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5
Primary
Based on Latest
MOE Syllabus

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CONQUER
PROBLEM SUMS

- Proven strategies used by top performing schools to conquer problem sums
- Structured and guided approach to support learning in school
- Challenging questions to excel in P5 Mathematics

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Answers for P5 Conquer Problem Sums

For full solutions, please visit www.onsponge.com to download.

Chapter 1 Whole Numbers

Unit 1.1 – More Than/Less Than

Qn 1	210 shells	Qn 2	102 sweets
Qn 3	105 muffins	Qn 4	$140
Qn 5	32 stickers	Qn 6	53 boys

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

Qn 1	114 adults	Qn 2	80 chocolates
Qn 3	165	Qn 4	$280
Qn 5	32 pupils	Qn 6	96 muffins

Unit 1.3 – Equal Stage (Beginning/End)

Qn 1	14 boys	Qn 2	51 cards
Qn 3	55 oranges	Qn 4	66 stickers
Qn 5	84 magnets	Qn 6	55 pears

Unit 1.4 – Constant Difference Between Individuals

Qn 1	4 years ago	Qn 2	4 years ago
Qn 3	180 children	Qn 4	41 adults
Qn 5	72 sweets	Qn 6	$76

Unit 1.5 – Number of Units x Value of Units

Qn 1	60 cars	
Qn 2	72 chickens	
Qn 3	(a) 30 plates	(b) $290
Qn 4	25	
Qn 5	120 adults	
Qn 6	(a) 12	(b) $500

Unit 1.6 – Key Construct: Simultaneous Concept

Qn 1	4 small cubes	Qn 2	350g
Qn 3	$1.20	Qn 4	$6.50
Qn 5	800g	Qn 6	$80
Qn 7	17 pieces		

Unit 1.7 – Key Construct: Excess and Shortage

Qn 1	$51.20	
Qn 2	$1058	
Qn 3	(a) 0.35ℓ	(b) 9.95ℓ
Qn 4	235 beads	
Qn 5	178 adults	
Qn 6	(a) 96g	(b) 62 pies
Qn 7	$15.80	

Unit 1.8 – Key Construct: Gap and Differences

Qn 1	84	
Qn 2	168	
Qn 3	312	
Qn 4	(a) 120 pens	(b) $\frac{2}{5}$
Qn 5	(a) 105 cups	(b) $1400

Chapter 2 Fraction

Unit 2.1 – Part-whole Relationship (Type 1)

Qn 1	(a) $\frac{9}{20}$	(b) $60
Qn 2	(a) $\frac{2}{15}$	(b) $180
Qn 3	(a) $\frac{3}{14}$	(b) $224
Qn 4	25 muffins	Qn 5 $3000
Qn 6	1050 students	

Unit 2.2 – Part-whole Relationship (Type 2)

Qn 1	$3700	Qn 2	$108
Qn 3	$4050	Qn 4	$189
Qn 5	40 students		
Qn 6	240 participants		

Unit 2.3 – Part-whole Relationship (Type 3)

Qn 1	$65	Qn 2	$320
Qn 3	48 students	Qn 4	$78
Qn 5	$400	Qn 6	$3000

Unit 2.4 – Equal Fractions

Qn 1	$456	Qn 2	$840
Qn 3	1560 students	Qn 4	$120
Qn 5	120 chocolate cookies	Qn 6	$120

Unit 2.5 – Repeated Identity

Qn 1	12 banana muffins	Qn 2	171 sweets
Qn 3	301 students	Qn 4	400 people
Qn 5	$\frac{18}{19}$	Qn 6	36 cm^2

Unit 2.6 – External Unchanged

Qn 1	600 mℓ	Qn 2	750 children
Qn 3	64 students	Qn 4	48 fruits
Qn 5	84 members	Qn 6	800 mℓ

Unit 2.7 – Unchanged Total

Qn 1 84 students Qn 2 25 stickers

Qn 3 200 pieces Qn 4 60 questions

Qn 5 $112 Qn 6 $240

Unit 2.8 – Constant Difference

Qn 1 21 children Qn 2 4 years old

Qn 3 10 years' time Qn 4 12 cards

Qn 5 56 kg Qn 6 184 cm^2

Unit 2.9 – Number of Units x Value of Units

Qn 1 85 girls Qn 2 75 green marbles

Qn 3 72 people Qn 4 1000 students

Qn 5 42 coins Qn 6 100 adults

Unit 2.10 – Key Construct: Fraction As An Object

Qn 1 $\frac{11}{12}$ ℓ Qn 2 $1\frac{2}{3}\ell$

Qn 3 $\frac{13}{18}$ kg Qn 4 $1\frac{7}{8}$ m

Qn 5 $2\frac{1}{5}$ kg Qn 6 $\frac{1}{5}$ m

Qn 7 (a) 16 cups (b) $\frac{1}{10}\ell$

Chapter 3 Rate

Unit 3.1 – Rate Involving One Object

Qn 1 270 plates Qn 2 12 houses

Qn 3 $12.60 Qn 4 162 km

Qn 5 $400 Qn 6 $4\frac{4}{9}$ days

Unit 3.2 – Rate Involving Two Different Objects

Qn 1 $16.30

Qn 2 (a) $21 (b) $6

Qn 3 $164 Qn 4 $12

Qn 5 $532

Qn 6 (a) $5.70 (b) 13 min

Unit 3.3 – Key Construct: Rate involving 2 Different Objects

Qn 1 10 stickers Qn 2 6 days

Qn 3 $2\frac{2}{3}$ days

Qn 4 (a) Machine A (b) 49 min

Qn 5 11.45 a.m.

Qn 6 (a) 80 toys

(b) Please refer to Full Solutions for the answer

(c) 4.30 p.m.

Chapter 4 Angles I

Unit 4.1 – Angles on a Straight Line

Qn 1 48° Qn 2 40°

Qn 3 $\angle x = 45°$; $\angle y = 75°$

Qn 4 $\angle x = 45°$; $\angle y = 90°$; $\angle z = 45°$

Qn 5 $\angle x = 54°$; $\angle y = 56°$

Unit 4.2 – Vertically Opposite Angles

Qn 1 $\angle x = 50°$; $\angle y = 25°$

Qn 2 80°

Qn 3 $\angle x = 80°$; $\angle y = 40°$

Qn 4 $\angle x = 40°$; $\angle y = 20°$

Qn 5 $\angle x = 32°$; $\angle y = 74°$

Qn 6 $\angle x = 42°$, $\angle y = 55°$

Qn 7 $\angle x = 72°$; $\angle y = 24°$; $\angle z = 72°$

Unit 4.3 – Alternate, Corresponding & Interior Angles

Qn 1 $\angle x = 37°$; $\angle y = 50°$

Qn 2 $\angle a = 31°$; $\angle b = 80°$

Qn 3 $\angle x = 28°$; $\angle y = 30°$; $\angle z = 90°$

Qn 4 $\angle a = 45°$; $\angle b = 135°$

Qn 5 171°

Qn 6 $\angle a = 119°$; $\angle b = 30°$

Qn 7 $\angle p = 25°$; $\angle q = 80°$

Qn 8 $\angle x = 30°$; $\angle y = 95°$; $\angle z = 150°$

Unit 4.4 – Isosceles Triangle

Qn 1 105°

Qn 2 25°

Qn 3 (a) $\angle PRS = 110°$ (b) $\angle RST = 40°$

Qn 4 20°

Qn 5 $\angle x = 25°$; $\angle y = 60°$

Qn 6 $\angle x = 68°$; $\angle y = 44°$; $\angle z = 38°$

Qn 7 $\angle x = 25°$; $\angle y = 240°$

Qn 8 123°

Qn 9 (a) $\angle PRS = 110°$ (b) $\angle RST = 40°$

Chapter 5 Angles II (Closed Figures)

Unit 5.1 – Interior and Exterior Angles Within a Triangle

Qn 1 55° Qn 2 77°

Qn 3 $\angle y = 20°$; $\angle z = 76°$

Qn 4 $\angle x = 76°$; $\angle y = 96°$

Qn 5 320° Qn 6 10°

Qn 7 160° Qn 8 360°

Qn 9 $\angle x = 92°$; $\angle y = 122°$

Unit 5.2 – Angle Properties Within a Rhombus

Qn 1 60°

Qn 2 (a) $\angle QPR = 33°$ (b) $\angle QCB = 96°$

(c) $\angle RSC = 63°$

Qn 3 25° Qn 4 15°

Qn 5 (a) 55° (b) 10°

Qn 6 $\angle x = 72°$; $\angle y = 43°$

Qn 7 (a) $\angle x = 32.5°$ (b) $\angle y = 45°$

Qn 8 $\angle x = 55°$; $\angle y = 95°$

Qn 9 $\angle x = 17.5°$; $\angle y = 35°$

Qn 10 $\angle x = 105°$; $\angle y = 15°$

Unit 5.3 – Angle Properties Within a Parallelogram

Qn 1 $\angle x = 15°$; $\angle y = 60°$; $\angle z = 75°$

Qn 2 $\angle x = 25°$; $\angle y = 67°$; $\angle z = 33°$

Qn 3 (a) $\angle SRU = 44°$ (b) $\angle PSR = 124°$

Qn 4 (a) $\angle ADC = 20°$ (b) $\angle CAD = 130°$

(c) $\angle ACB = 130°$

Unit 5.4 – Angle Properties Within a Trapezium

Qn 1 (a) 48° (b) 32°

Qn 2 $\angle x = 34°$; $\angle y = 34°$

Qn 3 $\angle x = 94°$; $\angle y = 49°$

Qn 4 42°

Qn 5 (a) $\angle t = 69°$ (b) $\angle y = 15°$

(c) $\angle x = 72°$ (d) $\angle u = 57°$

Unit 5.5 – Angle Properties Within a Trapezium

Qn 1 69° Qn 2 11°

Qn 3 $\angle BGC = 14°$; $\angle CDG = 110°$

Qn 4 67.5°

Qn 5 38°

Qn 6 (a) $\angle ZNM = 58°$ (b) $\angle XMZ = 64°$

Qn 7 (a) $\angle EDB = 113°$ (b) $\angle AEB = 128°$

Chapter 6 Area of Triangle

Unit 6.1 – Area of Triangle

Qn 1 Height = AB Height = AF

Height = DC Height = AB

Qn 2 Base = 12 cm; Height = 16 cm

Qn 3 Base = 4 cm; Height = 7 cm

Qn 4 Base = 5 cm; Height = 20 cm

Qn 5 Base = 14 cm; Height = 7 cm

Qn 6 Base = 12 cm; Height = 3cm

Qn 7 12 cm Qn 8 12 cm

Qn 9 10 cm Qn 10 42 cm

Unit 6.2 – Finding the Area of a Triangle in Unit Squares

Qn 1 (a) 14 cm^2 (b) 12 cm^2

Qn 2 (a) 11 cm^2 (b) 15 cm^2

Qn 3 (a) 23.5 cm^2 (b) 13 cm^2

Qn 4 (a) 16.5 cm^2 (b) 20 cm^2

Unit 6.3 – Triangle with Common Base or Height

Qn 1 32 cm^2 Qn 2 100 cm^2

Qn 3 150 cm^2 Qn 4 200 cm^2

Qn 5 100 cm^2 Qn 6 18 cm^2

Qn 7 17.5 cm^2

Unit 6.4 – Triangles with Common Bases

Qn 1 60 cm^2 Qn 2 120 cm^2

Qn 3 16 cm Qn 4 62 cm

Qn 5 48 cm^2 Qn 6 230 cm^2

Qn 7 150 cm^2 Qn 8 150 cm^2

Unit 6.5 – Composite Figures Involving Triangles

Qn 1 240 cm^2 Qn 2 480 cm^2

Qn 3 240 cm^2 Qn 4 49 cm^2

Qn 5 44 cm; 42 cm

Chapter 7 Percentage

Unit 7.1 – Percentage Increase

Qn 1 425 pebbles Qn 2 270 workers

Qn 3 360 pupils Qn 4 $300

Qn 5 $4000 Qn 6 240 boys

Unit 7.2 – Multiplication in Percentage

Qn 1 $400 Qn 2 $4000

Qn 3 $1000 Qn 4 200 litres

Qn 5 200 blue marbles Qn 6 $2160

Qn 7 10% Qn 8 5%

Qn 9 130 cm Qn 10 56.25%

Qn 11 $3200 Qn 12 $3600

Unit 7.3 – Overlapping Percentage

Qn 1 300 students Qn 2 30 children

Qn 3 200 students Qn 4 104 students

Unit 7.4 – GST and Annual Interest

Qn 1 $480 Qn 2 $1850

Qn 3 $817.50 Qn 4 $118.30

Qn 5 $2092.80 Qn 6 $1962

Unit 7.5 – Simple Interest

Qn 1 $32 137.50 Qn 2 $15 000

Qn 3 $34 200 Qn 4 $336 000

Qn 5 $3888 Qn 6 $12 500

Unit 7.6 – Discount and Percentage Discount

Qn 1 $10 Qn 2 15%

Qn 3 $280 Qn 4 $128.25

Qn 5 $2.50 Qn 6 $250

Unit 7.7 – Equal Fractions

Qn 1 112 stickers Qn 2 $300

Qn 3 136 students Qn 4 $170

Qn 5 200 chocolate muffins Qn 6 330 students

Unit 7.8 – External Unchanged

Qn 1	30 students	Qn 2	12 children
Qn 3	30 lemons	Qn 4	36 boys

Unit 7.9 – Repeated Identity

Qn 1	150 cards	Qn 2	200 cookies
Qn 3	100 marks	Qn 4	154 people
Qn 5	188 marbles	Qn 6	55 more log cake
Qn 7	60 books		

Unit 7.10 – Unchanged Total

Qn 1	80 adults	Qn 2	200 pieces
Qn 3	180 pieces	Qn 4	150 pages
Qn 5	70 pages	Qn 6	$156
Qn 7	100 cookies		

Unit 7.11 – Constant Difference

Qn 1	48 students	Qn 2	$450
Qn 3	504 students	Qn 4	825 shirts
Qn 5	80 cm^2	Qn 6	6 years old

Unit 7.12 – External Changed

Qn 1	$31.20	Qn 2	36 stickers
Qn 3	X = 1620 students; Y = 1800 students		
Qn 4	$30	Qn 5	128 ducks
Qn 6	$720		

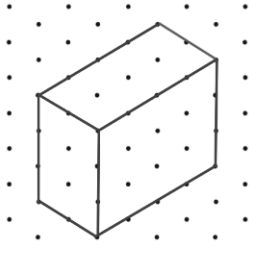
Chapter 8 Volume

Unit 8.1 – Finding Volume of a Cuboid with Given Dimension

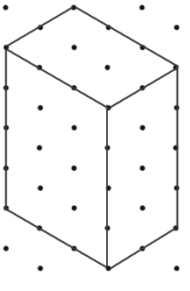
Qn 1	270 cm^3	Qn 2	240 cm^3
Qn 3	7200 cm^3	Qn 4	10 000 cm^3
Qn 5	10 000 cm^3	Qn 6	1728 cm^3
Qn 7	5184 cm^3	Qn 8	5400 cm^3
Qn 9	2000 cm^3	Qn 10	1000 cm^3
Qn 11	250 litres	Qn 12	432 cm^3

Unit 8.2 – Drawing cubes and cuboids on isometric grids

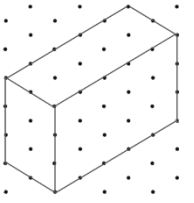
Qn 1



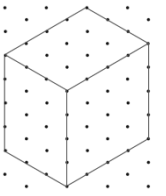
Qn 2



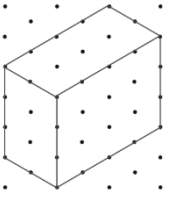
Qn 3



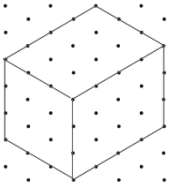
Qn 4



Qn 5



Qn 6



Unit 8.3 – Finding Dimension with Given Volume

Qn 1	600 cm^2		
Qn 2	(a) 4.5 cm	(b) 4 cm	
Qn 3	11 cm	Qn 4	20 cm
Qn 5	144 cm^2		

Unit 8.4 – Length, Area and Volume of Cubes

Qn 1	1664 cm^3	Qn 2	2 cm
Qn 3	25 cm^2	Qn 4	729 cm^3
Qn 5	3 cm	Qn 6	216 cm^3
Qn 7	3 cm^3	Qn 8	54 cm^3

Unit 8.5 – Volume and Area of Unit Cubes

Qn 1	12 cm^3	Qn 2	6 cm^3
Qn 3	8 cm^3	Qn 4	7 cm^3
Qn 5	14 cm^3	Qn 6	44 cm^2
Qn 7	54 cm^2	Qn 8	26 cm^2

