L : T = 8u : 5u : 6u
\]

Tang = 75% (3 units) x 2
Tang = 6u x 1.5 = 9u (Difference of 3u)
Yeo & Lim gave away in ratio of 3 : 1 (Total of 4p)

\[
Y : L : T = 8u : 5u : 6u
\]

Since 3u = 4p
12u = 4p
3u = 1p

Difference = 23 units - 17 units = 6 units
6 units = 240
1 unit = 40
9 units = 9 x 40 = 360

---

Unit 9.10 – Unchanged Total

The forum page at www.onSponge.com for more challenging problem sums.
**Unit 9.11 – Constant Difference**

**Qn 1**
- Boys: 30% (3 units) = 9 units
- Girls: 70% (7 units) = 21 units
- Difference: 4 units

- Boys: 60% (3 units) × 2 = 6 units
- Girls: 100% (5 units) × 2 = 10 units
- Difference: 2 units × 2 = 4 units

- Increase each = 6 units – 3 units = 3 units
- 3 units = 9
- 1 unit = 3
- Total number of students in the end = 16 units
  - 16 × 3 = 48

**Qn 2**
- Alan: 75% (3 units) × 3 = 9 units
- Kumar: 100% (4 units) × 3 = 12 units
- Difference = 1 unit × 3 = 3 units

- Alan: 25% (1 unit)
- Kumar: 100% (4 units)
- Difference = 3 units

- Decrease each = 9 units – 1 unit = 8 units

**Qn 3**
- At first
  - X : Y = 10 : 12
  - End
  - X : Y = 3 : 5

- 10 units = 1680
- 1 unit = 168
- 3 units = 168 × 3 = 504

- Increase each = 12 units – 11 units = 1 unit
- Number of shirts Shop X had in the end = 11 × 75 = 825

**Qn 4**
- Shop X: 4 units × 3 = 12 units
- Shop Y: 7 units × 3 = 21 units
- Difference: 3 units × 3 = 9 units
- Shop X: 55% (11 units)
- Shop Y: 100% (20 units)
- Difference: 9 units

- Decrease each = 12 units – 11 units = 1 unit
- 1 unit = 75
- Number of shirts Shop X had in the end = 11 × 75 = 825

**Unit 9.12 – External Changed**

**Qn 1**

<table>
<thead>
<tr>
<th>20-cent</th>
<th>50-cent</th>
</tr>
</thead>
<tbody>
<tr>
<td>3 units</td>
<td>4 units</td>
</tr>
<tr>
<td>15 units</td>
<td>28 units</td>
</tr>
</tbody>
</table>

- 7 parts × 5 parts = 35 parts
- 3 parts × 5 parts = 15 parts
- 5 parts × 5 parts = 25 parts
- 5 parts × 5 parts = 25 parts
- 5 parts × 5 parts = 25 parts
- 5 parts × 5 parts = 25 parts
- 5 parts × 5 parts = 25 parts
### Qn 1 (Cont.)

<table>
<thead>
<tr>
<th>20-cent</th>
<th>50-cent</th>
</tr>
</thead>
<tbody>
<tr>
<td>15 units</td>
<td>125</td>
</tr>
<tr>
<td></td>
<td>70</td>
</tr>
<tr>
<td>28 units</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
</tr>
<tr>
<td>35 units</td>
<td></td>
</tr>
</tbody>
</table>

13 units = 125 + 70 = 195
1 unit = 195 ÷ 13 = 5

At first
Number of 20-cent coins = 3 × 15 = 45
Number of 50-cent coins = 4 × 15 = 60
Total amount of money = ($0.20 × 45) + ($0.50 × 60)
= $9 + $30
= $39

### Qn 2

<table>
<thead>
<tr>
<th></th>
<th>Elias</th>
<th>Ramesh</th>
</tr>
</thead>
<tbody>
<tr>
<td>x4</td>
<td>45% (9 units)</td>
<td>100% (20 units)</td>
</tr>
<tr>
<td></td>
<td>36 units</td>
<td>156</td>
</tr>
<tr>
<td>x4</td>
<td>75% (3p)</td>
<td>100% (4p)</td>
</tr>
<tr>
<td></td>
<td>60 units</td>
<td>60</td>
</tr>
</tbody>
</table>

