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- Challenging questions to excel in P5 Mathematics

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Solutions

Note: In all solutions, U represents Units

Chapter 1 Whole Numbers



= \$80 + \$60

= \$140



= 6 + 8 = 14

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Qn 6 (0	Cont.)		
3 units	= \$48		
1 unit	= \$48 ÷ 3		
	= \$16		
Amoun	t each of them spent	= \$92 — \$16 = \$76	

Unit 1.5 – Number of Units x Value of Units Qn 1 Number of Number of Total value vehicles (units) wheels = (wheels) × Motorbikes 2 4 × = 8u Cars 1 × 4 4u = 12u = 720 12 units 1 unit = 720 ÷ 12 = 60 Total number of cars = 1 unit = 1 × 60 = 60 Qn 2 Number of Number Total Animals (units) × of legs = unit (legs) Chicken = 2 × 2 4u Horses 1 × 4 4u = 8u 8 units = 288 1 unit = 288 ÷ 8 = 36 Total number of chickens = 2 units = 2 × 36 = 72 Qn 3 Number of Cost of Total Items (units) × <u>1 item (\$)</u> = unit (\$) Plates 3 12 = 36u × Bowls 1 × 7 = 7u 43u 43 units = 430 = 430 ÷ 43 1 unit = 10 (a) Total number of plates bought = 3 units $= 3 \times 10$ = 30 plates

(b) Difference in the amount of money spent = \$29 units = \$29 × 10 = \$290 Qn 4 No. of No. of

N	lo. of		No. of pac	ket		
S	tudents	х	drinks/pers	on	=	Total packet
Girls	3 units	×	3		=	9 units
Boys	1 unit	×	5		=	5 unit
Total amo	ount =	= 5 u	nits + 9 uni	ts		
	=	= 14	units			
14 ur	nits =	= 350)			
1 unit	t =	= 350) ÷ 14			
	=	= 25				
Qn 5						
	<u>Units</u>	×	<u>Value (\$)</u>	=	Tota	<u>l unit (\$)</u>
Adults	4	×	7	=	2	28u
Children	1	×	4	=		<u>4u</u>
					3	32u
32 units	= 960)				
1 unit	= 960) ÷ 3	2			
	= 30					
Number of	of adults	= 4	1 units			
		= 4	4 × 30			
		= 1	20			

Qn 6
No. × Value = Total value
Bolster 1 units
$$\times$$
 \$25 = 25 units
Pillow 3 units \times \$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**

Chapter 2 Fractions Unit 2.1 – Part-whole Relationship (Type 1) Qn 1 $\frac{2}{5}$ (biscuits) 3 8 = 20 5 _ _

(b)
$$\frac{3}{20}$$
 of total = \$9
 $\frac{1}{20}$ of total = \$9 ÷ 3
= \$3
Total = 20 × 3
= **\$60**

(

Total
$$\begin{pmatrix} \frac{2}{3} \text{ (CDs)} \\ \frac{1}{3} \text{ (remainder)} \end{pmatrix} \begin{pmatrix} \frac{3}{5} \text{ (crayons)} \\ \frac{2}{5} \text{ (storybook)} \\ \frac{1}{3} \times \frac{2}{5} = \frac{2}{15} \end{pmatrix} \begin{pmatrix} \frac{1}{3} \times \frac{2}{5} = \frac{3}{15} \\ \frac{1}{3} \times \frac{2}{5} = \frac{2}{15} \end{pmatrix}$$

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

(b)
$$\frac{2}{15}$$
 of total = \$24
 $\frac{1}{15}$ of total = \$24 ÷ 2
= \$12
Total = 15 x \$12
= **\$180**







Qn 5

;	2 5 total + \$15		
Total	/	1 3	emainder + \$30 (plates)
	³ / ₅ total − \$15 —	$\frac{2}{3}$	remainder - \$30 (\$120)
(1	remainder)		
$\frac{2}{3}$ remaind	er = \$120 + \$30		
	= \$150		
$\frac{1}{3}$ remaind	er = \$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

1 of total + \$400 (Plasma) 5 of remainder + \$240 (refrigerator) Total 3 $\sqrt{\frac{1}{5}}$ of total – \$400 of remainder – $240 \rightarrow 1260$ (remainder) 3 = \$1260 + \$240 remainder $\overline{4}$ = \$1500 $\frac{1}{4}$ remainder = \$1500 ÷ 3 = \$500 Remainder = 4 units = 4 × \$500 = \$2000 4 5 total - \$400 = \$2000 4 5 = \$2400 total $\frac{1}{5}$ 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 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 = \$360 ÷ 3 1 unit = \$120 Keng Wee's money = 7 units = 7 × \$120 = \$840 Qn 3 $\frac{3}{5}$ Boys $=\frac{4}{7}$ Girls $=\frac{12}{21}$ Girls 12 $\frac{12}{20}$ Boys = 20 units Boys Girls = 21 units Difference = 1 unit

= 65Total no. of students in the end $= 24 \times 65$ = 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 Rasidah Difference 2 units = \$48 1 unit = \$24 Tatal (Baidab)	= 7 units = 5 units = 2 units
Total (Raidan)	= 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 of Chocolate = $2 \times \frac{1}{6}$ of Vanilla 4 $\frac{1}{4}$ of Chocolate = $\frac{1}{3}$ of Vanilla Chocolate = 4 units Vanilla = 3 units Total = 4 units + 3 units = 7 units = 280 7 units 1 unit = 280 ÷ 7 = 40 Number of chocolate cookies given away = 3 units $= 3 \times 40$ = 120