Unit 8.6 – Volume = Base Area x Height

Qn 1	3 cm	Qn 2	60 cm
Qn 3	30 min	Qn 4	100 cm
Qn 5	60 min	Qn 6	8 cm
Qn 7	(a) 24 litres	(b) 16 cm	
Qn 8	2304 cm^3		

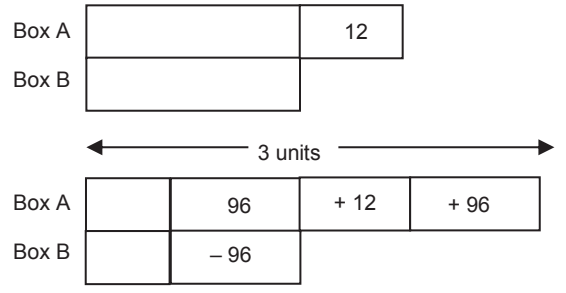
Solutions

Note: In all solutions, U represents Units

Chapter 1 Whole Numbers

Unit 1.1 – More than/Less Than

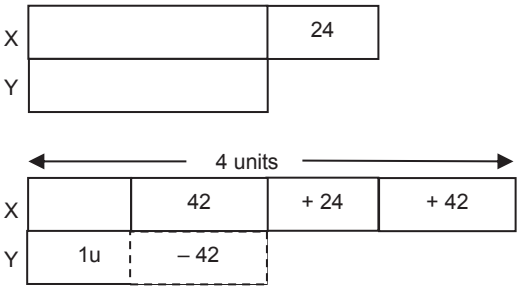
Qn 1



2 units = 96 + 12 + 96 = 204
1 unit = 204 ÷ 2
= 102

Number of shells in Box A at first = 102 + 96 + 12 = **210**

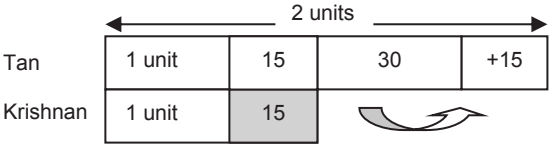
Qn 2



3 units = 42 + 24 + 42 = 108
1 unit = 108 ÷ 3
= 36

Number of sweets in Container X at first
= 36 + 42 + 24
= **102**

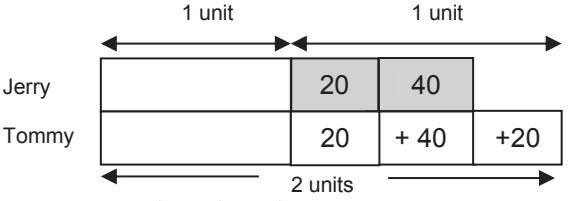
Qn 3



1 unit = 15 + 30 + 15
= 60

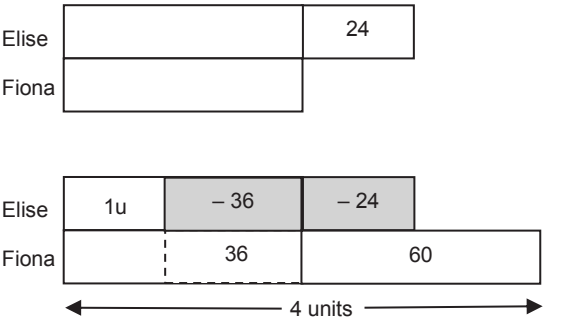
Number of muffins Mrs Tan had at first = 1 unit + 45
= 60 + 45
= **105**

Qn 4



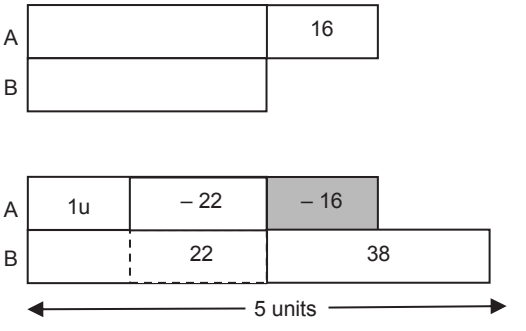
1 unit = $20 + $40 + $20
= $80
Jerry at first = 1 unit + $60
= $80 + $60
= **$140**

Qn 5



2 units = 36 + 60 = 96
1 unit = 96 ÷ 3
= **32**

Qn 6

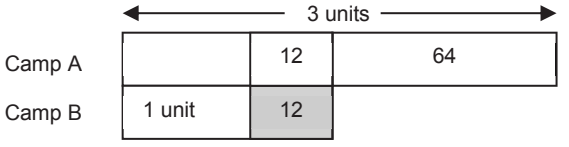


4 units = 22 + 38 = 60
1 unit = 60 ÷ 4 = 15

Number of boys in group A at first = 15 + 38 = **53**

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

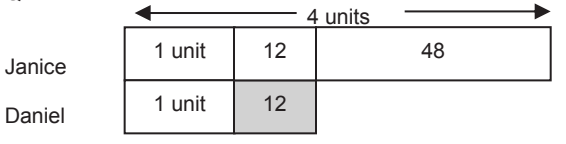
Qn 1



2 units = 12 + 64
= 76
1 unit = 76 ÷ 2
= 38

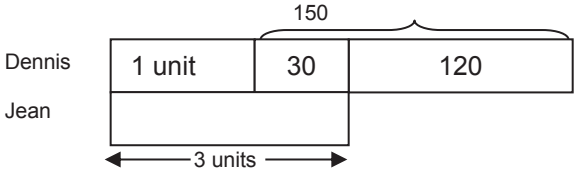
Total number of adults in Campsite A at first = 3 units
= 3 × 38
= **114**

Qn 2



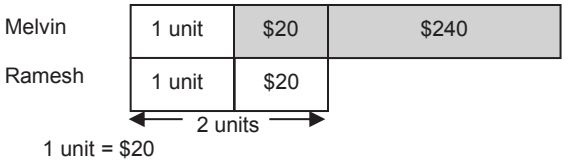
3 units = 12 + 48
= 60
1 unit = 60 ÷ 3
= 20
Number of chocolate Janice had at first = 4 units
= 4 × 20
= **80**

Qn 3



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

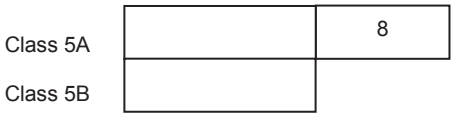
Qn 4



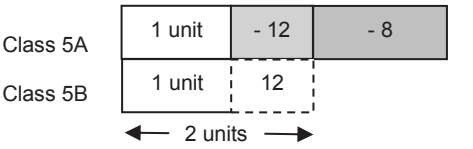
1 unit = $20

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

Qn 5

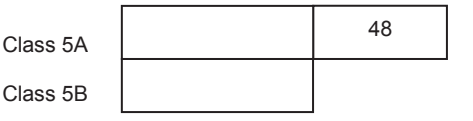


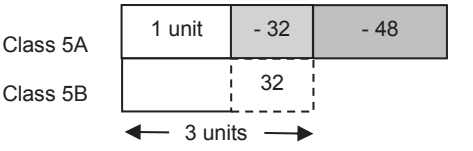
Qn 5 (Cont.)



Number of pupils in Class 5 A at first = 12 + 12 + 8
= **32**

Qn 6

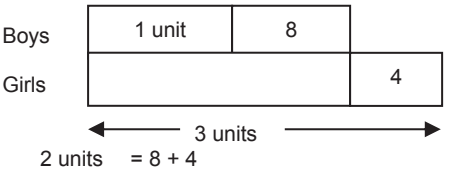




2 units = 32
1 unit = 32 ÷ 2
= 16
Number of muffins Melissa baked at first = 16 + 32 + 48
= **96**

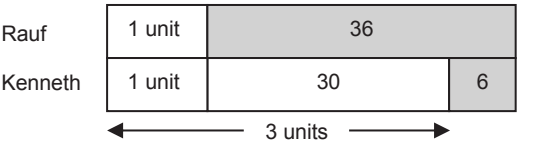
Unit 1.3 – Equal Stage (Beginning/End)

Qn 1



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

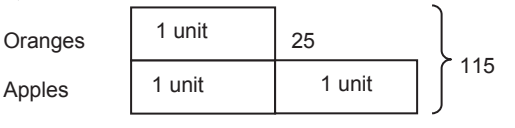
Qn 2



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

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

Qn 3



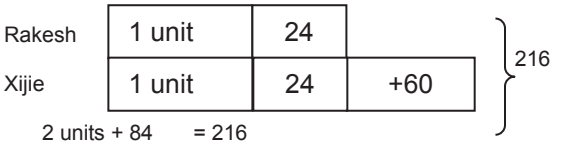
Qn 3 (Cont.)

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**

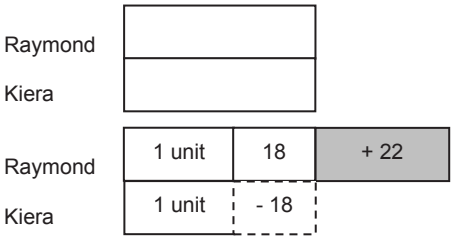
Qn 4

<u>End</u>



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

Qn 5

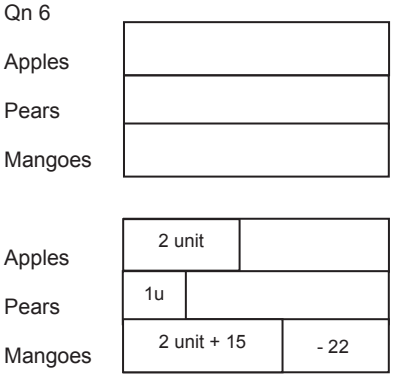


Total at first = 2 units + 18
= 128

2 units = 128 – 40 = 88
1 unit = 88 ÷ 2 = 44

Number of magnets Raymond had at first = 44 + 18 + 22
= **84**

Qn 6



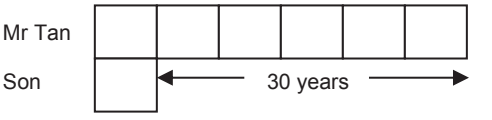
Total left = 5 units + 15 = 105
1 unit = (105 – 15) ÷ 5 = 18

Mangoes at first = 18 x 2 + 15 + 22 = 73
Number of pears sold = 73 – 18 = **55**

Unit 1.4 – Constant Difference Between Individuals

Qn 1

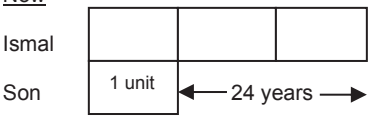
Difference in age = 30 years



5 units = 30
1 unit = 30 ÷ 5
= 6
Mr Tan's age when son was 6 = 6 units
= 6 × 6
= 36
Number of years ago = 40 – 36
= **4**

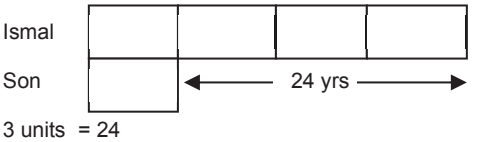
Qn 2

<u>Now</u>



2 units = 24
1 unit = 24 ÷ 2
= 12

<u>Some time ago</u>

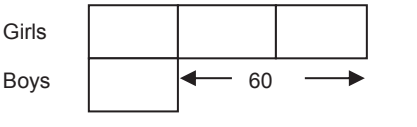


3 units = 24
1 unit = 24 ÷ 3
= 8
Number of years ago = 12 – 8
= **4**

Qn 3

Difference at first = 180 – 120
= 60

<u>End</u>



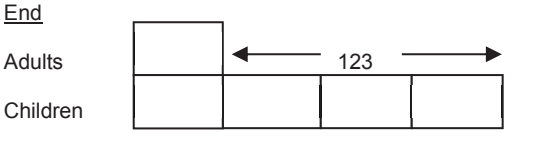
2 ☐ = 60 ☐ = 30

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

Qn 4

Difference between the number of adults and children = 123

<u>End</u>



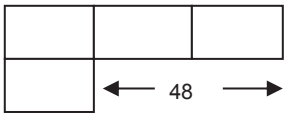
Qn 4 (Cont.)

Difference 3 units = 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
Calvin



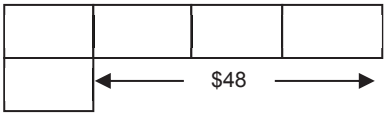
2 □ = 48

□ = 24

Daniel at first = 3 □
= 3 × 24
= **72**

Qn 6
Difference at first = \$140 − \$92
= \$48
In the end

Luke
Isaac



3 units = \$48
1 unit = \$48 ÷ 3
= \$16
Amount each of them spent = \$92 − \$16
= **\$76**

Unit 1.5 – Number of Units x Value of Units

Qn 1

	Number of vehicles (units)	×	Number of wheels	=	Total value (wheels)
Motorbikes	4	×	2	=	8u
Cars	1	×	4	=	4u
					12u

12 units = 720
1 unit = 720 ÷ 12
= 60
Total number of cars = 1 unit
= 1 × 60
= **60**

Qn 2

	Number of Animals (units)	×	Number of legs	=	Total unit (legs)
Chicken	2	×	2	=	4u
Horses	1	×	4	=	4u
					8u

Qn 2 (Cont.)

8 units = 288
1 unit = 288 ÷ 8
= 36

Total number of chickens = 2 units
= 2 × 36
= **72**

Qn 3

	Number of Items (units)	×	Cost of 1 item (\$)	=	Total unit (\$)
Plates	3	×	12	=	36u
Bowls	1	×	7	=	7u
					43u

43 units = 430
1 unit = 430 ÷ 43
= 10
(a) Total number of plates bought = 3 units
= 3 × 10
= **30 plates**

(b) Difference in the amount of money spent = \$29 units
= \$29 × 10
= **\$290**

Qn 4

	No. of students	x	No. of packet drinks/person	=	Total packet
Girls	3 units	×	3	=	9 units
Boys	1 unit	×	5	=	5 unit

Total amount = 5 units + 9 units
= 14 units
14 units = 350
1 unit = 350 ÷ 14
= **25**

Qn 5

	Units	×	Value (\$)	=	Total unit (\$)
Adults	4	×	7	=	28u
Children	1	×	4	=	4u
					32u

32 units = 960
1 unit = 960 ÷ 32
= 30

Number of adults = 4 units
= 4 × 30
= **120**

Qn 6

	No.	×	Value	=	Total value
Bolster	1 units	×	\$25	=	25 units
Pillow	3 units	×	\$50	=	150 units
			175 units	=	700
			1 unit	=	4

(a) No. of pillows = 3 units
= 3 × 4
= **12**

(b) Difference in amount spent = 125 units
= 125 × 4
= **\$500**

Unit 1.6 Key Construct: Simultaneous Concept

Qn 1

12 big cubes = 30 small cubes (÷ by 3 throughout)
4 big cubes = 10 small cubes
8 big cubes = 20 small cubes
8 big cubes + 6 small cubes = 20 small cubes + 6 small cubes
= 26 small cubes

Number of extra small cubes container can hold
= 30 small cubes – 26 small cubes
= **4 small cubes**

Qn 2

Container + 15 balls = 1100g
Container + 20 balls = 1350g
Difference = 5 balls = 1350g – 1100g = 250g

1 ball = 250g ÷ 5 = 50g
15 balls = 50g x 15 = 750g

Container = 1100g – 750g = **350g**

Qn 3
3 highlighters + 7 pens = $13.50

Let cost of 1 pen = 1 unit
1 highlighter = 1 unit + $0.50
3 highlighters = 3 units + $1.50

7 pens = 7 units
Total cost = 10 units + $1.50 = $13.50
10 units = $12
1 unit = $12 ÷ 10
= **$1.20**

Qn 4

3 files + 2 markers = $22.50
2 files + 3 markers = $17.50
(make the markers the same)

Since LCM of 2 and 3 is 6,
9 files + 6 markers = $22.50 x 3 = $67.50
4 files + 6 markers = $17.50 x 2 = $35

5 files = $67.50 – $32($35)
= $32.50

1 file = $32.50 ÷ 5
= **$6.50**

Qn 5

Box + 30 balls = 1100g
Box + 25 batteries = 1550g

Let the mass of 1 ball = 1u
Mass of 1 battery = 3u
Mass of 30 balls = 30u
Mass of 25 batteries = 25 x 3u = 75u

Difference = 75u – 30u = 45u
45u = 1550g – 1100g = 450g
1u = 450g ÷ 45 = 10g

Qn 5 (Cont.)
30 balls = 10g x 30 = 300g
Box = 1100g – 300g
= **800g**

Qn 6

4 volleyballs = 3 basketballs
5 volleyballs + 2 basketballs = $460
(make the number of volleyballs the same)

Since LCM of 4 and 5 is 20,
20 volleyballs = 15 basketballs
20 volleyballs + 8 basketballs = $460 x 4 = $1840
15 basketballs + 8 basketballs = $1840

23 basketballs = $1840
1 basketball = $1840 ÷ 23
= **$80**

Qn 7

1 rectangular piece of cardboard cut into 4 squares, increase = 3 pieces

Big increase = 101 – 50 = 51
Small increase = 3

No. of rectangular pieces she bought
= 51 ÷ 3
= **17** pieces

Unit 1.7 Key Construct: Excess and Shortage

Qn 1

Difference between a highlighter and a pen
= $0.40 + $0.20
= $0.60

Let the cost of 1 pen = $1 unit

Cost of 1 highlighter = $1 unit + $0.60
15 highlighters + 12 pens = 12 units + 15 units + $0.60 x 15
= 27 units + $9

27 units + $9 = $49.50
27 units = $49.50 – $9 = $40.50
1 unit = $40.50 ÷ 27 = $1.50

Amount of money he had at first
= $49.50 + $1.50 + $0.20
= **$51.20**

Qn 2

Difference between a big pot and a small pot = $32 + $16 = $48

Let the cost of 1 small pot = $1 unit

Cost of 1 big pot = $1 unit +$48

3 big pots + 5 small pots = 3 units + $48 x 3 + 5 units = 8 units + $144

8 units + $144 = $928
8 units = $928 – $144 = $784
1 unit = $784 ÷ 8 = $98

Qn 2 (Cont.)