24 units = 96
1 unit = 4
Total Elias at first = 9 × 4 = 36

### Qn 3

Last year: 90% → 9 units
100% → 10 units
In the end: 70% → 7 parts
100% → 10 parts

<table>
<thead>
<tr>
<th></th>
<th>School X</th>
<th>School Y</th>
</tr>
</thead>
<tbody>
<tr>
<td>x10</td>
<td>9 units</td>
<td>10 units</td>
</tr>
<tr>
<td></td>
<td>+200</td>
<td>+200</td>
</tr>
<tr>
<td></td>
<td>-220</td>
<td>-220</td>
</tr>
<tr>
<td></td>
<td>7 parts</td>
<td>10 parts</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>70 parts</td>
<td>70 parts</td>
</tr>
<tr>
<td></td>
<td>90 units</td>
<td>70 units</td>
</tr>
<tr>
<td></td>
<td>70 units</td>
<td>1400</td>
</tr>
<tr>
<td></td>
<td>70 units</td>
<td>2200</td>
</tr>
<tr>
<td></td>
<td>20 units</td>
<td>20 units</td>
</tr>
</tbody>
</table>

20 units = 1400 + 2200 = 3600
1 unit = 3600 ÷ 20 = 180
Number of students who enrolled into School X last year
= 9 × 180
= 1620
Number of students who enrolled into School Y last year
= 10 × 180
= 1800

### Qn 4

75% → 3 units
100% → 4 units

<table>
<thead>
<tr>
<th></th>
<th>Daniel</th>
<th>Annabel</th>
</tr>
</thead>
<tbody>
<tr>
<td>x8</td>
<td>+$20</td>
<td>+$40</td>
</tr>
<tr>
<td></td>
<td>3 units</td>
<td>4 units</td>
</tr>
<tr>
<td></td>
<td>5 parts</td>
<td>8 parts</td>
</tr>
<tr>
<td>+$160</td>
<td>20 units</td>
<td>$200</td>
</tr>
<tr>
<td></td>
<td>40 parts</td>
<td></td>
</tr>
</tbody>
</table>

4 units = $40

Daniel’s savings at first = 3 × $10 = $30

### Qn 5

<table>
<thead>
<tr>
<th></th>
<th>Chickens</th>
<th>Ducks</th>
</tr>
</thead>
<tbody>
<tr>
<td>x4</td>
<td>5 units</td>
<td>8 units</td>
</tr>
<tr>
<td></td>
<td>-50</td>
<td>-8</td>
</tr>
<tr>
<td>4 × (25%)</td>
<td>1p</td>
<td>4p (100%)</td>
</tr>
</tbody>
</table>

Chickens = 20 units
Ducks = 8 units

12 units = 192
1 unit = 16
Ducks at first = 8 × 16 = 128

### Qn 6

May: 90% → 9 units
100% → 10 units
June: 80% → 4 units
100% → 5 parts

<table>
<thead>
<tr>
<th></th>
<th>Mrs Tan</th>
<th>Mrs Ismal</th>
</tr>
</thead>
<tbody>
<tr>
<td>x5</td>
<td>9 units</td>
<td>10 units</td>
</tr>
<tr>
<td></td>
<td>-400</td>
<td>+600</td>
</tr>
<tr>
<td></td>
<td>+4 units</td>
<td>4 parts</td>
</tr>
<tr>
<td></td>
<td>+2000</td>
<td>+2400</td>
</tr>
</tbody>
</table>

Mrs Tan’s salary in May = 9 × $80 = $720

### Chapter 10 Volume

#### Unit 10.1 – Finding Volume of a Cuboid with Given Dimension

### Qn 1

Volume of cuboid = L × B × H
= 9 cm × 5 cm × 6 cm
= 270 cm³

### Qn 2

Volume of cuboid = L × B × H
= 5 cm × 4 cm × 12 cm
= 240 cm³

### Qn 3

Capacity of tank = L × B × H
= 30 cm × 20 cm × 12 cm
= 7200 cm³

### Qn 4

Volume of water = L × B × H
= 40 cm × 25 cm × 10 cm
= 10 000 cm³

### Qn 5

Volume of water = L × B × H
= 20 cm × 20 cm × 25 cm
= 10 000 cm³

Visit the forum page at www.onSponge.com for more challenging problem sums.
Qn 6
Volume of water = L x B x H
= \( \frac{3}{3} \times 12 \text{ cm} \times 12 \text{ cm} \times 20 \text{ cm} \)
= 1728 cm³