Qn 6 Left Dennis = $\frac{3}{4}$ $Roy = \frac{1}{3}$ = Twice $\times \frac{1}{3}$ Roy 3 Dennis $=\frac{2}{3}$ Roy $\frac{3}{4}$ Dennis $=\frac{6}{9}$ Roy $\frac{3}{8}$ Dennis Dennis = 8 units = 9 units Rov Total, 17 units = \$340 1 unit = \$20 Dennis in the end = 6 units $= 6 \times \$20$ = \$120

Unit 2.5 – Repeated Identity

Qn 1 1 unit \times 3 = 3 units Banana Chocolates 5 units \times 3 = 15 units Banana = 3 units Chocolates = 15 units 3 units Banana Blueberry = 1 unit Blueberry 1 unit = 3 units + 15 units + 1 unit Total = 19 units 19 units = 76 = 76 ÷ 19 1 unit = 4 Number of banana muffins = 3 units = 3 × 4 = 12 Qn 2 Siti \times 4 = 8 units 2 unit Siti = 8 units 7 units $\times 4 = 28$ units Joel Joel = 28 units Melvin = 12 units Melvin 3 units $\times 4 = 12$ units Joel 4 unit \times 4 = 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 5 (Cont.) <u>Terry</u> 7 units	: <u>Ch</u> : 8 u	elsia Inits	: <u>Dave</u> : 13 units
Difference bet	ween Te 6 u	rry and Da inits =	ave \$24 \$4
Cost of preser	nt 28 u	nits = : = :	28 × \$4 \$112
Qn 6 Benson + Dar Jean	yl	3 units × 1 unit	5 = 15 units x 5 = 5 units
Daryl + Jean Benson		3 units × 2 units ×	4 = 12 units 4 = 8 units
<u>Benson</u> 8 units	: <u>Da</u> : 7 u	<u>ryl</u> inits	: <u>Jean</u> : 5 units
Difference bet	ween Be	nson and 3 units	Jean = \$36
		1 unit	= \$12
Total sum sha	red = 2 = 2 = \$	20 units 20 × \$12 5 240	
Unit 2.8 – C	onstant	Differer	ice
Qn 1 <u>At first</u> Boys Girls	1 unit <u>2 units</u>	×3 = ×3 =	- 3 units - <u>6 units</u>
Difference	1 unit	×3 =	3 units
<u>End</u> Boys Girls Difference	2 units <u>5 units</u> 3 units		
End Boys Girls Difference Decrease Total number	2 units <u>5 units</u> 3 units 1 unit = of childre	3 en in the ei	nd = 7 units = 7 × 3 = 21
End Boys Girls Difference Decrease Total number	2 units <u>5 units</u> 3 units 1 unit = of childre	3 en in the ei	nd = 7 units = 7 × 3 = 21
End Boys Girls Difference Decrease Total number	2 units <u>5 units</u> 3 units 1 unit = of childre	3 In in the e	nd = 7 units = 7 x 3 = 21
End Boys Girls Difference Decrease Total number Qn 2 <u>Present</u> John	2 units <u>5 units</u> 3 units 1 unit = of childre 1 unit	3 en in the en	nd = 7 units = 7 x 3 = 21 2 units
End Boys Girls Difference Decrease Total number Qn 2 <u>Present</u> John Sister Difference	2 units 5 units 3 units 1 unit = of childres 1 unit <u>4 units</u> 3 units	3 m in the er × 2 = × 2 = × 2 =	and = 7 units = 7 × 3 = 21 2 units $\frac{8 \text{ units}}{6 \text{ units}}$
End Boys Girls Difference Decrease Total number Qn 2 <u>Present</u> John Sister Difference John	2 units 5 units 3 units 1 unit = of childre 1 unit <u>4 units</u> 3 units 3 units 5 units	3 en in the en x 2 = x 2 = x 2 = x 3 =	nd = 7 units = 7 x 3 = 21 2 units $\frac{8 \text{ units}}{6 \text{ units}}$ 9 units
End Boys Girls Difference Decrease Total number Qn 2 <u>Present</u> John Sister Difference John Sister Difference	2 units 5 units 3 units 1 unit = of childred 1 unit 4 units 3 units 3 units 5 units 2 units	3 en in the en x 2 = x 2 = x 2 = x 3 = x 3 = x 3 = x 3 = x 3 =	nd = 7 units = 7 x 3 = 21 2 units $\frac{8 \text{ units}}{6 \text{ units}}$ 6 units 9 units 15 units 6 units
End Boys Girls Difference Decrease Total number Qn 2 <u>Present</u> John Sister Difference John Sister Difference Increase each	2 units 5 units 3 units 1 unit = of childred 1 unit 4 units 3 units 3 units 2 units 2 units	3 en in the en x 2 = x 2 = x 2 = x 3 = x 3 = x 3 = 7 units 1 unit	nd = 7 units = 7 x 3 = 21 2 units 8 units 6 units 9 units 15 units 6 units = 14 = 14 \div 7 = 2