(a) Each small pot cost **$98**
(b) Amount of money Mrs Imran had at first
= $928 + $98 + $32
= **$1058**

Qn 3

Difference between a big bottle and small bottle =
$0.2\ell + 0.15\ell = 0.35\ell$

Let the volume of 1 small bottle = 1 unit

Cost of 1 big pot = 1 unit + 0.35ℓ
4 big bottles + 7 small bottles
= 4 units + $4x0.35\ell$ + 7 units = 11 units $+1.4\ell$

11 units $+1.4\ell$ = 9.1ℓ
11 units = $9.1\ell - 1.4\ell = 7.7\ell$
1 unit = $7.7\ell \div 11 = 0.7\ell$

(a) $\mathbf{0.35\ell}$
(b) Amount of apple juice at first
= $9.1\ell + 0.7\ell + 0.15\ell = \mathbf{9.95\ell}$

Qn 4

7 necklaces, short of 114 beads
4 necklaces, 36 beads left

3 necklace = 114 beads + 36 beads = 150 beads
1 necklace = 150 beads ÷ 3 = 50 beads

Total beads Celine had
= 50 x 4 + 36
= **236 beads**.

Qn 5

Each child 5 sweets, left 53 sweets
Each child 7 sweets, left 3 sweets.

Each child extra 2 sweets, Jason need 53 – 3 = 50 sweets

(a) Number of children = 50 ÷ 2 = 25

(b) Number of sweets Jason had
= 25 x 5 + 53
= **178 sweets**

Qn 6

Made 48 pies, left 1800g of flour,
Made 23 pies, left 4200g of flour.

25 pies will need 4200g – 1800g = 2400g

(a) 1 pie = 2400g ÷ 25 = 96g
Each pie weighed **96g**

(b) 4200g + 1800g = 6000g

Number of additional pies
= 6000g ÷96g
= 62.5 pies ≈ **62** pies.

Qn 7

Difference between a pen and a pencil = $1.40 – $0.80 = $0.60

Let the cost of a pencil be $1 unit

Cost of 1 pen = $1u + $0.60

Since 3 pens = 4 pencils
$3u + $0.60 x 3 = 4 units
1 unit = $1.80
3 pens + 4 pencils = 7 units + $1.80
= 7 x $1.80 + $1.80 = $14.40

Amount of money Daniel had = $14.40 + $1.40
= **$15.80**

Unit 1.8 Key Construct: Gap and Differences

Qn 1

3 small key chains for $7
2 large key chains for $11.

Since James made an equal number of small and large key chains,
LCM of 2 and 3 is 6.

6 small key chains = $7 x 2 = $14
6 large key chains = $11 x 3 = $33

Difference between 6 small and 6 large key chains
= $33 – $14
= $19

Number of sets = $133 ÷ $19 = 7 sets
Number of key chains he made
= 7 x (6 + 6)
= **84**

Qn 2

3 cakes cost $4
4 muffins cost $7

Since Aunty Pek bought an equal number of cakes and muffins,
LCM of 3 and 4 is 12.

12 cakes cost $4 x 4 = $16
12 muffins cost $7 x 3 = $21

Difference between 12 cakes and 12 muffins = $21 – $16 = $5

Number of sets
= $70 ÷ $5
= 14 sets

Number of cakes she bought
= 12 x 14
= **168** cakes

Qn 3

3 key chains cost $7
4 magnets cost $11

Qn 3 (Cont.)
Since Jimmy bought an equal number of key chains and magnets,

LCM of 3 and 4 is 12.

12 key chains cost $7 x 4 = $28
12 magnets cost $11 x 3 = $33

Difference between 12 key chains and 12 magnets
= $33 – $28
= $5

Number of sets
= $65 ÷ $5
= 13 sets

Number of magnets and key chains he bought
= 13 x (12 + 12)
= **312**

Qn 4

(a) 5 pens cost $6
3 pencils cost $2.40
Since Celest bought an equal number of pens and pencils,
LCM of 3 and 5 is 15.

15 pens cost $6 x 3 = $18
15 pencils cost $2.40 x 5 = $12
Total cost of 15 pens and 15 pencils
= $18 + $12
= $30

Number of sets = $240 ÷ $30 = 8 sets
Number of pens she bought
= 8 x 15
= **120**

(b) 5 pens cost $6
3 pencils cost $2.40

Since Brian spent equal amount on the pens and pencils,
LCM of 2.4 and 6 is 12

$12 ÷ $6 = 2 sets
$12 can buy 2 x 5 pens = 10 pens

$12 ÷ $2.40 = 5 sets
$12 can also buy 3 x 5 = 15 pencils
Fraction of total items that were pens = $\frac{10}{25} = \frac{2}{5}$

Qn 5

(a) 7 cups cost $20
3 plates cost $14
Since Mrs Imran bought an equal number of plates and cups,
LCM of 3 and 7 is 21.

21 cups cost $20 x 3 = $60
21 plates cost $14 x 7 = $98

Difference between 21 plates and 21 cups
= $98 – $60
= $38

Number of sets = $190 ÷ $38 = 5
Number of cups she bought = 21 x 5 = **105**

Qn 5 (Cont.)

(b) 7 cups cost $20
3 plates cost $14

Since Mrs Gomez spent an equal amount on the plates and cups,
LCM of 14 and 20 is 140.

$140 ÷ $20 = 7 sets
$140 can buy 7 x 7 = 49 cups

$140 ÷ $14 = 10 sets
$140 can buy 3 x 10 = 30 plates

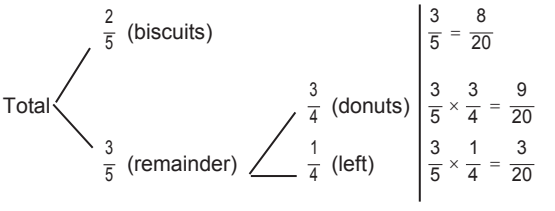
Difference = 49 – 30 = 19 items
Number of sets = 190 ÷ 19 = 10

Amount of money she spent on the cups
= 10 x $140
= **$1400**

Chapter 2 Fractions

Unit 2.1 – Part-whole Relationship (Type 1)

Qn 1



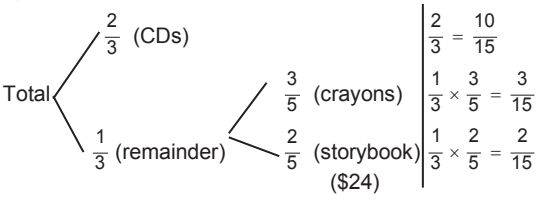
(a) Fraction of money spent on donuts = $\frac{9}{20}$

(b) $\frac{3}{20}$ of total = $9

$\frac{1}{20}$ of total = $9 ÷ 3
= $3

Total = 20 × 3
= **$60**

Qn 2



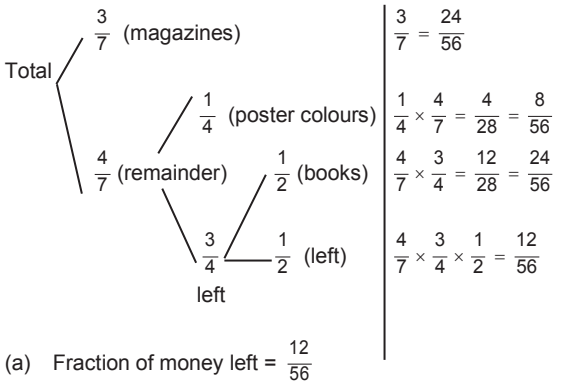
(a) $\frac{2}{15}$ of her money was spent on the storybook

(b) $\frac{2}{15}$ of total = $24

$\frac{1}{15}$ of total = $24 ÷ 2
= $12

Total = 15 × $12
= **$180**

Qn 3



(a) Fraction of money left = $\frac{12}{56}$

= $\mathbf{\frac{3}{14}}$

(b) Difference = $\frac{12}{56}$ of total − $\frac{8}{56}$ of total

= $\frac{4}{56}$ of total

$\frac{4}{56}$ of total = \$16

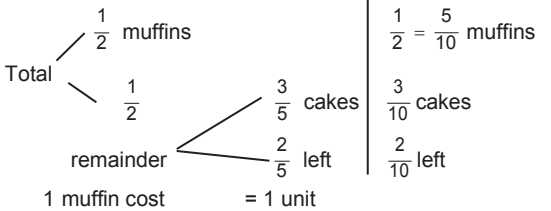
$\frac{1}{56}$ of total = \$16 ÷ 4

= \$4

Total = 56 × \$4

= **\$224**

Qn 4



1 muffin cost = 1 unit
1 cake cost = 3 units
5 cakes cost = 15 units

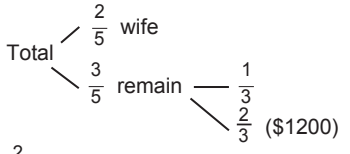
$\frac{3}{10}$ total = 15 units

$\frac{1}{10}$ total = 5 units

$\frac{5}{10}$ total = 25 units

= **25**

Qn 5



$\frac{2}{3}$ remainder = \$1200

$\frac{1}{3}$ remainder = \$600

Remainder = \$1800

= $\frac{3}{5}$ total

Qn 5 (Cont.)

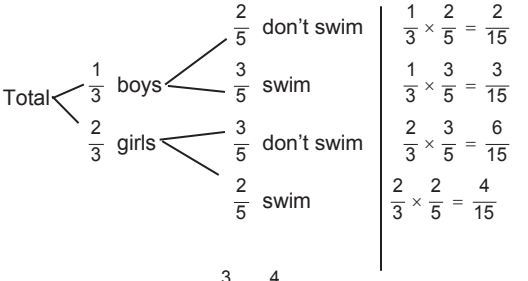
$\frac{1}{5}$ total = \$1800 ÷ 3

= \$600

Total = \$600 × 5

= **\$3000**

Qn 6



Total swimmers, $\frac{3}{15} + \frac{4}{15} \rightarrow 490$

$\frac{7}{15}$ total = 490

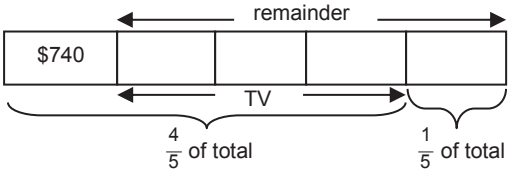
$\frac{1}{15}$ total = 70

Total = 70 × 15

= **1050**

Unit 2.2 – Part-whole Relationship (Type 2)

Qn 1



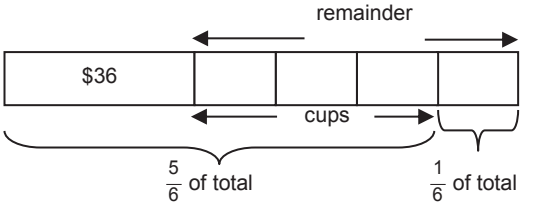
Since $\frac{1}{5}$ of total = 1 unit, $\frac{4}{5}$ of total = 4 units

\$740 = 1 unit → $\frac{1}{5}$ of total

Salary = \$740 × 5

= **\$3700**

Qn 2



Since $\frac{1}{6}$ of total = 1 unit, $\frac{5}{6}$ of total = 5 units

$\frac{2}{6}$ of total = \$36

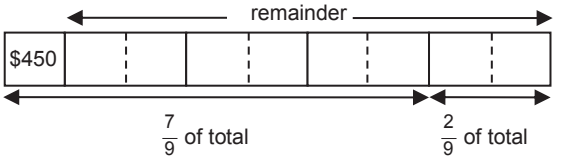
$\frac{1}{6}$ of total = \$36 ÷ 2

= \$18

Total = \$18 × 6

= **\$108**

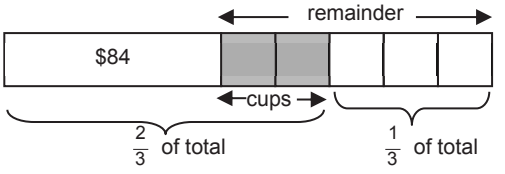
Qn 3



$\frac{1}{9}$ of total = $450

Total = $450 × 9
= **$4050**

Qn 4



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

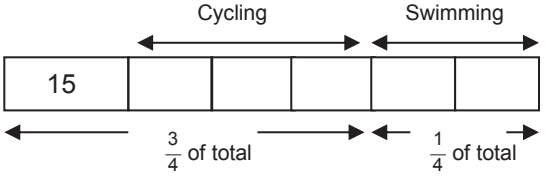
$\frac{2}{3}$ of total = 6 units

4 units = $84

1 unit = $84 ÷ 4
= $21

At first = 9 units
= 9 × $21
= **$189**

Qn 5



Since $\frac{1}{4}$ total = 2 ☐

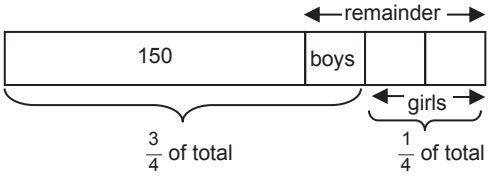
$\frac{3}{4}$ total = 6 ☐

3 ☐ = 15

☐ = 5

Total 8 ☐ = 8 × 5
= **40**

Qn 6



Qn 6 (Cont.)

Since $\frac{1}{4}$ of total = 2 units, $\frac{3}{4}$ of total = 6 units

5 units = 150

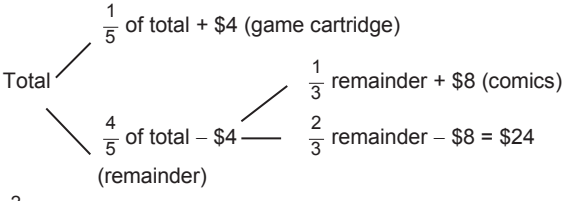
1 unit = 150 ÷ 5 = 30

Total = 8 units
= 8 × 30
= 240

There were **240** participants.