Qn 7
Volume of water = L x B x H
= \( \frac{2}{3} \times 18 \text{ cm} \times 18 \text{ cm} \times 24 \text{ cm} \)
= 5184 cm³

Qn 8
\( \frac{2}{3} \) of tank = 3600 mℓ
\( \frac{1}{3} \) of tank = 1800 mℓ
Volume of water the tank can hold = 1800 cm³ x 3 = 5400 cm³

Qn 9
\( \frac{3}{4} \) of tank = 8400 cm³
\( \frac{1}{4} \) of tank = 4200 cm³
Full tank = 4200 cm³ x 3 = 12600 cm³

Qn 10
Height : Width : Length
4 : 1 : 2

<table>
<thead>
<tr>
<th>Height</th>
<th>Width</th>
<th>Length</th>
</tr>
</thead>
<tbody>
<tr>
<td>4 units</td>
<td>20 cm</td>
<td></td>
</tr>
<tr>
<td>1 unit</td>
<td>5 cm</td>
<td></td>
</tr>
<tr>
<td>Height</td>
<td>20 cm</td>
<td></td>
</tr>
<tr>
<td>Width</td>
<td>5 cm</td>
<td></td>
</tr>
<tr>
<td>Length</td>
<td>2 x 5 cm</td>
<td>10 cm</td>
</tr>
<tr>
<td>Volume</td>
<td>L x B x H</td>
<td>= 1000 cm³</td>
</tr>
</tbody>
</table>

Qn 11

<table>
<thead>
<tr>
<th>Breadth</th>
<th>Height</th>
<th>Capacity of tank</th>
</tr>
</thead>
<tbody>
<tr>
<td>( \frac{1}{3} ) x 200 cm</td>
<td>( \frac{1}{2} ) x 50 cm</td>
<td>L x B x H</td>
</tr>
<tr>
<td>= 50 cm</td>
<td>= 25 cm</td>
<td>= 220 cm x 50 cm x 25 cm</td>
</tr>
<tr>
<td></td>
<td></td>
<td>= 250 000 cm³</td>
</tr>
<tr>
<td></td>
<td></td>
<td>= 250 litres</td>
</tr>
</tbody>
</table>

Qn 12
Since width x height = 36 cm² (6 cm x 6 cm)
Width = Height = 6 cm
Length = 2 x 6 cm = 12 cm
Volume of cuboid = L x B x H
= 12 cm x 6 cm x 6 cm
= 432 cm³

Unit 10.2 – Drawing Cubes and Cuboids on Isometric Grids

Unit 10.3 – Finding Dimension with Given Volume

Qn 1
\( \frac{2}{3} \) of tank = 8400 cm³
\( \frac{1}{3} \) of tank = 4200 cm³
Full Tank = 4200 cm³ x 3 = 12600 cm³
Base area = \( \frac{Volume}{Height} \)
= \( \frac{12600 \text{ cm}³}{21 \text{ cm}} \)
= 600 cm²

Qn 2
Since volume = L x B x H
(a) Length = \( \frac{Volume}{B x H} \)
= \( \frac{135 \text{ cm}³}{6 \text{ cm} \times 5 \text{ cm}} \)
= 4.5 cm
(b) Length = \( \frac{Volume}{Area} \)
= \( \frac{288 \text{ cm}³}{72 \text{ cm}²} \)
= 4 cm

Qn 3
Height = \( \frac{Volume}{Base area} \)
= \( \frac{1430 \text{ cm}³}{130 \text{ cm}²} \)
= 11 cm

Qn 4
Base area = \( \frac{Volume}{Height} \)
= \( \frac{1920 \text{ cm}³}{8 \text{ cm}} \)
= 240 cm²