End Boys Girls Difference Decrease Total number Qn 2 <u>Present</u> John Sister Difference John Sister Difference Increase each	2 units 5 units 3 units 1 unit = of children 1 unit 4 units 3 units 3 units 2 units 2 units 5 units 2 units	3 m in the end x 2 = x 2 = x 3 = x 3 = x 3 = 7 units 1 unit 2 units	$ \begin{array}{l} \text{and} = 7 \text{ units} \\ = 7 \times 3 \\ = 21 \end{array} $ $ \begin{array}{l} \text{2 units} \\ \underline{8 \text{ units}} \\ 6 \text{ units} \\ 9 \text{ units} \\ \underline{15 \text{ units}} \\ 6 \text{ units} \\ = 14 \\ = 14 \div 7 \\ = 2 \end{array} $
End Boys Girls Difference Decrease Total number Qn 2 <u>Present</u> John Sister Difference John Sister Difference Increase each John's age no	2 units 5 units 3 units 1 unit = of childred 1 unit 4 units 3 units 3 units 3 units 2 units 1 unit 3 units 3 units 2 units 1 unit 3 units 3 units 1 unit 2 units 1 unit 1 unit 2 units 1 unit 2 units 1 unit 1 unit 2 units 1 unit 1 unit 2 units 1 unit 1 unit 2 units 1 unit 1 unit 1 unit 1 unit 2 units 1 unit 1 unit 1 unit 1 unit 1 unit 2 units 1 unit 1 unit 2 units 1	3 en in the en x 2 = x 2 = x 3 = x 3 = x 3 = 7 units 1 unit 2 units 2 x 2 4	$nd = 7 \text{ units}$ $= 7 \times 3$ $= 21$ 2 units 8 <u>units</u> 6 units 9 units 15 <u>units</u> 6 units $= 14$ $= 14 \div 7$ $= 2$
End Boys Girls Difference Decrease Total number Qn 2 <u>Present</u> John Sister Difference John Sister Difference Increase each John's age no	2 units <u>5 units</u> 3 units 1 unit = of childre 1 unit <u>4 units</u> 3 units <u>5 units</u> 2 units w = =	x = x $x = x$ $x =$	$ind = 7 \text{ units} = 7 \times 3 = 21$ $2 \text{ units} = 21$ $2 \text{ units} = 0 \text{ units} = 14 = 14 \div 7 = 2$
End Boys Girls Difference Decrease Total number Qn 2 <u>Present</u> John Sister Difference John Sister Difference Increase each John's age no Qn 3 <u>Present</u> Mira Eather	2 units 5 units 3 units 1 unit = of childred 1 unit 4 units 3 units 3 units 3 units 2 units 1 unit 4 units 3 units 2 units 1 unit 3 units 3 units 2 units 4 units 3 units 4 units 2 units 4 units 3 units 4 units 4 units 4 units 3 units 4 u	3 en in the end x = 2 = 2 = 2 = 2 = 2 = 2 = 2 = 2 = 2 =	and = 7 units = 7 x 3 = 21 2 units 8 units 6 units 9 units 15 units 6 units = 14 = 14 \div 7 = 2
End Boys Girls Difference Decrease Total number Qn 2 <u>Present</u> John Sister Difference Increase each John's age no Qn 3 <u>Present</u> Mira Father Difference	2 units <u>5 units</u> 3 units 1 unit = of childre 1 unit <u>4 units</u> 3 units <u>5 units</u> 2 units w = = = = =	3 m in the effective of the effective	and = 7 units = 7 x 3 = 21 2 units 8 units 6 units 9 units 15 units 6 units = 14 = 14 \div 7 = 2 bld old old
End Boys Girls Difference Decrease Total number Qn 2 <u>Present</u> John Sister Difference Increase each John's age no Qn 3 <u>Present</u> Mira Father Difference <u>Future</u>	2 units 5 units 3 units 1 unit = of childred 1 unit 4 units 3 units 3 units 3 units 2 units 4 units 3 units 3 units 4 units 3 units 4 units 3 units 4 units 3 units 4 units 4 units 3 units 4 units 4 units 4 units 3 units 5 units 4 units 4 units 4 units 5 units 4 units 4 units 4 units 5 units 4 units 4 units 5 units 5 units 4 units 5 units 5 units 5 units 6 units 7	3 m in the effective of the effective	$d = 7 \text{ units} = 7 \times 3 = 21$ $2 \text{ units} = 21$ $2 \text{ units} = 0 \text{ units} = 14 = 14 \div 7 = 2$ $d = 14 \text{ units} = 14 uni$
End Boys Girls Difference Decrease Total number Qn 2 <u>Present</u> John Sister Difference John Sister Difference Increase each John's age no Qn 3 <u>Present</u> Mira Father Difference <u>Future</u> Mira Father	2 units 5 units 3 units 1 unit = of childred 1 unit 4 units 3 units 3 units 3 units 2 units w = = = = = = =	3 en in the end x = 2 = x = 2 = x = 3 = x = 3 = 7 units 1 unit 2 units 2 x 2 4 8 years of 44 years 36 years 1 unit 3 units	$d = 7 \text{ units} \\ = 7 \times 3 \\ = 21$ $2 \text{ units} \\ \frac{8 \text{ units}}{6 \text{ units}} \\ 6 \text{ units} \\ \frac{15 \text{ units}}{6 \text{ units}} \\ = 14 \\ = 14 \div 7 \\ = 2$ $dd \frac{14}{6 \text{ units}} \\ dd \frac{14}{6 \text{ units}} \\ $