Unit 2.3 – Part-whole Relationship (Type 3)

Qn 1



$\frac{2}{3}$ of remainder = $8 + $24
= $32

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

Remainder = $16 × 3
= $48

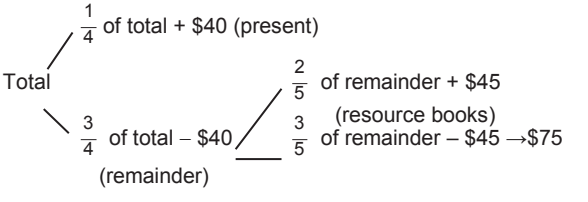
$\frac{4}{5}$ of total – $4 = $48

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

$\frac{1}{5}$ of total = $52 ÷ 4
= $13

Total = $13 × 5
= **$65**

Qn 2



$\frac{3}{5}$ of remainder = $75 + $45 → $120

$\frac{1}{5}$ of remainder = $120 ÷ 3 → $40

Remainder = 5 units → 5 × $40 → $200

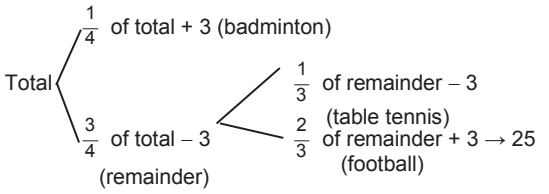
$\frac{3}{4}$ of total – $40 = $200

$\frac{3}{4}$ of total = $240

$\frac{1}{4}$ of total = $240 ÷ 3
= $80

Total = $80 × 4
= **$320**

Qn 3



$\frac{2}{3}$ of remainder = 25 – 3
= 22

$\frac{1}{3}$ of remainder = 22 ÷ 2
= 11

Remainder = 3 units
= 3 × 11
= 33

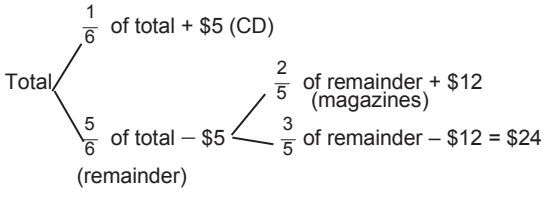
$\frac{3}{4}$ of total – 3 = 33

$\frac{3}{4}$ of total = 36

$\frac{1}{4}$ of total = 36 ÷ 3
= 12

Total = 4 units
= 4 × 12
= **48**

Qn 4



$\frac{3}{5}$ of remainder = $24 + $12
= $36

$\frac{1}{5}$ of remainder = $36 ÷ 3
= $12

Remainder = 5 units
= 5 × 12
= $60

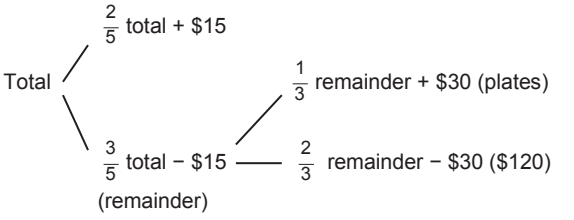
$\frac{5}{6}$ of total – $5 = $60

$\frac{5}{6}$ of total = $65

$\frac{1}{6}$ of total = $65 ÷ 5
= $13

Total = 6 units
= 6 × $13
= **$78**

Qn 5



$\frac{2}{3}$ remainder = $120 + $30
= $150

$\frac{1}{3}$ remainder = $75

Remainder = 75 × 3
= $225

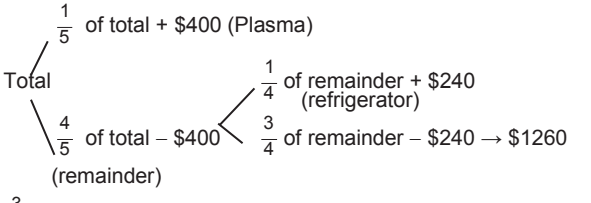
$\frac{3}{5}$ total – $15 = $225

$\frac{3}{5}$ total = $225 + 15
= $240

$\frac{1}{5}$ total = $80

Total = $80 × 5
= **$400**

Qn 6



$\frac{3}{4}$ remainder = $1260 + $240
= $1500

$\frac{1}{4}$ remainder = $1500 ÷ 3
= $500

Remainder = 4 units
= 4 × $500
= $2000

$\frac{4}{5}$ total – $400 = $2000

$\frac{4}{5}$ total = $2400

$\frac{1}{5}$ total = $2400 ÷ 4
= $600

Total = 5 × $600
= **$3000**

Unit 2.4 – Equal Fractions

Qn 1

$\frac{3}{4}$ of Chelsia's money = $\frac{5}{6}$ of Brian's money

$\frac{15}{20}$ of Chelsia's money = $\frac{15}{18}$ of Brian's money

Chelsia's money = 20 units
Brian's money = 18 units

Qn 1 (Cont.)

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 × $12
= **$456**

Qn 2

Amount Left

$\frac{3}{4}$ of Ema's money = $\frac{3}{7}$ 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 × $120
= **$840**

Qn 3

$\frac{3}{5}$ Boys = $\frac{4}{7}$ Girls

$\frac{12}{20}$ Boys = $\frac{12}{21}$ Girls

Boys = 20 units
Girls = 21 units
Difference = 1 unit
= 65

Total no. of students in the end = 24 × 65
= **1560**

Qn 4

Left amount

Rasidah = $\frac{2}{5}$ Chai Seng = $\frac{1}{7}$

$\frac{1}{7}$ Chai Seng = $\frac{1}{2}$ of what Rasidah left

$\frac{1}{7}$ Chai Seng = $\frac{1}{2} \times \frac{2}{5}$ Rasidah

$\frac{1}{7}$ Chai Seng = $\frac{1}{5}$ Rasidah

Chai Seng = 7 units
Rasidah = 5 units
Difference = 2 units

2 units = $48
1 unit = $24

Total (Raidah) at first = 5 units
= 5 × $24
= **$120**

Qn 5

Number of cookies Left

Chocolate = $\frac{1}{4}$ Vanilla = $\frac{1}{6}$

$\frac{1}{4}$ of Chocolate = Twice of the vanilla cookies left

$\frac{1}{4}$ of Chocolate = 2 × $\frac{1}{6}$ of Vanilla

$\frac{1}{4}$ of Chocolate = $\frac{1}{3}$ of Vanilla

Chocolate = 4 units
Vanilla = 3 units
Total = 4 units + 3 units
= 7 units

7 units = 280
1 unit = 280 ÷ 7
= 40

Number of chocolate cookies given away = 3 units
= 3 × 40
= **120**

Qn 6

Left

Roy = $\frac{1}{3}$ Dennis = $\frac{3}{4}$

$\frac{3}{4}$ Dennis = Twice × $\frac{1}{3}$ Roy

$\frac{3}{4}$ Dennis = $\frac{2}{3}$ Roy

$\frac{6}{8}$ Dennis = $\frac{6}{9}$ Roy

Dennis = 8 units
Roy = 9 units

Total, 17 units = $340
1 unit = $20

Dennis in the end = 6 units
= 6 × $20
= **$120**

Unit 2.5 – Repeated Identity

Qn 1

Banana 1 unit × 3 = 3 units
Chocolates 5 units × 3 = 15 units

Banana 3 units
Blueberry 1 unit

Banana = 3 units
Chocolates = 15 units
Blueberry = 1 unit

Total = 3 units + 15 units + 1 unit
= 19 units

19 units = 76
1 unit = 76 ÷ 19
= 4
Number of banana muffins = 3 units
= 3 × 4
= **12**

Qn 2

Siti	2 unit	× 4 = 8 units	Siti = 8 units
Joel	7 units	× 4 = 28 units	Joel = 28 units
Melvin	3 units	× **7** = 21 units	Melvin = 21 units
Joel	4 unit	× 7 = 28 units	

Difference between Melvin and Siti = 21 units – 8 units
= 13 units

13 units = 39
1 unit = 3

Total number of sweets shared at first = 57 units
= 57 × 3
= **171**

Qn 3

Group A	3 unit	× 5 = 15 units	Group A = 15 units
Group B	4 units	× 5 = 20 units	Group B = 20 units
Group C	2 units	× 4 = 8 units	Group C = 8 units
Group B	5 unit	× 4 = 20 units	

Difference between Group A and Group C
= 15 units – 8 units
= 7 units

7 units = 49
1 unit = 49 ÷ 7
= 7

Total number of students in the three groups
= 15 units + 20 units + 8 units
= 43 units
= 43 × 7
= **301**

Qn 4
Boys = 1 unit
Girls = 5 units
Children = 6 units

Adults = $\frac{2}{3}$ x 6 units = 4 units

Difference between adults and boys
= 4 units – 1 unit
= 3 units

3 units = 120
1 unit = 120 ÷ 3 = 40

Total = 40 x 10 = **400**

Qn 5

Total Square = 5 units

Unshaded square		4 units	Unshaded Square = 4 units
Shaded square		1 unit	Shaded Area = 1 unit
Square	1 units	× 5 = 5 units	Unshaded Rectangle = 14 units
Rectangle	3 unit	× 5 = 15 units	

Fraction unshaded → $\frac{14 \text{ units} + 4 \text{ units}}{14 \text{ units} + 4 \text{ units} + 1 \text{ unit}} = \frac{18}{19}$

Qn 6
Square = 2 units
Rectangle = 5 units
Shaded area = $\frac{3}{4}$ x 2 units = 1.5 units

Unshaded part of square = 2 units – 1.5 units = 0.5 units

Unshaded part of rectangle = 5 units – 1.5 units = 3.5 units

Total unshaded parts = 4 units = 72cm^2

1 unit = 72cm^2 ÷ 4 = 18cm^2

Area of square = 2 x 18cm^2
= **36cm^2**

Unit 2.6 – External Unchanged

Qn 1

Orange	1 unit	× 2 = 2 units
Water	3 units	× 2 = 6 units

Orange 2 units
Water 7 units

Increase in water = 1 unit
= 300 mℓ
Amount of syrup used = 2 units
= 2 × 300 mℓ
= **600 mℓ**

Qn 2

Before

Children	:	3 units × 2	=	6 units
Adults	:	5 units × 2	=	10 units

After

Children	:	2 units × 3	=	6 units
Adults	:	3 units × 3	=	9 units

Decrease in adults = 1 unit
= 125

Number of children = 6 units
= 6 × 125
= **750**

Qn 3

Boys	:	2 units × 3	= 6 units
Girls	:	3 units × 3	= 9 units
Boys	:	3 units × 2	= 6 units
Girls	:	5 units × 2	= 10 units

Increase in girls
= 4

No. of students in the end
= 16 × 4
= **64**

Qn 4

Before

Pear	:	1 unit × 4 = 4 units
Kiwi	:	2 units × 4 = 8 units

If given away

Pear	:	4 units
Kiwi	:	5 units

Qn 4 (Cont.)
Decrease in number of Kiwi fruit = 8 units – 5 units
= 3 units
3 units = 12
1 unit = 12 ÷ 3
= 4
Total number of fruits = 12 units
= 12 × 4
= **48**

Qn 5
At first
Team A 6 units × 7 = 42 units
Team B 7 units × 7 = 49 units
End
Team A 7 units × 6 = 42 units
Team B 8 units × 6 = 48 units

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

Qn 6
At first
Syrup = 1 unit x 2 = 2 units
Water = 2 units x 2 = 4 units

End
Syrup = 2 units
Water = 5 units

Since the amount of syrup is the same, make the units that represent the syrup the same.

Increase in water = 5 units – 4 units = 1 unit
1 unit = 200 mℓ

Water at first = 200 mℓ x 4 = **800 mℓ**

Unit 2.7 – Unchanged Total

Qn 1
At first
Boys 2 units × 4 = 8 units
Girls 5 units × 4 = 20 units
28 units
End
Boys 1 unit × 7 = 7 units
Girls 3 units × 7 = 21 units
28 units

Number of students transferred = 3
Total number of students at first = 28 × 3
= **84**

Qn 2
At first
Teck Seng 3 units × 4 = 12 units
Wilson 4 units × 4 = 16 units
28 units
End
Teck Seng 1 unit × 7 = 7 units
Wilson 3 units × 7 = 21 units
28 units
Total number of stickers = 28 units
28 units = 140
1 unit = 140 ÷ 28
= 5

Qn 2 (Cont.)
Number of stickers transferred = 12 units – 7 units
= 5 units
= 5 × 5
= **25**

Qn 3

After 3 days
Fixed 1 unit × 5 = 5 units
Unfixed 3 units × 5 = 15 units
After 1 week
Fixed 2 units × 4 = 8 units
Unfixed 3 units × 4 = 12 units

Transfer 3 units = 30
1 unit = 30 ÷ 3
= 10

Total pieces of puzzle = 20 units
= 20 × 10
= **200**

Qn 4

After 1 hour
Answered 1 unit × 5 = 5 units
Unanswered 1 unit × 5 = 5 units

After 20 minutes
Answered 4 units × 2 = 8 units
Unanswered 1 unit × 2 = 2 units

Transfer 3 units = 18
1 unit = 6

Total questions in quiz = 10 units
= 10 × 6
= **60**

Qn 5
Terry = 1 unit x 7 = 7 units
Chelsia + Dave = 3 units x 7 = 21 units

Total = 4 units x 7 = 28 units

Chelsea = 2 units x 4 = 8 units
Terry + Dave = 5 units x 4 = 20 units

Total = 7 units x 4 = 28 units

Since the cost of the present remains the same, we find the LCM of 4 and 7, which is 28.

Terry = 7 units
Dave = 20 units – 7 units = 13 units

Difference between Terry and Dave = 13 units – 7 units = 6 units

6 units = $24
1 unit = $24 ÷ 6 = $4

Cost of present = 28 x $4 = **$112**

Qn 6
Benson + Daryl = 3 units x 5 = 15 units
Jean = 1 units x 5 = 5 units

Qn 6 (Cont.)

Total = 4 units x 5 = 20 units

Daryl + Jean = 3 units x 4 = 12 units
Benson = 2 units x 4 = 8 units

Total = 5 units x 4 = 20 units

Since the sum of money remains the same, we find the LCM of 4 and 5, which is 20.

Jean = 5 units
Benson = 8 units

Difference between Benson and Jean = 8 units – 5 units = 3 units
3 units = $36

1 unit = $36 ÷ 3 = $12
Sum of money = 20 x $12 = **$360**

Unit 2.8 – Constant Difference

Qn 1

At first			
Boys	1 unit	× 3	= 3 units
Girls	2 units	× 3	= 6 units
Difference	1 unit	× 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 × 3
= **21**

Qn 2

Present				
John	1 unit	× 2	=	2 units
Sister	4 units	× 2	=	8 units
Difference	3 units	× 2	=	6 units

John	3 units	× 3	=	9 units
Sister	5 units	× 3	=	15 units
Difference	2 units	× 3	=	6 units

Increase each 7 units = 14
1 unit = 14 ÷ 7
= 2
John's age now = 2 units
= 2 × 2
= **4**

Qn 3

Present		
Mira	=	8 years old
Father	=	44 years old
Difference	=	36 years old

Future		
Mira	=	1 unit
Father	=	3 units
Difference	=	2 units

2 units = 36

Qn 3 (Cont.)
1 unit = 36 ÷ 2
= 18 (Mira's age in the future)
Number of years = 18 – 8
= 10

Mira will be $\frac{1}{3}$ as old as her father in **10 years' time.**

Qn 4

At first		
Jenny	1 unit × 2	= 2 units
Daryl	2 units × 2	= 4 units
Difference	1 unit × 2	

End	
Jenny	= 1 unit
Daryl	= 3 units
Difference	= 2 units

Decrease each 1 unit = 12
Jenny in the end 1 unit = **12**

Qn 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 × 2
= **56 kg**

Qn 6

Square	2 unit × 4	=	8 units
Rectangle	5 units × 4	=	20 units
Difference	3 units × 4		

Unshaded square	1 unit × 3	=	3 units
Unshaded rect	5 units × 3	=	15 units
Difference	4 units × 3		

Decrease each	5 units	=	40 cm²
	1 unit	=	8 cm²

Total area of figure
= 3 units + 15 units + 5 units
= 23 units
= 23 × 8 cm²
= **184 cm²**

Unit 2.9 – Number x Value of Units

Qn 1

	Number of units	×	Value	=	Total unit (stickers)
Boys	2	×	4	=	8
Girls	1	×	5	=	5
					13 units

13 units = 1105

Qn 1 (Cont.)
1 unit = 1105 ÷ 13
= 85
Total number of girls 1 unit = 1 × 85
= **85**

Qn 2
Red = 1 unit x 2 = 2 units (since red is repeated)
Yellow = 3 units x 2 = 6 units

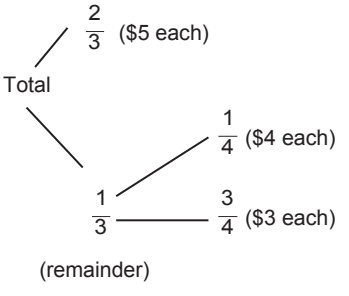
Red = 2 units
Green = 5 units

	Number	x	Value	= Total weight
Red	2 units	x	10g	= 20 units grams
Yellow	6 units	x	15g	= 90 units grams
Green	5 units	x	20g	= 100 units grams

Total = 210 units = 3150
1 unit = 3150 ÷ 210 = 15

Green marbles = 5 x 15 = **75**

Qn 3



$\frac{2}{3} = \frac{8}{12}$

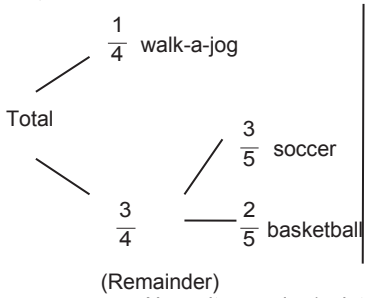
$\frac{1}{3} \times \frac{1}{4} = \frac{1}{12}$

$\frac{1}{3} \times \frac{3}{4} = \frac{3}{12}$

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

53 units = 318
1 unit = 318 ÷ 53
= 6
Total number of people = 12 × 6
= **72**

Qn 4



$\frac{1}{4} = \frac{5}{20}$

$\frac{3}{4} \times \frac{3}{5} = \frac{9}{20}$

$\frac{3}{4} \times \frac{2}{5} = \frac{6}{20}$

	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

99 units = 4950
1 unit = 50

Qn 4 (Cont.)
Total students = 20 units
= 20 × 50
= **1000**

Qn 5

$\frac{1}{3}$ 20 ct = $\frac{2}{3}$ 50 ct

$\frac{2}{6}$ 20 ct = $\frac{2}{3}$ 50 ct

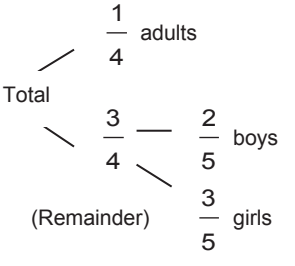
20 ct : 6 units
50 ct: 3 units
$1: 3 units