Page 32
Qn 4 (Cont.)
Since length × breadth = 5 units × 3 units = 240 cm²
1 unit × 1 unit → 240 cm² ÷ 15 = 16 cm²
16 cm² = 4 cm × 4 cm
1 unit = 4 cm
Length = 5 × 4 cm
= 20 cm

Qn 5
Volume of water = L × B × H
2880 cm³ = 3 units × 3 units × 5 units
Therefore 1 unit × 1 unit × 1 unit


Length of cube A

Volume A = L × L × L
= 5 cm × 5 cm × 5 cm
Volume of cube = 25 cm³

Area of shaded face = L × L
= 5 cm × 5 cm
Since L × B × H = 125 and L = B = H
L = 5 cm
Area of shaded face = 5 cm × 5 cm
= 25 cm²

Qn 3
Since L × B × H = 125 and L = B = H
L = 5 cm
Area of shaded face = 5 cm × 5 cm
= 25 cm²

Qn 4
L × L = 81 cm² (9 cm × 9 cm)
L = 9 cm
Volume of cube = 9 cm × 9 cm × 9 cm
= 729 cm³

Qn 5
Volume X : Volume Y = 27 : 1
Volume Y = 1 cm³
Volume X = 27 cm³
Edge of cube X = 3 cm

Qn 6
Volume A : Volume B = 64 : 27
(4 × 4 × 4) : (3 × 3 × 3)
Length of Cube B = 6 cm
1 unit = 6 cm + 3
= 2 cm
Length of cube A = 4 × 2 cm
= 8 cm

Qn 7
Length A : Length B : Volume A : Volume B
1 : 3 : 1 × 1 × 1 : 3 × 3 × 3
Volume B → 27 units = 81 cm³
1 unit = 3 cm³
Volume A = 3 cm³

Qn 8
Length C : Length D
= 3 : 4
Volume C : Volume D
= (3 × 3 × 3) : (4 × 4 × 4)
= 27 : 64
Volume D 64 units = 128 cm³
1 unit = 2 cm³
Volume C 27 × 2 = 54 cm³

Unit 10.5 – Volume and Area of Unit Cubes
Qn 1
Volume = (1 + 3 + 8) × 1 cm³
= 12 cm³

Qn 2
Volume of solid = (1 + 2 + 3) × 1 cm³
= 6 cm³

Qn 3
Volume of solid = (1 + 1 + 6) × 1 cm³
= 8 cm³

Qn 4
Volume of solid = (3 × 4) × 1 cm³
= 7 cm³

Qn 5
Volume of solid = (1 + 3 + 9) × 1 cm³
= 14 cm³

Qn 6
Front = 7 faces, Back = 7 faces, Left = 6 faces, Right = 6 faces, Top = 9 faces, Bottom = 9 faces
Total = 44 faces
Total area to be painted = 44 × 1 cm²
= 44 cm²

Qn 7
Front = 8 faces, Back = 8 faces, Left = 9 faces, Right = 9 faces, Top = 10 faces, Bottom = 10 faces
Total = 54 faces
Total area to be painted = 54 × 1 cm²
= 54 cm²

Qn 8
Front = 4 faces, Back = 4 faces, Left = 4 faces, Right = 4 faces, Top = 5 faces, Bottom = 5 faces
Total = 26 faces
Total area to be painted = 26 × 1 cm²
= 26 cm²

Unit 10.6 – Volume = Base Area x Height
Qn 1
Height = Volume
Base area
= 84 cm²
28 cm²
= 3 cm

Visit the forum page at www.onSponge.com for more challenging problem sums.
Qn 2
\[ \frac{2}{3} \text{ of tank} = 96,000 \text{ cm}^3 \]
\[ \frac{1}{3} \text{ of tank} = 48,000 \text{ cm}^3 \]
Full volume = \( \frac{48,000 \times 3}{3} = 144,000 \text{ cm}^3 \)
Height = \( \frac{144,000 \text{ cm}^3}{60 \text{ cm} \times 40 \text{ cm}} = 60 \text{ cm} \)

Qn 3
Time taken to fill the tank = \( \frac{110 \times 90 \times 50}{16,500} = 30 \text{ min} \)