Qn 3 (Cont.) 2 units = 36 1 unit = $36 \div 2$ = 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

Qn 5

At first Shop A = Shop B = Difference =	68 kg 128 kg 60 kg
End Shop A = Shop B = Difference =	2 units 5 units 3 units
3 units =	60 kg
1 unit =	20 kg
Shop A (end)	= 2 units
O I A (I I)	= 40 kg
Shop A (sold)	= 68 kg - 40 kg
Total and	= 28 Kg
TOLAI SOID	$= 20 \text{ kg} \times 2$
	= 50 kg
Qn 6 Square Rectangle	$2 \text{ unit } \times 4 = 8 \text{ units}$
Difference	$3 \text{ units } \times 4 = 20 \text{ units}$
DITCICITCC	5 dinits × 4
Unshaded squar	e 1 unit × 3 = 3 units
Unshaded rect	$5 \text{ units } \times 3 = 15 \text{ units}$
Difference	4 units × 3

Decrease each	5 units	=
	1 unit	=
Total area of figure		

= 3 units + 15 units + 5 units

= 23 units

^{= 23 × 8} cm² = **184 cm²**

Unit 2.9	– Numbe	er of	Units	x Va	alue of Units
Qn 1	Number				Total unit
	of units	×	Value	=	(stickers)
Boys	2	×	4	=	8
Girls	1	×	5	=	5
					13 units
13 units	= 1105				
1 unit	= 1105 ÷	13			
	= 85				
Total nur	nber of girl	s	1 unit =	= 1 ×	85
	•		=	- 85	

40 cm² 8 cm²



= 75



Qn 4





Qn 5

 $\frac{1}{3} 20 \text{ ct} = \frac{2}{3} 50 \text{ ct}$ $\frac{2}{6} 20 \text{ ct} = \frac{2}{3} 50 \text{ ct}$ $20 \text{ ct} = \frac{2}{3} 50 \text{ ct}$



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Qn 5 (Cont.) 50 ct : 3 units :	\$1 5 units	
No. units × 6 units × 3 units × 5 ×	value (¢) 20 50 100	 Total amount (unit ¢) 120 units 150 units 500 units 770 units
770 units 1 unit Total coins	= 2310 = 3 = 6 units + 3 = 14 units = 14 × 3 = 42	units + 5 units
Qn 6		
$\frac{1}{4}$ ad	lults	$\frac{1}{4} = \frac{5}{20}$
$\left \frac{3}{4} \right =$	$-\frac{2}{5}$ boys	$\frac{3}{4} \times \frac{2}{5} = \frac{6}{20}$
(Remainder)	– giris 5	$\begin{array}{c} - \times - = - \\ 4 & 5 & 20 \end{array}$
No Adults 5 u Boys 6 u Girls 9 u Total	. × valu inits × 5 coupc inits × 4 co inits × 3 co 70	ie = Total coupons $ins = 25 units$ $ins = 24 units$ $ins = 27 units$ $76 units$ $ins = 1520$ $1 unit = 20$
Total adults	5 units $= 5 \times$	20

= 100

Chapter 3 Ratio	
Unit 3.1 – Part-whole Relations	ship
Qn 1	
$\frac{1}{4}$ (men)	$\frac{1}{4} = \frac{4}{16}$
lotal	
$\frac{1}{4}$ (women)	$\frac{3}{4} \times \frac{1}{4} = \frac{3}{16}$
	4 4 10
$\sqrt{\frac{3}{2}}$ $\frac{5}{2}$ (children)	$\frac{3}{-} \times \frac{3}{-} = \frac{9}{-}$
4 4 (remainder)	4 4 16

Difference in the number of children and men

$$= \frac{9}{16} - \frac{4}{16}$$

= $\frac{5}{16}$
 $\frac{5}{16}$ of total = 150
 $\frac{1}{16}$ of total = 150 ÷ 5
= 30
Total number of visitors = 16 units
= 16 × 30
= **480**



Qn 3 <u>Unshaded Sq</u> : <u>Shaded sq</u> 3 units : 4 units	
Shaded rect. : Unshaded rec 2 units ^{x2} : 7 units ^{x2}	<u>21</u>
Shaded area 4 units = 16 1 unit = 4 c Area of figure = 3 u = 21 = 84	cm ² m ² nits + 4 units +14 units units × 4 cm²
Qn 4 Jacintha : Isabel 2 units : 1 unit	
1 unit ^{x2} : 4 units ^{x2}	}
<u>Jacintha</u> : <u>Isabel</u> 2 units : 1 unit	. <u>Evelyn</u> : 8 units
Difference between Evelyn and Is 7 units = 63 1 unit = 9 Total = 11 units = 11×9 = 99	abel
$\begin{array}{c} Qn \ 5 \\ \underline{20\text{-cent}} \ : \ 50\text{-cent} \\ 5^{\times 3} \ : \ 3^{\times 3} \end{array} \qquad \begin{array}{c} \underline{20\text{-c}} \\ \hline \end{array}$	<u>ent : \$1</u> 3 ^{×5} : 2 ^{×3}
15 : 9	15 : 10
<u>20-cent</u> : <u>50-cent</u> : <u>\$1</u> 15 : 9 : 10	
Total = 15 units + 9 units + 10 uni = 34 units 34 units = 102 1 unit = 102 \div 34 = 3 Total value = (15 units × \$0.20) + (9 units × \$0 = (15 x 3 x \$0.20) + (9 x 3 x \$.50) = \$9 + \$13.50 + \$30 = \$52.50	ts 0.50) + (10 units × \$1) + (10 × 3 × \$1)
Unit 3.3 – External Unchang	ed
At firstMale: 2^{x4} : 7^{x4} 8 units28 units	End Male : Female 1 ^{×7} : 4 ^{×7} 7 units 28 units
Difference in the number of men	= 8 units – 7 units = 1 unit
1 unit = 12 Total number of passengers on M = 36 units = 36 × 12 = 432	RT train at first
Qn 2	
<u>At first</u> 20-cent : 50-cent 3 : 11	End 20-cent : 50-cent 1 : 3 x3 x3
3 units 11 units	3 units 9 units