No. units	×	value (¢)	=	Total amount (unit ¢)
6 units	×	20	=	120 units
3 units	×	50	=	150 units
5	×	100	=	500 units
				770 units

770 units = 2310
1 unit = 3

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

Qn 6



$\frac{1}{4} = \frac{5}{20}$

$\frac{3}{4} \times \frac{2}{5} = \frac{6}{20}$

$\frac{3}{4} \times \frac{3}{5} = \frac{9}{20}$

	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

76 units = 1520
1 unit = 20

Total adults = 5 units = 5 × 20
= **100**

Unit 2.10 – Key Construct: Fraction As An Object

Qn 1

Remaining orange juice = $3\frac{1}{3}\ell - 1\frac{1}{2}\ell$

$= \frac{10}{3}\ell - \frac{3}{2}\ell$

$= \frac{20}{6}\ell - \frac{9}{6}\ell$

$= \mathbf{\frac{11}{6}}\ell$

Amount of orange juice in 1 cup = $= \frac{1}{2} \times \frac{11}{6}\ell = \mathbf{\frac{11}{12}}\ell$

Qn 2

Milk for smoothie = $\frac{1}{3} \times 4\frac{1}{2}\ell = \frac{1}{3} \times \frac{9}{2}\ell$

$= \frac{3}{2}\ell$

Amount of milk left = $4\frac{1}{2}\ell - 1\frac{1}{3}\ell - \frac{3}{2}\ell = \frac{9}{2}\ell - \frac{4}{3}\ell - \frac{3}{2}\ell$

$= \frac{27}{6}\ell - \frac{8}{6}\ell - \frac{9}{6}\ell$

$= \frac{10}{6}\ell = 1\frac{4}{6}\ell$

$= 1\frac{2}{3}\ell$

Qn 3

Remaining flour = $\frac{2}{3} \times 2\frac{1}{6}$ kg $= \frac{2}{3} \times \frac{13}{6}$

$= \frac{13}{9}$ kg

Amount of flour left = $\frac{1}{2} \times \frac{13}{9}$ kg = **$\frac{13}{18}$ kg**

Qn 4

Remaining ribbon = $\frac{3}{4} \times 7\frac{1}{2}$ m $= \frac{3}{4} \times \frac{15}{2}$ m

$= \frac{45}{8}$ m

Amount of ribbon left = $\frac{1}{3} \times \frac{45}{8}$ m

$= \frac{15}{8}$ m = **$1\frac{7}{8}$ m**

Qn 5

Remaining sugar = $3\frac{1}{3}$ kg $- \frac{2}{5}$ kg $= \frac{10}{3}$ kg $- \frac{2}{5}$ kg

$= \frac{50}{15}$ kg $- \frac{6}{15}$ kg $= \frac{44}{15}$ kg

Final amount of sugar left = $\frac{3}{4} \times \frac{44}{15}$ kg $= \frac{33}{15}$ kg

$= 2\frac{3}{15}$ kg = **$2\frac{1}{5}$ kg**

Qn 6

No. of pieces = $7\frac{2}{5}$ m $\div \frac{4}{5}$ m

$= \frac{37}{5} \div \frac{4}{5} = \frac{37}{5} \times \frac{5}{4}$

$= \frac{37}{4} = \mathbf{9\frac{1}{4}}$

(a) She can cut **9** shorter pieces

(b) Length of remaining ribbon = $\frac{1}{4} \times \frac{4}{5}$ m = **$\frac{1}{5}$ m**

Qn 7

No. of cups = $6\frac{1}{2}\ell \div \frac{2}{5}\ell$

$= \frac{13}{2} \div \frac{2}{5} = \frac{13}{2} \times \frac{5}{2}$

$= \frac{65}{4} = 16\frac{1}{4}$ cups

(a) She can pour **16** cups

(b) Amount of remaining orange juice = $\frac{1}{4} \times \frac{2}{5}\ell$ = **$\frac{1}{10}\ell$**

Chapter 3 Rate

Unit 3.1 Rate Involving One Object

Qn1

1 minute → 6 plates

45 minutes → 45 × 6 = **270 plates**

Qn 2

3 days → 1 house

1 day → $\frac{1}{3}$ house

36 days → $\frac{1}{3} \times 36$ = **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 $\frac{1}{8} + \frac{1}{10} = \frac{5}{40} + \frac{4}{40} = \frac{9}{40}$

$\frac{9}{40}$ 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 3.2 – Rate Involving Two Different Objects

Qn 1

11.4km – 2km = 9.4km

9.4km = 9.4 x 1000 = 9400m

9400m ÷ 500m = 18, Remainder 400m

Taxi fare = \$4.50 + 19 x \$0.40 + \$4.20

= **\$16.30**

Qn 2

(a) 4 p.m. to 5 p.m., he will pay \$5

5 p.m. to 7 p.m. , he will pay \$8 x 2 = \$16

Total Jason had to pay = \$5 + \$16 **= \$21**

Qn 2 (Cont.)

(b) 4 p.m. to 7 p.m. , she will pay $9 x 3 = $27

Difference she had to pay = $27 – $21
= **$6**

Qn 3

$115m^3 = 50m^3 + 50m^3 + 15m^3$

Cost = $1.35 x 50 + $1.45 x 50 + $1.60 x 15
= **$164**

Qn 4

3.30 p.m. to 6 p.m., duration = 2h 30min = 1h + 1h 30min
Parking charges = $2.50 + $1.50 x 3 + $5 = **$12**

Qn 5

Weekday = $7 x 8 + 2 x $10 = $76

Weekend = $76 x 1.5 = $114

Wages = $76 x 4 + $114 x 2
= **$532**

Qn 6

(a) 10 min = 5 min + 5 min

Total cost = $3.20 + $0.50 x 5 = **$5.70**

(b) Difference in first 5 min = $4 – $3.20 = $0.80

Difference in every additional min
= $0.50 – $0.40
= $0.10

Number of additional min needed to close the gap of $0.80
= $0.80 ÷ $0.10
= 8 minutes

Total duration of talk time = 8 min + 5 min = **13min**

Unit 3.3 – Key Construct: Rate involving 2 Different Objects

Qn 1

In 1 min, machine X print $\frac{1}{40}$ of the stickers.

In 1 min, machine X print $\frac{1}{50}$ of the stickers.

In 1 min, difference = $\frac{1}{40} - \frac{1}{50}$ of the stickers.

$= \frac{5}{200} - \frac{4}{200}$ of the stickers

$= \frac{1}{200}$ stickers

$\frac{1}{200}$ stickers = **10 stickers**

Qn 2

In 1 day, Johnny can paint $\frac{1}{6}$ house

Together, Johnny and Ramesh can paint $\frac{1}{3}$ house

Ramesh alone can paint $\frac{1}{3} - \frac{1}{6} = \frac{1}{6}$ house

$\frac{1}{6}$ house take Ramesh 1 day

Whole house will take Ramesh **6 days.**

Qn 3

In 1 day, John and Rauf build $\frac{1}{4}$ of the model train, Rauf and Sean build $\frac{1}{6}$ of the model train and John and Sean build $\frac{1}{3}$ of the model train.

Together (John, Rauf and Sean) build
$\rightarrow \frac{1}{4} + \frac{1}{6} + \frac{1}{3} \rightarrow \frac{9}{12} = \frac{3}{4}$ 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 $\frac{1}{3}$ day
$\frac{8}{8}$ of the model train in $\frac{8}{3}$ days = $\mathbf{2\frac{2}{3}}$ **days.**

Qn 4

In 2 min, machine A assembles 12 toys
In 3min, machine B assembles 15 toys
In 1 minute, machine A assembles 6 toys
In 1 minute, machine B assembles 5 toys

(a) **Machine A** is faster
(b) In 5 min, machine B assembles 5 x 5 = 25 toys

Big difference needed = 25 + 24 = 49 toys
Small difference = 6 – 5 = 1 toy
No. of mins needed = 49 ÷ 1 = **49min**

Qn 5

In 1min, machine A folds 5 boxes
In 3min, machine A folds 15 boxes.
In 3min, machine B folds 10 boxes.

In 3min, machine A folds 5 more boxes than machine B.

From 0900 to 0930, machine B folds 10 x 10 = 100 boxes.

No. of sets of 3min needed for machine A to fold 125 more boxes than machine B
= (100 + 125) ÷ (15 – 10) = 45 blocks of 3min

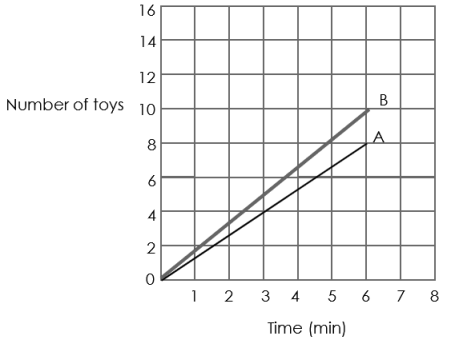
Actual time needed = 45 x 3min = 135min = 2h 15min

At **11.45 a.m,** machine A will fold 125 more boxes than machine B.

Qn 6

(a) Machine A in 6min can assemble 8 toys
Machine A in 1 hour can assemble 8 x 10 = **80 toys**

(b)



(c) Machine A in 90min can assemble 8 x 15 = 120 toys
In 1 hour, machine B assembles 20 more toys then machine A.

Time needed for machine B = 120 ÷ 20 = 6 hours.

At **4.30 p.m**., both machines will assemble the same number of toys.

Chapter 4 Angles I

Unit 4.1 – Angles on a Straight Line

Qn 1

$\angle x$ = 180° – 54° – 78°
= **48°**

Qn 2

$\angle x$ = 180° – 98° – 42°
= **40°**

Qn 3

80° – 60° = 120°
8 units = 120°
1 unit = 15°
$\angle y$ = 5 units
= 5 ×15°
= **75°**

$\angle x$ = 3 units
= 3 ×15°
= **45°**

Qn 4

$\angle y$ = 2 units, $\angle x$ = 1 unit, $\angle z$ = 1 unit

Total = 4 units = 180°
1 unit = 45°
$\angle x$ = 1 unit = **45°**

$\angle y$ = 2 units = 2 × 45°
= **90°**
$\angle z$ = 1 unit = **45°**

Qn 5

$\angle x$ = 180 ° – 90° – 36° = **54°**
$\angle$y = 90° – 34° = **56°**

Unit 4.2 – Vertically Opposite Angles

Qn 1

$\angle y$ = **25°** (vertically opposite $\angle$)
$\angle x$ = **50°** (vertically opposite $\angle$)

Qn 2

$\angle y$ + 45° = 125° (vertically opposite $\angle$)
$\angle y$ = 125° – 45° (vertically opposite $\angle$)
= **80°**

Qn 3

$\angle x$ +$\angle y$ = 120° (vertically opposite $\angle$)
3 units = 120°
1 unit = 40°
$\angle x$ = 2 units
= 2 × 40°
= **80°**
$\angle y$ = 1 unit
= **40°**

Qn 4

$\angle x$ +$\angle y$ +120° = 180° ($\angle$ on straight line)
$\angle x$ +$\angle y$ = 60°
3 units = 60°
1 unit = 20°
$\angle x$ = 2 units
= 2 × 20°
= **40°**
$\angle y$ = **20°**

Qn 5

$\angle x$ = **32°**
$\angle y$ = 180° – $\angle x$ –74°
= 180° – 32° – 74°
= **74°** ($\angle$ on a straight line)

Qn 6

$\angle x$ = **42°** (vertically opposite $\angle$)
$\angle y$ = 180° – 83° – 42°
= **55°** ($\angle$ on a straight line)

Qn 7

$\angle x$ +$\angle y$ + 84° = 180° ($\angle$ on a straight line)
$\angle x$ +$\angle y$ = 180° – 84°
= 96°

4 units = 96°
1 unit = 24°
$\angle x$ 3 units = 3 × 24°
= **72°**
$\angle y$ 1 unit = **24°**
$\angle z$ = $\angle x$
= **72°** (vertically opposite $\angle$)

Unit 4.3 – Alternate, Corresponding & Interior Angles

Qn 1

$\angle BFC$ = 130° (corresponding $\angle$)
$\angle y$ = 180° – 130°
= **50°** ($\angle$ on a straight line)
$\angle EFC$ = 130° – 75°
= 55°
$\angle ECF$ = 180° – 55° – 112°
= 13°

$\angle x$ = 180° – 13° – 130°
= **37°** (sum of $\angle$s in a Δ)

Qn 2

$\angle a = 180° - 69° - 80°$
$= \mathbf{31°}$

$\angle b = 180° - 100°$
$= \mathbf{80°}$

Qn 3

$\angle z = 180° - 56° - 34°$
$= \mathbf{90°}$ ($\angle$s on a straight line)
$2x = 180° - 34° - 90°$ (alternate $\angle$)
$= 56°$
$x = \mathbf{28°}$

$3y = 180° - 90°$ (alternate $\angle$)
$= 90°$
$y = \mathbf{30°}$

Qn 4

$\angle x = 180° - 135°$
$= 45°$

$\angle y = \mathbf{135°}$

Qn 5

$180° - 93° = 87°$
$180° - 78° = 102°$

$\angle x + \angle y = 360° - 102° - 87°$
$= \mathbf{171°}$

Qn 6

$\angle a = 180° - 61° = 119°$
$180° - 31° - 61° = 88°$

$\angle b = 180° - 88° - 62°$
$= \mathbf{30°}$

Qn 7

$\angle BDE = 50°$ (alternate $\angle$)
$\angle p = 50° \div 2$
$= \mathbf{25°}$ ($\angle$ bisector)

$\angle BGD = 180° - 105°$
$= 75°$

$\angle q = 180° - 75° - 25°$
$= \mathbf{80°}$ (sum of $\angle$s in a Δ)

Qn 8

$\angle BEG = 60°$ (alternate $\angle$)
$\angle x = 60° \div 2$
$= \mathbf{30°}$
$\angle BDE = 180° - 125°$
$= 55°$ ($\angle$ on a straight line)
$\angle y = 180° - 55° - 30°$
$= \mathbf{95°}$ (sum of $\angle$s in a Δ)
$\angle z = 180° - 30°$
$= \mathbf{150°}$ (sum of interior $\angle$s)

Unit 4.4 – Isosceles Triangle

Qn 1

$\angle CBE = 85°$ (isosceles Δ)
$\angle CAD = 180° - 85° - 85°$
$= 10°$ (sum of $\angle$s in a Δ)
$\angle FBA = 180° - 85°$
$= 95°$ ($\angle$ on a straight line)

Qn 1 (Cont.)