Qn 4
Total volume = \( 3.5 \times 1000 \times 5 \times 60 = 1,050,000 \text{ cm}^3 \)
Depth at first = \( \frac{1050000}{5880} = 100 \text{ cm} \)

Qn 5
In 1 min, both taps filled = \( 140 \text{ cm}^3 + 100 \text{ cm}^3 = 240 \text{ cm}^3 \)
Time taken for both taps to completely fill the tank = \( \frac{30 \times 24 \times 20}{240} = 60 \text{ min} \)

Qn 6
Volume of water leaked = \( (400 + 300) \times 6 = 4200 \text{ cm}^3 \)
Depth at first = \( \frac{4200}{60:10} = 7 \text{ cm} \)
New height = \( 15 \text{ cm} - 7 \text{ cm} = 8 \text{ cm} \)

Qn 7
(a) Volume of water at first = \( \frac{4}{3} \times 40 \text{ cm} \times 30 \text{ cm} \times 25 \text{ cm} = 24,000 \text{ cm}^3 \) or 24 / (b) Volume of water in glass tank = \( 24,000 - 4,000 = 20,000 \text{ cm}^3 \)
Height = \( \frac{2000}{50:25} = 16 \text{ cm} \)

Qn 8
Length : Breadth : Breadth : Height
\[ 3^3 : 2^3 : 5^2 : 4^2 \]
15 : 10 : 10 : 8
Length = \( 16 \text{ cm} \)
8 units = \( 16 \text{ cm} \)
1 unit = \( 2 \text{ cm} \)
Length = \( 30 \text{ cm} \)
Breadth = \( 20 \text{ cm} \)
Capacity = \( 30 \text{ cm} \times 20 \text{ cm} \times 16 \text{ cm} = 9600 \text{ cm}^3 \)

Unit 10.7 Volume with Common Base or Height
Qn 1
Volume of water = \( (28 \text{ cm} \times 20 \text{ cm} \times 14 \text{ cm} \times \frac{3}{4}) = 5880 \text{ cm}^3 \)
\[ \frac{1}{3} \text{ Height} = \frac{1}{3} \times 20 = 5 \text{ cm} \]
Base area = \( \frac{5880}{5} = 1176 \text{ cm}^2 \)

Qn 2
When height is the same,
Base area A : Base area B
\( = (25 \times 12) : (20 \times 20) \)
\( = 300 : 400 \)
Volume A : Volume B
\( 3 : 4 \)

Volume of A = \( 25 \text{ cm} \times 12 \text{ cm} \times 21 \text{ cm} = 6300 \text{ cm}^3 \)
7 units = \( 6300 \text{ cm}^3 \)
1 unit = \( 900 \text{ cm}^3 \)
3 units = \( 2700 \text{ cm}^3 \)
Height = \( \frac{2700 \text{ cm}^3}{25 \text{ cm} \times 12 \text{ cm}} = 9 \text{ cm} \)

Qn 3
When height is the same,
Base area of Container A : Base area of Container B
\( = (40 \times 15) : (25 \times 20) \)
\( = 600 : 500 \)
Volume of Container A : Volume of Container B
\( 6 : 5 \)

Volume of A = \( 40 \text{ cm} \times 15 \text{ cm} \times 22 \text{ cm} = 13,200 \text{ cm}^3 \)
11 units = \( 13,200 \text{ cm}^3 \)
1 unit = \( 1200 \text{ cm}^3 \)
Volume A = 6 units = \( 6 \times 1200 \text{ cm}^3 = 7200 \text{ cm}^3 \)
Height = \( \frac{7200 \text{ cm}^3}{40 \text{ cm} \times 15 \text{ cm}} = 12 \text{ cm} \)

Qn 4
When the base is the same,
Volume of Container A : Volume of Container B
\( = \text{Depth of Container A} : \text{Depth of Container B} \)
\( = 4 : 1 \)
5 units = \( 25 \text{ cm} \)
1 unit = \( 5 \text{ cm} \)
Base area of container B = \( \frac{240}{5} = 48 \text{ cm}^2 \)

Qn 5
4 units = \( 24 \text{ cm} \)
1 unit = \( 6 \text{ cm} \)
Base area of container B = \( \frac{120}{6} = 20 \text{ cm}^2 \)