Qn 2 (Cont.) Decrease in 50-cent coins = 11 units - 9 units = 2 units 2 units = 8 1 unit = 8 ÷ 2 = 4

Total amount of money in the end

(3 units × \$0.20) + (9 units × \$0.50) =

(3 × 4 × \$0.20) + (9 × 4 × \$0.50) \$2.40 + \$18 =

= \$20.40 =

Qn 3

At first Pears : 3 units :	<u>Apples</u> 4 units	
End <u>Pears</u> 1 unit ^{x3} :	Apples 2 units ^{×3}	
3 units :	6 units	
Increase in app 2 units = 12 1 unit = 6 Total = 7 unit 7 units = 7 × 6 = 42	les = 2 units s	
Qn 4		
At first 20-cent : \$1 4 : 1	End 20-cent : \$1 2 ^{x2} : 1 ^{x2}	
At first 20-cent : \$1 4 : 1 4 units 1 un	$ \frac{End}{20\text{-cent}} : \$1 \\ 2^{x^2} : 1^{x^2} \\ \overline{4 \text{ units}} 2 \text{ units} $	
$\frac{\text{At first}}{20\text{-cent}} : \1 $\frac{4}{4} : 1$ $\frac{1}{4 \text{ units}} 1 \text{ units}$ Increase in \$1 c	$\frac{End}{20\text{-cent}} : \1 $\frac{2^{x^2}}{4 \text{ units}} : 1^{x^2}$ nit $\frac{4 \text{ units}}{4 \text{ units}} = 1 \text{ unit}$ $= 1 \text{ unit}$	
$\frac{\text{At first}}{20\text{-cent}} : \1 $\frac{4}{4} : 1$ $\frac{1}{4 \text{ units}} 1 \text{ unit}$ Increase in \$1 of the term of the term of the term of the term of term	$\frac{End}{20\text{-cent} : \$1}{2^{x^2} : 1^{x^2}}$ nit $\frac{4 \text{ units} 2 \text{ units}}{4 \text{ units} 2 \text{ units}}$ coins = 2 units – 1 unit = 1 unit ey at first 20) + (1 unit × \$1) 20) + (1 × 8 × \$1)	
$\frac{\text{At first}}{20\text{-cent}} : \1 $\frac{4}{4} : 1$ $\frac{1}{4} \text{ units } 1 \text{ units } 1$ Increase in \$1 cc I unit = 8 Amount of mone = (4 units × \$. = (4 × 8 × \$0.2 = \$6.40 + \$8 = \$14.40 Qn 5	$\frac{End}{20\text{-cent} : \$1}{2^{x^2} : 1^{x^2}}$ nit $\frac{4 \text{ units} 2 \text{ units}}{4 \text{ units} 2 \text{ units}}$ coins = 2 units – 1 unit = 1 unit ey at first 20) + (1 unit x \\$1) 20) + (1 x \\$ x \\$1)	

<u>At first</u> <u>Team X</u> : <u>T</u> 5 :	ēam Y 6	End Team X 2 ^{x2}	<u>Team Y</u> 3 ^{×2}	
5 units	6 units	4 units	6 units	
Decrease in Team X = 5 units – 4 units = 1 unit 1 unit = 6 Total number of members in Team Y = 6 units				
		= 6 × = 36	6	

Unit 3.4 – Unchanged Total Qn 1

<u>At first</u> Boys 3	:	Girls 5	Total 8 units	End Boys : Girls 3 ^{x2} : 1 ^{x2}	Total 4 units
3 units		5 units	8 units	6 units 2 units	8 units

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

Qn	2	

At first				End			
Α	:	В	Total	A	:	В	Total
5	:	7	12 units	1	:	2	3 units
				× 4		× 4	
5 units		7 units	12 units	4 units		8 units	12 units
Change in School B = 8 units – 7 units							

1 unit = 90

Total number of students in School B in the end = 8 units = 8 × 90 = 720

= 1 unit

Qn 3

At first Fixed : 1×4 :	Unfixed 4 ^{×4}	<u>Total</u> 5 units	<u>End</u> Fixed 1×⁵	: Unfixed : 3 ^{×5}	<u>Total</u> 4 units
4 units	16 units	20 units	5 units	15units	20 units
Change in the number of pieces fixed $= 5$ units $- 4$ units = 1 unit 1 unit $= 20$ Total number of pieces in the puzzle $= 20$ units $= 20 \times 20$ = 400					
Qn 4					
First hour Answered 2 ^{×4}		Unanswe 3 ^{×4}	ered	Total 5 units	
8 units		12 units	5	20 units	
After and Answered 3 ^{×5}	t <u>her half a</u> 1 :	<u>in hour</u> Unanswe 1 ^{×5}	ered	Total 4 units	
15 units	;	5 units		20 units	
Change in number of questions = 15 units – 8 units = 7 units					
7 units = 14					
1 unit =	14 ÷ 7				