$\angle BFA = 180° - 95° - 10°$
$= 75°$ (sum of $\angle$s in a Δ)
$\angle m = 180° - 75°$
$= \mathbf{105°}$ ($\angle$ on a straight line)

Qn 2

$\angle ABC = \angle ACB$
$= 180° - 110°$
$= 70°$ ($\angle$ on a straight line)
$\angle XBA = 180° - 70°$
$= 110°$ ($\angle$ on a straight line)
$\angle a = 180° - 45° - 110°$
$= \mathbf{25°}$ (sum of $\angle$s in a Δ)

Qn 3

$\angle PQR = 55°$ (isosceles Δ)
$\angle PRQ = 180° - 55° - 55°$ (sum of Δ)
$= 70°$
$\angle PRS = 180° - 70°$ ($\angle$s on a straight line)
$= \mathbf{110°}$

$\angle SRT = 180° - 110°$
$= 70°$ ($\angle$s on straight line)
$\angle RST = 180° - 70° - 70°$
$= \mathbf{40°}$

Qn 4

$\angle PQT = 70°$ (isosceles Δ)
$\angle QTU = 70°$ (alternate $\angle$)
$\angle QTR = 70° - 50°$
$= \mathbf{20°}$

Qn 5

$$\angle x = \frac{180° - 130°}{2}$$
$= \mathbf{25°}$ (isosceles Δ)
$\angle ACF = 180° - \angle x$
$= 180° - 25°$
$= 155°$ (sum of interior $\angle$s)
$\angle DCF = 180° - 110°$
$= 70°$ (sum of interior $\angle$s)
$\angle y = 155° - 70° - 25°$
$= \mathbf{60°}$

Qn 6

$\angle z = \mathbf{38°}$ (alternate $\angle$s)
$180° - 30° - 38° = 112°$ (sum of $\angle$s in a Δ)
$\angle x = 180° - 112°$
$= \mathbf{68°}$ ($\angle$ on a straight line)
$\angle y = 180° - \angle x - \angle x$
(vertically opp.$\angle$, sum of $\angle$ in a Δ)
$= 180° - 68° - 68°$
$= \mathbf{44°}$

Qn 7

$\frac{180° - 75°}{2} = 55°$

$180° - 30° - 30° = 120°$
$\angle y = 360° - 120°$
$= \mathbf{240°}$
$\angle x = 55° - 30°$
$= \mathbf{25°}$

Qn 8

$\angle KEF = 60° - 38°$
$= 22°$
$\angle KFE = 60° - 25°$
$= 35°$
$\angle EKF = 180° - 22° - 35°$
$= 123°$ (vertically opp.$\angle$s, sum of $\angle$s in a Δ)

$\angle HKG =$ **123°** (vertically opp. $\angle$s)

Qn 9

$\angle PQR = 55°$ (Δ isosceles)
$\angle PRQ = 180° - 55° - 55°$ (sum of triangle)
$= 70°$

(a) $\angle$PRS $= 180° - 70°$ (angle on straight line)
$=$ **110°**

$\angle SRT = 180° - 110°$
$= 70°$ (angle on straight line)

(b) $\angle RST = 180° - 70° - 70°$
$=$ **40°** (Δ isosceles)

Chapter 5 Angles II (Closed Figures)

Unit 5.1 – Interior and Exterior Angles Within A Triangle

Qn 1

$\angle x = 125° - 70°$
$=$ **55°** (2 interior $\angle$ = 1 exterior $\angle$)

Qn 2

$\angle y = 142° - 65°$
$=$ **77°** (2 interior $\angle$ = 1 exterior $\angle$)

Qn 3

$\angle z = 34° + 42°$
$=$ **76°** (2 interior $\angle$s = 1 exterior $\angle$)
$\angle y + 56° = 76°$ (2 interior $\angle$s = 1 exterior $\angle$)
$\angle y =$ **20°**

Qn 4

$\angle y = 42° + 54°$
$=$ **96°** (2 internal $\angle$ = 1 external $\angle$)
$180° - 96° = 84°$
$\angle x = 180° - 84° - 20°$
$=$ **76°**

Qn 5

$\angle a + \angle b + 20° = \angle c + \angle d + 20° = 180°$(sum of $\angle$s in Δ)
$\angle a + \angle b + \angle c + \angle d = (180° \times 2) - 20° - 20°$
$= 360° - 40°$
$=$ **320°**

Qn 6

$60° + 60° = 120°$
$180° - 110° - 20° = 50°$
$\angle x = 180° - 100° - 70°$
$=$ **10°** (sum of $\angle$s in a Δ)

Qn 7

$\angle WUV = \angle b + \angle d$ (2 internal $\angle$ = 1 external $\angle$)
$\angle UWV = \angle a + \angle c$ (2 internal $\angle$ = external $\angle$)
$\angle a + \angle b + \angle c + \angle d + 20° = 180°$ (sum of Δ)
$\angle a + \angle b + \angle c + \angle d =$ **160°**

Qn 8

$\angle a + \angle b + \angle c + \angle d + \angle e + \angle f$
$= (180° \times 3) - 180°$
$=$ **360°** since the sum of $\angle$ of ΔRSV $= 180°$

Qn 9

$$\angle PQS = \frac{80° - 34°}{2}$$
$= 73°$ (isosceles Δ)

$\angle x = 180° - 73° - 15°$
$=$ **92°** (sum of $\angle$s in Δ)

$\angle PTR = 180° - 92°$
$= 88°$

$\angle y = 34° + 88°$
$=$ **122°** (2 interior $\angle$s = 1 exterior $\angle$)

Unit 5.2 – Angle Properties Within A Rhombus

Qn 1

$\angle DAB = 180° - 30° - 30°$
$= 120°$ (sum of $\angle$s in a Δ)

$$\angle x = \frac{120°}{2}$$
$=$ **60°**

Qn 2

$\angle QPB = 180° - 114°$
$= 66°$
(a) $\angle QPR = \frac{66°}{2}$
$=$ **33°**

(b) $\angle$QCB $=$ **96°**

(c) $\angle RSC = 180° - 84° - 33°$
$=$ **63°**

Qn 3

$\angle ADC = 180° - 130°$
$= 50°$
$\angle x = \frac{50°}{2}$
$=$ **25°**

Qn 4

$180° - 45° - 90° - 30° = 15°$
$\angle x =$ **15°**

Qn 5

$\angle FBE = 90°$
(a) $\angle BFE = \angle DFC$
$= 180° - 90° - 35°$
$=$ **55°**

$\angle DBF = 45°$ (diagonal of square)
$\angle BDF + 45° = \angle DFC$

(b) $\angle BDF = 55° - 45°$
$=$ **10°**

Qn 6

$\angle x = 180^\circ - 108^\circ$
$= \mathbf{72^\circ}$ (interior $\angle$s)
$180^\circ - 90^\circ - 47^\circ = 43^\circ$
$\angle y = \mathbf{43^\circ}$ (alternate $\angle$s)

Qn 7

$\angle FBD = 180^\circ - 70^\circ - 45^\circ$
$= 65^\circ$
$\angle x = 65^\circ \div 2$
$= \mathbf{32.5^\circ}$
$\angle BDE = 180^\circ - 65^\circ$
$= 115^\circ$

$70^\circ + \angle y = 115^\circ$ (2 internal $\angle$ = 1 external $\angle$)
$\angle y = 115^\circ - 70^\circ$
$= \mathbf{45^\circ}$

Qn 8

$\angle x = 180^\circ - 105^\circ + 20^\circ$
$= \mathbf{55^\circ}$

$\angle y = 55^\circ + 20^\circ + 20^\circ$
$= \mathbf{95^\circ}$ (2 interior $\angle$s = 1 exterior $\angle$)

Qn 9

BD diagonal, bisector → $\angle y = \angle 2x$
$\angle ADC = 180^\circ - 110^\circ$
$= 70^\circ$ (interior $\angle$)

$\angle y = \angle 2x$
$= 180^\circ - 110^\circ$
$= \frac{70^\circ}{2}$ (sum of $\angle$s in a $\triangle$)
$\angle x = \mathbf{17.5^\circ}$
$\angle y = \mathbf{35^\circ}$

Qn 10

$\angle DAO = 45^\circ$ (diagonal of square)
$\angle DAE = 180^\circ - 90^\circ - 60^\circ$
$= 30^\circ$ (sum of Δ)
$\angle y = 45^\circ - 30^\circ$
$= \mathbf{15^\circ}$

$\angle x = 15^\circ + 90^\circ$
$= \mathbf{105^\circ}$ (2 internal $\angle$ = 1 external $\angle$)

Unit 5.3 – Angles Properties Within a Parallelogram

Qn 1

$\angle y = \mathbf{60^\circ}$ (alternate $\angle$)
$\angle x = 180^\circ - 35^\circ - 70^\circ - 60^\circ$
$= \mathbf{15^\circ}$ (sum of $\angle$s in a $\triangle$)

$\angle z = \angle x + \angle y$
$= 60^\circ + 15^\circ$
$= \mathbf{75^\circ}$ (2 interior $\angle$s = 1 exterior $\angle$)

Qn 2

$\angle x = \mathbf{25^\circ}$ (alternate $\angle$)
$\angle y = 42^\circ + 25^\circ$
$= \mathbf{67^\circ}$ (2 internal $\angle$ = 1 external $\angle$)

$\angle z = 180^\circ - 80^\circ - 42^\circ - 25^\circ$
$= \mathbf{33^\circ}$ (sum of Δ)

Qn 3

$\angle RSU = 180^\circ - 88^\circ = 92^\circ$ (corresponding $\angle$)
(a) $\angle SRU = \frac{180^\circ - 92^\circ}{2}$
$= \mathbf{44^\circ}$ (isosceles $\triangle$)

(b) $\angle PSR = 360^\circ - 144^\circ - 92^\circ$
$= \mathbf{124^\circ}$

Qn 4

$\angle BAC = 30^\circ$ (alternate $\angle$)
$\angle CAD = 180^\circ - 30^\circ - 20^\circ = 130^\circ$
(a) $\angle ADC = 180^\circ - 130^\circ - 30^\circ$
$= \mathbf{20^\circ}$ (sum of Δ)

(b) $\angle CAD = \mathbf{130^\circ}$

(c) $\angle ACB = 180^\circ - 20^\circ - 30^\circ$
$= \mathbf{130^\circ}$

Unit 5.4 – Angle Properties Within A Trapezium

Qn 1

$\angle CDB = \frac{180^\circ - 120^\circ}{2}$
$= 30^\circ$ (isosceles Δ)
(a) $\angle BDE = 78^\circ - 30^\circ$
$= \mathbf{48^\circ}$

(b) *$\angle BEA = 78^\circ$ (corresponding $\angle$)*

$\angle EBC = 180^\circ - 120^\circ$
$= 60^\circ$ (interior $\angle$)
$\angle EBA = 130^\circ - 60^\circ$
$= 70^\circ$
$\angle BAE = 180^\circ - 78^\circ - 70^\circ$
$= \mathbf{32^\circ}$ (sum of $\angle$s in a Δ)

Qn 2

$180^\circ - 118^\circ = 62^\circ$ ($\angle$ on straight line)
$\angle y = 180^\circ - 84^\circ - 62^\circ$
$= \mathbf{34^\circ}$ (sum of Δ)

$\angle x = \angle y$
$= \mathbf{34^\circ}$ (alt. $\angle$)

Qn 3

$\angle DAB = 180^\circ - 86^\circ$
$= 94^\circ$
$\angle ABD = \frac{180^\circ - 94^\circ}{2}$
$= 43^\circ$
$\angle y = 180^\circ - 88^\circ - 43^\circ$
$= \mathbf{49^\circ}$ (interior $\angle$s)
$\angle x = 180^\circ - 86^\circ$
$= \mathbf{94^\circ}$ (interior $\angle$s)

Qn 4

$\angle y = 90^\circ - 48^\circ$
$= \mathbf{42^\circ}$ (2 interior $\angle$s = 1 exterior $\angle$)

Qn 5

$\angle BFC = 54^\circ$ (alternate $\angle$)
(a) $\angle t = 180^\circ - 57^\circ - 54^\circ$
$= \mathbf{69^\circ}$
(b) $\angle y = 69^\circ - 54^\circ$
$= \mathbf{15^\circ}$

Qn 5 (Cont.)

(c) $\angle BAF = 54°$ (isosceles Δ)
$\angle x = 180° - 54° - 54°$
$= \mathbf{72°}$ (sum of isosceles Δ)

(d) $\angle u = \angle CBE$
$= \mathbf{57°}$ (alternate $\angle$)

Unit 5.5 – Key Construct: Similar Angles in Folded Shapes

Qn 1

$\angle DCA = (90° - 48°) \div 2$
$= 21°$
$\angle DAC = 180° - 90° - 21°$
$= \mathbf{69°}$

Qn 2

$\angle ACD = 45°$
$\angle CAD = 180° - 118° - 45°$
$= 17°$

$\angle BAE = 45° - 17° - 17°$
$= \mathbf{11°}$

Qn 3

$\angle BGC = 180° - 61° - 61° - 22° - 22°$
$= \mathbf{14°}$

$\angle CDG = 180° - 22° - 48°$
$= \mathbf{110°}$

Qn 4

$\angle PQR = 45°$
$\angle SQO = (90° - 45°) \div 2$
$= 22.5°$

$\angle SOQ = 180° - 90° - 22.5°$
$= \mathbf{67.5°}$

Qn 5

$\angle BAC = 180° - 35° - 35°$
$= 110°$

$\angle DAB = \angle CAE$
$= 180° - 129° - 33°$
$= 18°$

$\angle BAC = 110° - 18° \times 4$
$= \mathbf{38°}$

Qn 6

$\angle XZY = (180° - 52°) \div 2$
$= 64°$

$\angle MNZ = \angle NMZ$
$= (180° - 64°) \div 2$
$= \mathbf{58°}$

$\angle ZNM = 58°$
$\angle XMZ = 180° - 58° - 58°$
$= \mathbf{64°}$

Qn 7

$\angle EDB = 180° - 67°$
$= \mathbf{113°}$

Qn 7 (Cont.)

$\angle ABC = (180° - 98°) \div 2$
$= 41°$

$\angle DEB = 180° - 41° - 113°$
$= 26°$

$\angle AEB = 180° - 26° \times 2$
$= \mathbf{128°}$

Chapter 6 Area of Triangle

Unit 6.1 – Area of Triangle

Qn 1

Height = **AB** Height = **AF**
Height = **DC** Height = **AB**

Qn 2

Base = **12 cm** Height = **16 cm**

Qn 3

Base = **4 cm** Height = **7 cm**

Qn 4

Base = **5 cm** Height = **20 cm**

Qn 5

Base = **14 cm** Height = **7 cm**

Qn 6

Base = 4 cm + 8 cm
$= \mathbf{12\ cm}$

Height = 8 cm – 5 cm
$= \mathbf{3\ cm}$

Qn 7

Area of ΔBCD
$= (\frac{1}{2} \times 18 \times 8)$
$= (\frac{1}{2} \times 8 \times DF)$
$DF = \frac{18 \times 8}{12}$
$= \mathbf{12\ cm}$

Qn 8

Area of shaded ΔBCD
$= (\frac{1}{2} \times 20 \times CE)$
$= (\frac{1}{2} \times 16 \times 15)$
$CE = \frac{16 \times 15}{20}$
$= \mathbf{12\ cm}$

Qn 9

Area of ΔABC
$= (\frac{1}{2} \times 15 \times 20)$
$= (\frac{1}{2} \times 30 \times BD)$
$BD = \frac{15 \times 20}{30}$
$= \mathbf{10\ cm}$

Qn 10

Area of shaded ΔABC

$= (\frac{1}{2} \times 12 \times AB)$

$= (\frac{1}{2} \times 28 \times 18)$

$AB = \frac{28 \times 18}{12}$

$=$ **42 cm**

Unit 6.2 – Finding the Area of a Triangle in Unit Squares

Qn 1

(a) Triangle

$= (6 \times 6) - (\frac{1}{2} \times 4 \times 2) - (\frac{1}{2} \times 6 \times 2) - (\frac{1}{2} \times 4 \times 6)$

$= 36\ cm^2 - 4\ cm^2 - 6\ cm^2 - 12\ cm^2$

$=$ **14 cm²**

(b) Triangle

$= (6 \times 6) - (\frac{1}{2} \times 4 \times 6) - (\frac{1}{2} \times 2 \times 3) - (\frac{1}{2} \times 3 \times 6)$

$= 36\ cm^2 - 12\ cm^2 - 3\ cm^2 - 9\ cm^2$

$=$ **12 cm²**

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 cm²**

(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 cm²**

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 cm²**

(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 cm²**

Qn 4

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

Area of Region A $= \frac{1}{2} \times 6\ cm \times 1\ cm$
$= 3\ cm^2$

Area of Region B $= \frac{1}{2} \times 5\ cm \times 3\ cm$
$= 7.5\ cm^2$

Qn 4 (Cont.)

Area of region C $= \frac{1}{2} \times 2\ cm \times 3\ cm$
$= 3\ cm^2$

Shaded area $= 30\ cm^2 - 3\ cm^2 - 7.5\ cm^2 - 3\ cm^2$
$=$ **16.5 cm²**

(b) Area of rectangle $= 6\ cm \times 6\ cm$
$= 36\ cm^2$

Area of Region A $= \frac{1}{2} \times 4\ cm \times 2\ cm$
$= 4\ cm^2$

Area of Region B $= \frac{1}{2} \times 2\ cm \times 3\ cm$
$= 3\ cm^2$

Area of region C $= \frac{1}{2} \times 6\ cm \times 3\ cm$
$= 9\ cm^2$

Shaded area
$= 36\ cm^2 - 9\ cm^2 - 4\ cm^2 - 3\ cm^2$
$=$ **20 cm²**

Unit 6.3 – Triangle with Common Base or Height

Qn 1

Area of rectangle $= (11 \times 8)$
$= 88\ cm^2$

Area of 3 Δs

$= (\frac{1}{2} \times 11 \times 3) + (\frac{1}{2} \times 8 \times 8) + (\frac{1}{2} \times 5 \times 3)$

$= 16.5\ cm^2 + 32\ cm^2 + 7.5\ cm^2$

$= 56\ cm^2$

Area of shaded triangle $= 88\ cm^2 - 56\ cm^2$
$=$ **32 cm²**

Qn 2

Area of 1 triangle $= \frac{1}{2} \times b \times h$

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

$= 50\ cm^2$

Area of shaded parts = 2 triangles
$= 2 \times 50\ cm^2$
$=$ **100 cm²**

Qn 3

Area of big triangle $= \frac{1}{2} \times 20\ cm \times 10\ cm$
$= 100\ cm^2$

Area of small triangle $= \frac{1}{2} \times 10\ cm \times 10\ cm$
$= 50\ cm^2$

Area of shaded parts $= 100\ cm^2 + 50\ cm^2$
$=$ **150 cm²**

Qn 4

Area of 1 triangle $= \frac{1}{2} \times b \times h$

$= \frac{1}{2} \times 20\ cm \times 10\ cm$

$= 100\ cm^2$

Area of shaded parts = 2 triangles
$= 2 \times 100\ cm^2$
$=$ **200 cm²**

Qn 5

Area of 1 triangle $= \frac{1}{2} \times b \times h$

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

$= 50\text{ cm}^2$

Area of shaded parts = 2 triangles

$= 2 \times 50\text{ cm}^2$

$=$ **100 cm²**

Qn 6

ΔDEC is $\frac{1}{4}$ of square ABCD.