= 2 Total number of questions = 20 units = 20 × 2 = 40



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

Unit 3.5 – Constant Di	fference
Qn 1 At firet	
Rakesh : Smith	Difference
3 ^{x2} : 4 ^{x2}	1 unit
6 unite 9 unite	2 unite
In the end Rekeep in Smith	Difference
	2 units
1 unit 3 units	2 units
Difference = 6 units – 1 un	it
= 5 units	
5 units = \$2000	
1 Unit = $$2000 \div 5$ = \$400	
Mr Rakesh's salary = 6 un	nits
= 6 × 3	\$400
= \$24	00
0= 0	
At first	
Jeremy : Aunt	Difference
1 : 4	<u>3 units</u>
1 unit 4 units	3 units
In the end	5.00
Jeremy : Aunt	Difference
2.5	1 drift
6 units 9 units	3 units
Age difference = 6 units -	- 1 unit
= 5 units	
5 Units = 25 $1 \text{ unit} = 25 \div 5$	
= 5	
Jeremy's age now = 1 x	5
= 5	
<u></u>	
At first	
Joanne : Elizabeth	Difference
1 ^{×3} : 2 ^{×3}	1 unit
3 units 6 units	3 units
End	D."(
Joanne : Elizabeth	Difference 3 units
2 units 5 units	3 units
Change in allowance	= 3 units – 2 units = 1 unit
1 unit = \$4	a <i>i</i>
Joanne's allowance at first	= 3 units
	= \$ 1 2
	-
Qn 4	
At first	End
Shop X 120 ka	<u>Enu</u> Shop X 2 units
Shop Y <u>165 kg</u>	Shop Y <u>5 units</u>
Difference 45 kg	Difference 3 units

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

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

Qn 5

<u>At first</u>	
Square	1 unit × 5 (5 units)
Rectangle	3 units x 5 (15 units)
Difference	2 units × 5 (10 units)
<u>End</u>	

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

Decrease each = 20 cm^2 Area of square = 5×20 = 100 cm^2

Length = 10 cm

Qn 6		
<u>Present</u> Kim : 5 ^{×2} :	Daughter 2 ^{×2}	Difference 3 units
10 units	4 units	6 units
4 years ago Kim : 3 ^{x3} :	Daughter 1 ^{×3}	Difference 2 units
9 units	3 units	6 units
Difference in	their ages	= 10 units – 9 units = 1 unit
1 unit = 4		
Present age	of Mrs Kim	= 10 units
Ū.		= 10 × 4
		= 40

6 years from now, Mrs Kim will be 46 years old.

Unit 3.6 – Number of Units x Value of Units

Qn 1	Number		Value		Total unit
	<u>(units)</u>	×	(wheels	<u>s)</u> =	(wheels)
Cars	5	×	4	=	20 units
Lorries	2	×	4	=	8 units
Motorbik	es 4	×	2	=	8 units_
	Total nur	nber	of whee	els =	36 units
36 units	= 864				
1 unit	= 864 ÷ 36				
	= 24				
Number	of motorbike	s in	the carp	ark =	4 units
				=	4 × 24
				=	96
Qn 2	Number		Value		Total
	(units)	×	<u>(\$)</u>	=	<u>unit (\$)</u>
Adults	2	×	6	=	12
Boys	3	×	5	=	15

Girls 5 x 4 = 20Total sum of money = 47 units 47 units = 7051 unit = $705 \div 47$ = 15 Qn 2 (Cont.) Difference between the number of boys and girls = 5 units - 3 units = 2 units = 2 x 15 = **30**

Qn 3

Difference in cost = 1 unit \rightarrow \$3 Cost of 1 plate = 3 units → \$9 Cost of 1 cup = 2 units \rightarrow \$6 Total sales No. value × = Plates 3 units × \$9 = \$27 units Cups 5 units \$6 \$30 units × = Total \$57 units \$57 units = \$2850 1 unit = 50 (a) No. of plates sold in 1st month = 3 units $= 3 \times 50$ = 150 $=\frac{4}{7}$ total (b) Items sold $\frac{4}{7}$ total = 8 units = 8 × 50 = 400 3 total items left = 300 7 Qn 4 Number Value Total (units) <u>(g)</u> <u>units (g)</u> × Flour 8 300 2400 × = Sugar 2 × 200 = 400 Butter 300 300 1 × = Total mass 3100 units = 3100 units = 24 800 = 24 800 ÷ 3100 1 unit = 8 Number of packets of sugar used = 2 units = 2 × 8 = 16 Qn 5 Number Value Total unit (units) (points) (points) × = Red 3 2 = 6 × Green 1 5 5 × = 3 Blue 4 × = 12 Total points 23 units = 23 units = 184 1 unit = 184 ÷ 23 = 8 Total number of balls collected = 8 units = 8 × 8 = 64 Qn 6 Number Value Total unit (wheels) (wheels) = (units) × Cars 3 × 4 12 = Bikes 5 2 10 × = 2 3 6 Tricycles × = Total number of wheels = 28 units

28 units = 840 1 unit = 840 ÷ 28 = 30

Number of cars parked = 90





Chapter 4 Average Unit 4.1 – Averaging Out

Qn 1

Total mass (4 brothers) = 75 kg \times 4 = 300 kg Other 2 brothers' mass = 300 kg - 72 kg - 66 kg = 162 kg



The mass of my other 2 brothers are ${\bf 80~kg}$ and ${\bf 82~kg}$ respectively.

Qn 2

Average number of children per household = $(0 \times 50) + (1 \times 20) + (2 \times 50) + (3 \times 40)$ 50 + 20 + 50 + 40 240

$$=\frac{2}{10}$$

160 = **1.5**

= 1.5

Qn 3

Average number sweets received by each child

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

Unit 4.2 – Two Averages

Total height of six students	= 125 cm × 6
	= 750 cm
Total height of five students	= 120 cm × 5
	= 600 cm
Height of the sixth student	= 750 cm – 600 cm
	= 150 cm
Qn 2	

Total of first set	= 124 × 2 = 248
Total of next set	$= 262 \times 2$
Total of 4 numbers	= 324 = 248 + 524 = 772
Average of four numbers	$=\frac{722}{4}$ = 193
Qn 3	
Total mass of 12 children	n = 33 kg × 12 = 396 kg
Total mass of 18 children	$a = 36 \text{ kg} \times 18$ = 648 kg
Total mass of 30 children	h = 648 kg + 396 kg = 1044 kg
Average mass of 30 child	lren = 1044 kg ÷ 30 = 34.8 kg

Unit 4.3 - Average with Unknown Quantity

= 3

Qn 1 12 - 9 = 3For each plate to increase from \$8 to \$9, the increase per plate \rightarrow \$1

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

Qn 2

75 kg - 48 kg = 27 kg For each boy to increase from 45 kg to 48 kg, increase per boy = 3 kg Number of boys in the group = 27 kg \div 3 kg = 9

Qn 3

Difference in Gareth's results = 13 + 5= 18Difference in average score = 90 - 87= 3Total people involved = $18 \div 3$ = 6

Excluding Gareth himself, he had 5 good friends.

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Qn 4 Difference in Jean's score = 20 - 4 = 16Difference in average score = 80 - 78 = 2Number of people involved $= 16 \div 2$ = 8Excluding herself, Jean had **7 friends**.

Qn 5

Total marks deducted $= 96 \times 2$ = 192

Since 2 students left the class, besides the average of 60 marks lost, the loss will be re-distributed to the rest of the classmates such that each pupil student drop from an average of 60 marks to 58 marks. $192 - (2 \times 60) = 192 - 120$ = 72

Number of students at first
$$= 36 + 2$$
 (left)
= 38

Qn 6

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

	Male	Female	<u>Total</u>	
40 × 56 =	2240	$40 \times 64 = 2560$	4800 🕻	2
				1-40
45 × 56 =	2520	35 × 64 = 2240	4760	<hr/>
)+80
55 × 56 =	3080	25 × 64 = 1600	4680 🔇	2

Number of male singers = 55

Qn 7

Difference in the individual score = 18 + 9= 27Difference in average score = 85 - 82= 3No. of pupils in the group = $27 \div 3$ = 9

Qn 8

On 0

Total = 75×4 = 300 Chinese + Mathematics = 300 - 62 - 79= 159(a) Smallest difference = 80 - 79= 1(b) Biggest difference = 89 - 70= 19

QIIS		
Tota	l distance	= 8.50 × 4
		= 34 m
Ukra	ine + Germany	= 34 m - 8.95 m - 7.35 m
		= 17.7 m
(a) S	Smallest difference	= 9 m – 8.7 m
		= 0.3 m
(b) E	Biggest difference	= 9.7 m – 8 m
		= 1.7 m

Unit 4.4 – Average with Repeated Identity

Qn 1 Total (A + B) = 78×2 = 156 Total (B + C) = 74×2 = 148 Total (A + C) = 80×2 = 160

```
Qn 1 (Cont.)
    Total (2A + 2B + 2C) = 156 + 148 + 160
                        = 464
    A + B + C \rightarrow 464 \div 2 = 232
                        = 232 - 156
    Calvin's score
                        = 76
    Alan's score
                        = 232 - 148
                        = 84
    Bernard's score
                        = 232 - 160
                        = 72
Qn 2
    Total of John + Henry
                                 = $2400 × 2
                                 = $4800
                                 = $3000 × 2
    Total of Henry + Bernard
                                 = $6000
Difference between John and Bernard
= 2 units
= $(6000 - 4800)
= $1200
1 unit = $600
       = 5 × $600
John
       = $3000
Henry's salary = $4800 - $3000
               = $1800
Qn 3
    Total of Clara + Joan
                            = $80 \times 2
                            = $160
    Total of Clara + Melissa = $115 × 2
                            = $230
Difference between Joan's share and Melissa's share
= 9 units - 4 units
= 5 \text{ units}
5 units = $230 - $160
       = $70
1 unit = $70 ÷ 5
       = $14
Amount paid by Melissa = 9 units
                        = 9 × $14
                        = $126
Cost of present = $126 + $160
               = $286
Qn 4
    Total (Benson + Ryan)
                            = 450 × 2
                             = 900
    Total (Benson + Joseph) = 240 \times 2
                             = 480
Difference between Ryan and Joseph
= 5 units – 2 units
= 3 units
3 units = 900 - 480
       = 420
1 unit = 420 ÷ 3
       = 140
Ryan = 5 units
       = 5 × 140
       = 700
Benson = 900 - 700
        = 200
Qn 5
Total (Amos + Bernard)
                          = $2800 × 2
                          = $5600
Total (Bernard + Chelsia) = $4200 × 2
                          = $8400
                          = $2600 × 2
Total (Amos + Chelsia)
                          = $5200
```

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

Unit 5. r Rate involving One Object
Qn1 1 minute \rightarrow 6 plates 45 minutes \rightarrow 45 x 6 = 270 plates
Qn 2
3 days \rightarrow 1 house
1 day $\rightarrow \frac{1}{3}$ house
$36 \text{ days } \rightarrow \frac{1}{3} \times 36 = 12 \text{ houses}$
Qn 3
8 notebooks \rightarrow \$7.20 1 notebook \rightarrow \$7.20 \div 8 = \$0.90 14 notebooks \rightarrow 14 x \$0.90 = \$12.60
On 4
6 litres → 54 km 1 litre → 54 km ÷ 6 = 9 km 18 litres → 18 × 9 = 162 km
On 5
$\begin{array}{rcrcrcrc} 5 & + & + & + & + \\ 5 & 1 & \text{lesson} & \rightarrow & + & + & + \\ 1 & 1 & \text{lesson} & \rightarrow & + & + & + & + \\ 16 & 1 & \text{lessons} & \rightarrow & + & + & + & + \\ 16 & 1 & 1 & 1 & + & + & + \\ 16 & 1 & 1 & 1 & + & + & + \\ 16 & 1 & 1 & 1 & + & + & + \\ 16 & 1 & 1 & 1 & 1 & + \\ 16 & 1 & 1 & 1 & 1 & 1 & + \\ 16 & 1 & 1 & 1 & 1 & 1 & 1 \\ 16 & 1 & 1 & 1 & 1 & 1 & 1 \\ 16 & 1 & 1 & $
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 5.2 – Rate Involving Two Different Objects

Qn 1 In an hour,

Janice travels $\frac{1}{2}$ of the distance of Town A to Town B and

Joel travels $\frac{1}{2}$ of the distance of Town B to Town A.