ΔCBF is $\frac{1}{4}$ of square ABCD.

ΔAEF is $\frac{1}{8}$ of square ABCD.

Shaded triangle $= 1 - \frac{1}{4} - \frac{1}{4} - \frac{1}{8}$

$= 1 - \frac{2}{8} - \frac{2}{8} - \frac{1}{8}$

$= \frac{3}{8}$ 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 6.4 – 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 ΔABC and ΔADC share the same base AC,

the area of ΔABC is $\frac{1}{3}$ of ΔADC.

Difference = 2 units = 64 cm²

1 unit = 64 cm² ÷ 2

= 32 cm²

Area of $\Delta ADC = \frac{1}{2} \times AC \times 12\text{ cm}$

$= 3 \times 32\text{ cm}^2$

AC = 96 cm² ÷ 6cm = **16cm**

Qn 4

Since ΔADE and ΔBCE share the same base,

$\Delta ADE + \Delta BCE = \frac{1}{2}$ rectangle ABCD

Area of rectangle ABCD

$= 84\text{cm}^2 \times 2$

$= 168\text{cm}^2$

Breath AD = $168\text{cm}^2 \div 24\text{cm} = 7\text{cm}$

Perimeter of ABCD = (24cm + 7cm) x 2

$=$ **62cm**

Qn 5

Since ΔABD and ΔBCD share the same base BD, the area of ΔBCD is $\frac{3}{5}$ of ΔABD

Area of ΔABD = 5 units = 30 cm²

1 unit = 30 cm² ÷ 5 = 6 cm²

Area of quadrilateral = 8 units

$= 8 \times 6\text{ cm}^2$

$=$ **48 cm²**

Qn 6

Area of shaded region

$= (\frac{1}{2} \times 8 \times 20) + (\frac{1}{2} \times 12 \times 25)$

$= 80\text{ cm}^2 + 150\text{ cm}^2$

$=$ **230 cm²**

Qn 7

Area of shaded parts

$= (\frac{1}{2} \times 18 \times 10) + (\frac{1}{2} \times 12 \times 10)$

$= 90\text{ cm}^2 + 60\text{ cm}^2$

$=$ **150 cm²**

Qn 8

5 units	=	30 cm		
1 unit	=	6 cm		
AB	=	1 unit	=	6 cm
DE	=	4 units	=	24 cm

Area of shaded parts

$= (\frac{1}{2} \times 24 \times 10) + (\frac{1}{2} \times 6 \times 10)$

$= 120\text{ cm}^2 + 30\text{ cm}^2$

$=$ **150 cm²**

Unit 6.5 – Composite Figures Involving Triangles

Qn 1

Area of 1 triangle $= \frac{1}{2} \times 12\text{ cm} \times 8\text{ cm}$

$= 48\text{ cm}^2$

Area of figure $= 48\text{ cm}^2 \times 5$

$=$ **240 cm²**

Qn 2

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

$= 60\text{ cm}^2$

Area of 8 triangles $= 60\text{ cm}^2 \times 8$

$=$ **480 cm²**

Qn 3

Area of 1 triangle = $\frac{1}{2}$ × 10 cm × 8 cm
= 40 cm²
Area of figure = 40 cm² × 6
= **240 cm²**

Qn 4

P + R = $\frac{1}{2}$ rectangle ABCD
= Q + S
S = 24 cm² + 45 cm² – 20 cm²
= **49 cm²**

Qn 5

Figure 1, Perimeter = (21 cm – 5 cm – 5 cm) × 4
= **44 cm**
Figure 2, Perimeter = 21 cm × 2
= **42 cm**

Chapter 7 Percentage

Unit 7.1 – Percentage Increase

Qn 1

20% of original → 85
100% of original → 5 × 85 = **425**

Qn 2

100% of original → 1800
1% of original → 1800 ÷ 100 = 18

15% of original → 18 × 15 = **270**

Qn 3

At first	In the end
Girls → 40%	Girls → 40% + 12 (50% of total)
Boys → 60%	Boys → 60% – 60 (50% of total)

20% of the total → 60 + 12 = 72
10% of the total → 36

Total pupils at first → 10 × 36 = **360**

Qn 4

Aaron → 30% of the sum
Bernard → 70% of the sum

Difference → 40% of the sum = $120
1% of the sum → $120 ÷ 40 = $3

Sum of money → 100 × $3 = **$300**

Qn 5

20% of his salary → $800
1% of his salary → $800 ÷ 20 = $40

100% of his salary → 100 × $40 = **$4000**

Qn 6

30% of boys → 30% of total + 36
1% of boys → 1% of total + 1.2

100% of total → 1.2 × 100 = 120
Boys at first → 120 + 120 = **240**

Unit 7.2 – Multiplication in Percentage

Qn 1

At first
Janice's savings = 80%
David 's savings = 100%

End
Janice's savings = 80% x 80%
= $\frac{80}{100}$ x 80% = 64%

David 's savings = 100%

Total savings in the end = 164% → $820

1% → $820 ÷ $164= $5

Janice's savings at first = $5 x 80 = **$400**

Qn 2

Income 100% { Wife → 30%; Self → 70%

Income 120% { Wife → $\frac{30}{100}$ × 120% = 36%; Self → 120% – 36% = 84%

Increase in wife's income → 6% → $240
1% → $40
Income before increase = 100 × 40
= **$4000**

Qn 3

Salary → 100%
Savings → 45%
Expenditure → 55%

Salary → 80%
Savings → $\frac{45}{100}$ × 80% = 36%

Decrease in savings = 45% – 36%
= 9%
9% → $90
1% → $10

Salary at first → 100 × $10 = **$1000**

Qn 4

Amount of water left → 60% of 60%
→ $\frac{3}{5}$ × 60% = 36%

36%→ 72 litres
1% → 2 litres

Volume of water the tank can hold → 100%
→ 100 × 2 ℓ
= **200** ℓ

Qn 5

At first
Blue = 80% Red = 100%

Qn 5 (Cont.)

In the end

Blue = 110% x 80%

$= \frac{110}{100}$ x 80% = 88%

Red = 100% – 40% = 60%

Difference = 28% → 70

4% → 70 ÷ 7 = 10

Blue marbles at first = 80% → 20 x 10 = **200**

Qn 6

At first

Muthu : 90%

Esther : 100%

Increase

Muthu : $\frac{20}{100}$ × 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 × $20 = **$2160**

Qn 7

Chinese books = 2 units

English books = 3 units

Malay books = 3 units ÷ 2 = 1.5 units

Total = 6.5 units

= 3900

1 unit = 3900 ÷ 6.5 = 600

Chinese(original) = 2 x 600 = 1200

Malay (original) = 1.5 x 600 = 900

English original = 3 x 600 = 1800

Increase in Chinese = 20% x 1200 = 240

Increase in Malay = 10% x 900 = 90

Increase in English = 510 – 240 – 90 = 180

Percentage increase in English = $\frac{180}{1800}$ x 100%

= **10%**

Qn 8

Vernice = 3 units

Nathaniel = 4 units

Increase in Vernice = 40% x 3 units = 1.2 units

Qn 8 (Cont.)

Vernice's mass (end) = 4.2 units

Decrease needed for Nathaniel's mass

= 4.2 units – 4 units

= 0.2 units

Percentage increase

= $\frac{0.2}{4}$ x 100%

= **5%**

Qn 9

New length = $\frac{7}{5}$ x 25 cm

= 35 cm

New breadth = $\frac{3}{2}$ x 20 cm

= 30 cm

New perimeter = 35 cm + 30 cm + 35 cm + 30cm

= 130 cm

Qn 10

New length = $\frac{5}{4}$ x 20 cm

= 25 cm

New breadth = $\frac{5}{4}$ 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 = $\frac{5}{4}$ x 100 %

= **56.25 %**

Qn 11

Original salary = 100%,

Spend = 80%,

Saved = 20%

New salary = 80%,

Spend = 80% x 80% = 64%

Saved = 80% – 64% = 16%

Decrease in spending = 80% – 64% = 16%

16% total = $640

1% total = $640 ÷ 16 = $40

April salary

= 80 x $40

= **$3200**

Qn 12
Original salary = 100%,
Spend = 75%,
Saved = 25%

New salary = 120%,
Spend = 75% x 120% = 90%
Saved = 120% – 90% = 30%

Increase in spending = 90% – 75% = 15%

15% total = $450
1% total = $450 ÷ 15 = $30

April salary
= 120 x $30
= **$3600**

Unit 7.3 – 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%

25% → 75
1% → 3
Total number of students → 100% → 3 × 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 × 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 × 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%

No. of pupils who enjoyed both swimming and jogging
= $\frac{52}{100}$ × 200
= **104**

Unit 7.4 – GST

Qn 1

109% → $523.20
1% → $523.20 ÷ 109 = $4.80

100% → $4.80 x 100
= **$480**

Qn 2

9% → $166.50
1% → $166.50 ÷ 9 = $18.50

100% → $18.50 x 100
= **$1850**

Qn 3

9% difference→ $45
1% difference → $45 ÷ 9 = $5
100% difference → $5 x 100
= $500
$2000 – $500 = $1500
$1500 ÷ 2 = $750

Cost of dryer w/o GST = $750
Cost of dryer with GST = 109% x $750
= $\frac{109}{100}$ x $750
= **$817.50**

Qn 4

9% difference→ $2.70
1% difference → $2.70 ÷ 9 = $0.30
109% difference → $0.30 x 109
= $32.70

Cost of pants with GST = $85.60 +-$32.70
= **$118.30**

Qn 5

Price of microwave oven = 80% x $2400
= $1920

Price after GST = 109% x $1920
= **$2092.80**

Qn 6

109% → $2616
1% → $2616 ÷ 109 = $24

100% → $24 x 100
= $2400

$2400 ÷ 4 = $600

Cost of laptop w/o GST = $600 x 3
= $1800

Cost of laptop with GST = 109% x $1800
= $\frac{109}{100}$ x $1800
= $1962

Unit 7.5 – Simple Interest

Qn 1

Interest $= \frac{1.5}{100} \times \$30000 \times 4\frac{3}{4}$

$= \$2137.50$

Total amount = \$2137.50 + \$30 000

= **\$32 137.50**

Qn 2

Simple interest for a year = \$1440 ÷ 4

= \$360

Original sum $= \frac{100}{2.4} \times \$360$

= **\$15 000**

Qn 3

Interest for 4 years → $\frac{3.5}{100} \times \$30000 \times 4 = \$4200$

Total owed to the bank → \$4200 + \$30 000 = **\$34 200**

Qn 4

(Interest for 3 years) → 12%

12% → \$40 320

1% → \$40 320 ÷ 12 = \$3360

(Principal amount) 100% → \$3360 × 100 = **\$336 000**

Qn 5

(a) 2% → \$72

1% → \$72 ÷ 2 = \$36

100% → \$36 × 100 = **\$3600**

(b) Total sum after 4 years → \$3600 + \$72 × 4 = **\$3888**

Qn 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 → $\frac{100}{2} \times \$250$ = **\$12 500**

Unit 7.6 – Discount and Percentage Discount

Qn 1

Discounted price of 1 torch = \$200 ÷ 25

= \$8

Original price of 1 torch $= \frac{100}{80} \times \$8$

= **\$10**

Qn 2

Usual price of wallet $= \frac{100}{80} \times \$144$

= \$180

Discount given to wallet = \$180 − \$144

= \$36

Discount given to handbag = \$78 − \$36

= \$42

Original price of handbag = \$42 + \$238

= \$280

Qn 2 (Cont.)

Percentage discount for the handbag $= \frac{42}{280} \times 100\%$

= **15%**

Qn 3

109% → \$274.68

1% → \$274.68 ÷ 109 = \$2.52

100% → \$2.52 x 100 = \$252

90% of original bill → 252

10% of original bill → \$252 ÷ 9

= \$28

100% of original bill = \$28 x 10

= **\$280**

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 $= \frac{100}{80} \times \$2$

= **\$2.50**

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

Cost price of watch → 90 × 2 – 30 **or** 70 × 2 + 10 = \$150

\$150 + \$100 = **\$250**

Unit 7.7 – Equal Fractions

Qn 1

45% of Calvin's stickers = 25% of Brian's stickers

$\frac{9}{20}$ of Calvin's stickers $= \frac{1}{4}$ of Brian's stickers

$\frac{9}{20}$ of Calvin's stickers $= \frac{9}{36}$ of Brian's stickers

Qn 1 (Cont.)

Calvin = 20 units
Brian = 36 units
Difference = 16 units
= 32
1 unit = 2
Total number of stickers= 56 × 2
= **112**

Qn 2

35% of Joanna = 60% of Kelvin

$\frac{7}{20}$ of Joanna = $\frac{3}{5}$ of Kelvin

$\frac{21}{60}$ of Joanna = $\frac{21}{35}$ of Kelvin

Joanna = 60 units
Kelvin = 35 units
Difference = 25 units
= 125
1 unit = \$125 ÷ 5
= \$5
Amount of money Joanna had at first
= 60 × \$5
= **\$300**

Qn 3

40% of boys = 10% of girls

$\frac{2}{5}$ of boys = $\frac{1}{10}$ of girls

$\frac{2}{5}$ of boys = $\frac{2}{20}$ of girls

Boys = 5 units
Girls = 20 units
Difference = 15 units

15 units = 510
1 unit = 34

Total students in the end = 4 × 34
= **136**

Qn 4

Twice of Rahim's money left = Carena's money left
2 × 10% of Rahim's money = 40% of Carena's money

20% of Rahim's money = 40% Carena's money

$\frac{1}{5}$ of Rahim's money = $\frac{2}{5}$ of Carena's money

$\frac{2}{10}$ of Rahim's money = $\frac{2}{5}$ of Carena's money

Rahim's money = 10 units
Carena's money = 5 units
Difference = 5 units

5 units = \$85
1 unit = \$85 ÷ 5
= \$17
Rahim at first = 10 × \$17
= **\$170**

Qn 5

Chocolate left is equal to twice cheese left
20% chocolate = 2 × 25% cheese
20% chocolate = 50% cheese

$\frac{1}{5}$ chocolate = $\frac{1}{2}$ 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 = 55 × 6
= **330**

Unit 7.8 – External Unchanged

Qn 1

At first
Boys : 60% (3 units) × 7 (21 units)
Girls : 40% (2 units) × 7 (14 units)

End
Boys : 70% (7 units) × 3 (21 units)
Girls : 30% (3 units) × 3 (9 units)

Decrease = 5 units

5 units = 5
1 unit = 1
Total number of students in the end = 30 × 1
= **30**

Qn 2

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

End
Children : 60% (3 units) × 2 (6 units)
Adults : 40% (2 units) × 2 (4 units)

Qn 2 (Cont.)
Decrease in adults = 11 units
11 units = 22
1 unit = 2
Total children in the bus = 6 × 2
= **12**

Qn 3
At first
Lemons : 30% (3 units)
Others : 70% (7 units)
End
Lemons : 50% (1 unit) × 7 (7 units)
Others : 50% (1 unit) × 7 (7 units)

Increase = 4 units
4 units = 40
1 unit = 40 ÷ 4
= 10
Number of lemons at first = 3 × 10
= **30**

Qn 4
At first
Girls : 40% (2 units) × 3 (6 units)
Boys : 60% (3 units) × 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 × 4
= **36**

Units 7.9 – Repeated Identity

Qn 1
Arun = 80%
Ramesh = 100%
Arun = 40% = 80%
Jody = 100% = 200%

Total = 80% + 100% + 200% = 380%
380% → 285
20% → 285 ÷ 19 = 15
Jody → 200% → 15 x 10 = **150**

Qn 2
David = 90% = 9u x 4
= 36u

Ian = 100% = 10u x 4
= 40u

Rauf = 75% = 3u x 9
= 27u

David = 100% = 4u x 9
= 36u

Total = 36u + 40u + 27u
= 103u

103u = 515
1u = 515 ÷ 103 = 5

Ian = 40 x 5 = **200** cookies

Qn 3
Helen = 80% = 4u x 5 = 20u
Fiona = 100% = 5u x 5 = 25u
Daniel = 90% = 9u x 2 = 18u
Helen = 100% = 10u x 2 = 20u

Difference between Daniel and Fiona = 7u = 28

1u = 28 ÷ 7 = 4

Fiona's score = 25 x 4
= **100 marks**

Qn 4
Boys = 40%
Girls = 100%
Adults = 6 units
Children = 5 units

Since 5u → 140%
1u = 140% ÷ 5 = 28%

Adults = 6 x 28% = 168%

Difference between adults and girls
= 168% - 100% = 68%

68% → 34
2% → 1
Total at party = 308% → 154 x 1 = **154 people.**

Qn 5
Red = 75% = 3u x 5 = 15u
Blue= 100% = 4u x 5 = 20u
Green = 80% = 4u x 3 = 12u
Red = 100% = 5u x 3 = 15u

Difference between blue and green marbles = 8u = 32

1u = 32 ÷ 8 = 4

Total marbles = 47 x 4 = **188**

Qn 6
Shop A = 70% = 7u x 2 = 14u
Shop B = 100% = 10u x 2 = 20u
Shop B = 80% = 4u x 5 = 20u
Shop C = 100% = 5u x 5 = 25u

Total = 59u = 295
1u = 295 ÷ 59 = 5

Difference between Shop C and Shop A
= 5 x 11
= **55**

Qn 7

Yvonne = 60%, Lynette = 100%, Tania = 30%

Yvonne gave 20% x 60% = 12% to Tania,
and left 60% – 12 % = 48%

Lynette gave 40% to Tania, and left 60%
Increase in Tania = 12% + 40% = 52%

Tania at first = 52%
Tania in the end = 104%

Qn 7 (Cont.)
Difference between Tania and Yvonne in the end = 104% – 48% = 56%

56% → 280
1% → 280 ÷ 56 = 5

Yvonne gave to Tania = 12 x 5 = **60**

Unit 7.10 – Unchanged Total

Qn 1

At first
Adults 70% = 7u x 3 = 21u
Children 30% =3u x 3 = 9u

End
Adults 50% =1u x 10 = 10u
Children 100% =2u x 10 = 20u

Decrease in adults
= 11u
= 88

1u = 8

Adults in the end = 10 x 8 = **80**

Qn 2

1st day
Fixed : 45% (9 units)
Unfixed : 55% (11 units)

2nd day
Fixed : 75% (3 units) × 5 = 15 units
Unfixed : 25% (1 unit) × 5 = 5 units

Transfer = 6 units
6 units = 60
1 unit = 10

Total pieces in puzzle = 20 units
= 20 × 10
= **200**

Qn 3

1st day
Fixed : 20% (1 unit) × 9 9 units
Unfixed : 80% (4 units) × 9 36 units
Total 45 units

2nd day
Fixed : 80% (4 units) × 5 20 units
Unfixed : 100% (5 units) × 5 25 units
Total 45 units

Transfer = 20 units – 9 units
= 11 units

11 units = 44
1 unit = 44 ÷ 11
= 4
Total number of pieces in the puzzle = 45 × 4
= **180**

Qn 4

Read : 40% (2 units)
Unread : 60% (3 units)
Total 5 units

Qn 4 (Cont.)
Read : 80% (4 unit)
Unread : 20% (1 unit)
Total 5 units

Transfer = 4 units – 2 units
= 2 units
2 units = 60
1 unit = 60 ÷ 2
= 30

Total number of pages = 5 × 30
= **150**

Qn 5

Read : 40% (2 units) × 5 10 units
Unread : 100% (5 units) × 5 25 units

Read : 60% (3 unit) × 7 21 units
Unread : 40% (2 unit) × 7 14 units

Transfer = 11 units

11 units = 22
1 unit = 2
Total pages = 35 × 2
= **70**

Qn 6
Cherie = 50% = 1 unit x 13 = 13 units
Daniel + Elias = 100% = 2 units x 13 = 26 units

Total = 3 units x 13 = 39 units

Daniel = 30% = 3 units x 3 = 9 units
Cherie + Elias = 100% = 10 units x 3 = 30 units

Total = 13 units x 3 = 39 units

Since the cost of the present remains the same, we find the LCM of 3 and 13, which is 39.

Daniel = 9 units
Elias = 30 units – 13units = 17 units

Difference between Elias and Daniel = 17 units – 9 units = 8 units

8 units = $32
1 unit = $32 ÷ 8 = $4

Cost of present = 39 x $4 = **$156**

Qn 7
Gerald = 45% = 9 units
Xavier + Joshua = 55% = 11 units

Total = 20 units

Xavier = 25% = 1 unit x 4 = 4 units
Gerald + Joshua = 100% = 4 units x 4 = 16 units

Total = 5 units x 4 = 20 units

Since the total number of cookies remains the same, we find the LCM of 5 and 20, which is 20.

Qn 7 (Cont.)
Xavier = 4 units
Gerald = 9 units

Difference between Xavier and Gerald = 9 units – 4 units = 5 units

5 units = 25 cookies
1 unit = $25 ÷ 5 = 5 cookies

Total cookies = 20 x 5 = **100**

Unit 7.11 – Constant Difference

Qn 1

Boys : 30% (3 units)
Girls : 70% (7 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 = 9 ÷ 3
= 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
8 units = $400
1 unit = $400 ÷ 8
= $50
Amount of money Alan had at first = 9 × $50
= **$450**

Qn 3

School X = 1680
School Y = 20% x 1680 + 1680 = 2016
Difference = 2016 – 1680 = 336

Since an equal number of students left each school, difference remains the same,

School X (end) = 60%
School Y (end) = 100%

Difference = 40% → 336
10% → 336 ÷ 4 = 84

School X (end) = 84 x 6 = **504**

Qn 4

At first
Shop X : 4 units × 3 = 12 units
Shop Y : 7 units × 3 = 21 units
Difference 3 units × 3 = 9 units

Qn 4 (Cont.)

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**

Qn 5

Small Square : 40% (2 units) × 2 = 4 units
Big Square : 100% (5 units) × 2 = 10 units
Difference 3 units × 2 = 6 units

Unshaded small: 1 unit × 3 = 3 units
Unshaded big : 3 units × 3 = 9 units
Difference 2 units × 3 = 6 units

Decrease each = 1 unit
1 unit = 20 cm²
Area (small square) = 4 × 20 cm²
= **80 cm²**

Qn 6

Alexander : 40% (2 units)
Brother : 100% (5 units)
Difference 3 units

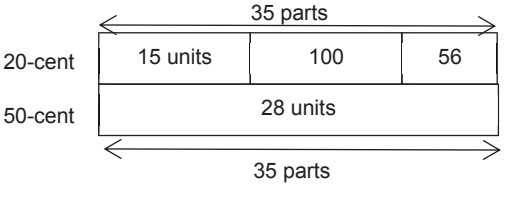
Alexander : 75% (3 units) ×3 = 9 units
Brother : 100% (4 unit) × 3 = 12 units
Difference 1 unit × 3 = 3 units

Increase each = 9 units – 2 units
= 7 units
7 units = 21
1 unit = 21 ÷ 7
= 3
Alexander 's age now = 2 × 3
= **6**

Unit 7.12 – External Changed

Qn 1

x 5 { 20c coins: 75% (3 units) + 20 = 60% (7 parts) ; 50c coins: 100% (4 units) – 8 = 40% (5 parts) } x 7



13 units = 156 coins
1 unit = 156 ÷ 13 = 12 coins

Sum of money at first = $0.20 x 3 x 12 + $0.50 x 4 x 12
= **$31.20**

Qn 2

	Elias	Ramesh	
×4	45% (9 units)	100% (20 units)	× 3
	+39	+20	
	4 × 75% (3p)	100% (4p) ×3	

Elias	36 units	156
Ramesh	60 units	60

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

	School X	School Y	*School X*	*School Y*
× 10	9 units	10 units	*90 units*	*70 units*
	– 220	+200	*–2200*	*+1400*
	7 parts	10 parts	*70 parts*	*70 parts*
		× 7	70 parts	

School X	90 units		
School Y	70 units	1400	2200
			20 units

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

	Daniel	Annabel	*Daniel*	*Annabel*
× 8	3 units	4 units	*24 units*	*20 units*
	+$20	+$40	*+$160*	*+$200*
	5 parts	8 parts	*40 parts*	*40 parts*
		× 5		

40 parts

Daniel	24 units	$160
Annabel	20 units	$200

4 units = $40

1 unit = $40 ÷ 4
= $10
Daniel's savings at first = 3 × $10
= **$30**

Qn 5

	Chickens	Ducks
×4	5 units	8 units
	–50	–8
	4 × (25%) 1p	4p (100%)

Chickens	20 units	8
Ducks	8 units	200

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

Qn 6

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

	Mrs Tan	Mrs Ismal	*Mrs Tan*	*Mrs Ismal*
×5	9 units	10 units	*45 units*	*40 units*
	+$400	+$600	*+$2000*	*+$2400*
	4 parts	5 parts	*20 parts*	*20 parts*
		×4		

20 parts

Mrs Tan	45 units	$2000
Mrs Ismal	40 units	$2400

5 units = $400
1 unit = $400 ÷ 5
= $80
Mrs Tan's salary in May = 9 × $80
= **$720**

Chapter 8 Volume

Unit 8.1 – 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**

Qn 6

Volume of water = L × B × H

$= \frac{3}{5} \times 12\text{ cm} \times 12\text{ cm} \times 20\text{ cm}$

= 1728 cm³

Qn 7

Volume of water = L × B × 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 tannk can hold = 1800 cm³ × 3

= 5400 cm³

Qn 9

$\frac{3}{4}$ of tank = 1500 cm³

$\frac{1}{4}$ of tank = 500 cm³

Full tank = 500 cm³ × 4

= 2000 cm³

Qn 10

Height = 4 units, width = 1 unit, length = 2 units

4 units = 20 cm
1 unit = 5 cm
Height = 20 cm
Width = 5 cm
Length = 2 × 5 cm
= 10 cm

Volume = L × B × H
= 10 cm × 5 cm × 20 cm
= **1000 cm³**

Qn 11

Breadth $= \frac{1}{4} \times 200\text{ cm}$

$= 50\text{ cm}$

Height $= \frac{1}{2} \times 50\text{ cm}$

$= 25\text{ cm}$

Capacity of tank = L × B × H
= 220 cm × 50 cm × 25 cm
= 250 000 cm³
= **250 litres**

Qn 12

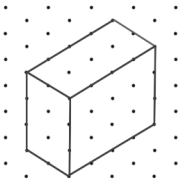
Since width × height = 36 cm² (6 cm × 6 cm)
Width = Height
= 6 cm
Length = 2 × 6 cm
= 12 cm

Qn 12 (Cont.)

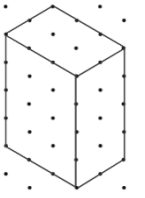
Volume of cuboid = L × B × H
= 12 cm × 6 cm × 6 cm
= **432 cm³**

Unit 8.2 – Drawing Cubes and Cuboids on Isometric Grids

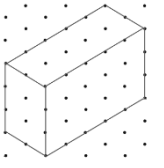
Qn 1



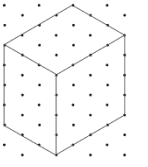
Qn 2



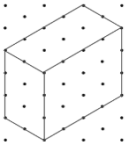
Qn 3



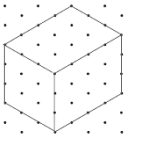
Qn 4



Qn 5



Qn 6



Unit 8.3 – 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 × 3
= 12 600 cm³

Base area $= \frac{\text{Volume}}{\text{Height}}$

$= \frac{12\,600\text{ cm}^3}{21\text{ cm}}$

= 600 cm²

Qn 2

Since volume = L × B × H

(a) Length $= \frac{\text{Volume}}{\text{B} \times \text{H}}$

$= \frac{135\text{ cm}^3}{6\text{ cm} \times 5\text{ cm}}$

= 4.5 cm

(b) Length $= \frac{\text{Volume}}{\text{Area}}$

$= \frac{288\text{ cm}^3}{72\text{ cm}^2}$

= 4 cm

Qn 3

$$\text{Height} = \frac{\text{Volume}}{\text{Base area}}$$

$$= \frac{1430\ \text{cm}^3}{130\ \text{cm}^2}$$

= **11 cm**

Qn 4

$$\text{Base area} = \frac{\text{Volume}}{\text{Height}}$$

$$= \frac{1920\ \text{cm}^3}{8\ \text{cm}}$$

$= 240\ \text{cm}^2$

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

$$= \frac{2880}{3 \times 3 \times 5}$$

$$= \frac{2880}{45}$$

= 64 cm³

1 unit = 4 cm

Since (4 × 4 × 4) = 64

Area of base = 3 units × 3 units
= (3 × 4) × (3 × 4)
= **144 cm²**

Unit 8.4 – Length, Area and Volume of Cubes

Qn 1

Volume of Cube B = 1 unit x 1 unit x 1 unit = 1 unit³
= 64 cm³

Length of cube B = 4cm (since 4 x 4 x 4 = 64)
Length of Cube A = 3 x 4cm = 12cm

Volume of cube A = 12cm x 12cm x 12cm = 1728 cm³

Difference in volume = 1728 cm³ – 64 cm³ = **1664 cm³**

Qn 2

Volume of metal cube = 8 cm × 8 cm × 8 cm
= 512 cm³

Volume of 1 cube = 512 cm³ ÷ 64
= 8 cm³

2 cm × 2 cm × 2 cm = 8 cm³

Length of edge of smaller cube = **2 cm**

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 of cube X = 27 x 1 cm³ = 27 cm³

Length of cube X = **3cm** (since 3 x 3 x 3 = 27)

Qn 6

Let the length of cube A be 2 units and
length of cube B be 1 unit.

Total surface area of A = 2 units x 2 units x 6 = 24 units².
Total surface area of B = 1 unit x 1 unit x 6 = 6 unit².

Difference in total surface area = 24 units² – 6 units²
= 18 units²

18 units² = 162 cm²
1 units² = 162 cm² ÷ 18 = 9 cm²
1 unit = 3cm (since 3 x 3 = 9)

Length of cube A = 2 x 3cm = 6cm

Volume of cube A = 6cm x 6cm x 6cm = **216 cm³**

Qn 7

Volume of cube B = 3 units x 3 units x 3 units = 27units³
27 units³ = 81cm³
1 unit³ = 81cm³ ÷ 27 = 3cm³

Volume of cube A = 1 unit x 1 unit x 1 unit = 1 unit³ = **3cm³**

Qn 8

Volume of cube C = 3 units x 3 units x 3 units = 27units³
Volume of cube D = 4 units x 4 units x 4 units = 64units³

64 units³ = 128cm³
1 unit³ = 128cm³ ÷ 64 = 2cm³

Volume of cube C = 27 x 2cm³ = **54cm³**

Unit 8.5 – 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 +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 8.6 – Volume = Base Area x Height

Qn 1

$$\text{Height} = \frac{\text{Volume}}{\text{Base area}}$$

$$= \frac{84\ \text{cm}^3}{28\ \text{cm}^2}$$

= **3 cm**

Qn 2

$\frac{2}{3}$ of tank = 96 000 cm³

$\frac{1}{3}$ of tank = 48 000 cm³

Full volume = 48 000 cm³ × 3
= 144 000 cm³

$$\text{Height} = \frac{144\ 000\ \text{cm}^3}{60\ \text{cm} \times 40\ \text{cm}}$$

= **60 cm**

Qn 3

$$\text{Time taken to fill the tank} = \frac{110 \times 90 \times 50}{16\ 500}$$

= **30 min**

Qn 4

Total volume = 3.5 × 1000 × 5 × 60
= 1 050 000 cm³

$$\text{Depth at first} = \frac{1050000}{125 \times 84}$$

= **100 cm**

Qn 5
In 1 min, both taps filled = 140 cm³ + 100 cm³
= 240 cm³
Time taken for both taps to completely fill the tank

$$= \frac{30 \times 24 \times 20}{240}$$

= **60 min**

Qn 6
Volume of water leaked = (400 + 300) × 6
= 4200 cm³

$$\text{Depth at first} = \frac{4200}{60 \times 10}$$

= 7 cm

New height = 15 cm – 7 cm
= **8 cm**

Qn 7

(a) Volume of water at first

$$= \frac{4}{5} \times 40\ \text{cm} \times 30\ \text{cm} \times 25\ \text{cm}$$

= **24 000 cm³** or **24** ℓ

(b) Volume of water in glass tank = 24 000 – 4 000
= 20 000

$$\text{Height} = \frac{200}{50 \times 25}$$

= **16 cm**

Qn 8

Length = 3 units, breadth = 1 unit, height = 1.5 units
Half the height = 1.5 units ÷ 2 = 0.75units = 6cm

1 unit = 6cm ÷ 0.75 = 8cm

Volume of water in can hold
= 3 x 8cm x 8cm x 1.5 x 8cm
= **2304cm³**