Together, they travel $\frac{1}{2} + \frac{1}{3} = \frac{3}{6} + \frac{2}{6}$ $\frac{5}{-}$ the dista =

$$\frac{5}{-}$$
 the distance of A to B

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

Qn 1 (Cont.) $\frac{5}{6}$ of the distance of Town A to Town B takes both of them 1 hour. $\frac{1}{6}$ of the distance of Town A to Town B takes both of them

 $\frac{1}{6}$ of the distance of Town A to Town B takes both of them 6

 $\frac{1}{5}$ hour.

To cover the distance between Town A and Town B, both of them would take $\frac{6}{5}$ hour = $1\frac{1}{5}$ hours.

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 $\frac{1}{3}$ days = $2\frac{2}{3}$ days.

Unit 5.3 – Rate Involving Three Different Objects Qn 1 In an hour, 1st pipe fill $\frac{1}{6}$ of the pool, 2nd pipe fill $\frac{1}{8}$ of the pool. Together, they fill $\frac{4}{24} + \frac{3}{24} = \frac{7}{24}$ of the pool In 2 hours, 1st and 2nd pipes fill $\frac{14}{24}$ of the pool, left $\frac{10}{24}$ of the pool. In 1 hour, 3rd pipe drain $\frac{1}{12}$ of the pool. In 1 hour with 3 pipes turned on, he can fill $\frac{7}{24} - \frac{1}{12} = \frac{7}{24} - \frac{2}{24} = \frac{5}{24}$ of the pool

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

Total time needed = 2 + 2 = **4 hours**

Qn 2
In an hour, 1st tap fills
$$\frac{1}{4}$$
 tank, 2nd tap fills $\frac{1}{3}$ tank
In 1 hour, both fill $\frac{1}{4} + \frac{1}{3} = \frac{3}{12} + \frac{4}{12} = \frac{7}{12}$ tank
Left = $\frac{5}{12}$ tank
In 1 hour, 3rd tap drains $\frac{1}{2}$ tank
With 1st and 3rd taps turned on $\rightarrow \frac{1}{2} - \frac{1}{4}$
 $= \frac{1}{4}$ tank was drained

Time taken to completely drain tank = $2\frac{1}{2}$ hours

Chapter 6 Angles I Unit 6.1 – Angles on a Straight Line Qn 1 $\angle x = 180^\circ - 54^\circ - 78^\circ$ = **48°** Qn 2 $\angle x = 180^{\circ} - 98^{\circ} - 42^{\circ}$ = 40° Qn 3 $80^{\circ} - 60^{\circ} = 120^{\circ}$ 8 units = 120° 1 unit = 15° = 5 units ∠v $= 5 \times 15^{\circ}$ = 75° = 3 units / x = 3 ×15° = 45° Qn 4 Total 9 units 180° = 20° 1 unit ∠x 3 units $3 \times 20^{\circ}$ 60° 4 × 20° ∠y 4 units 80° 2 × 20° ∠z 2 units **40°** Qn 5 Total 6 units 180° = 30° 1 unit = 2 units $2 \times 30^{\circ}$ ∠x = 60° = 3 units $3 \times 30^{\circ}$ ∠y

90° 1 × 30°

30°

_

1 units

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Unit	6.2 – Vertically Opposite Angles
Qn 1	$\angle y = 25^{\circ}$ (vertically opposite \angle) $\angle x = 50^{\circ}$ (vertically opposite \angle)
Qn 2	$\angle y + 45^\circ = 125^\circ (\text{vertically opposite } \angle)$ $\angle y = 125^\circ - 45^\circ (\text{vertically opposite } \angle)$ $= 80^\circ$
Qn 3	$\angle x + \angle y = 120^{\circ} \text{ (vertically opposite } \angle)$ $3 \text{ units} = 120^{\circ}$ $1 \text{ unit} = 40^{\circ}$ $\angle x = 2 \text{ units}$ $= 2 \times 40^{\circ}$ $= 80^{\circ}$ $\angle y = 1 \text{ unit}$ $= 40^{\circ}$
Qn 4	
	$ \angle x + \angle y + 120^\circ = 180^\circ (\angle \text{ on straight line}) \angle x + \angle y = 60^\circ 3 \text{ units } = 60^\circ 1 \text{ unit } = 20^\circ \angle x = 2 \text{ units} = 2 \times 20^\circ = 40^\circ \angle y = 20^\circ $
Qn 5	
	$\angle x = 32^{\circ}$ $\angle y = 180^{\circ} - \angle x - 74^{\circ}$ $= 180^{\circ} - 32^{\circ} - 74^{\circ}$ $= 74^{\circ} (\angle \text{ on a straight line})$
On 6	
Qno	$\angle x = 42^{\circ}$ (vertically opposite \angle) $\angle y = 180^{\circ} - 83^{\circ} - 42^{\circ}$ $= 55^{\circ}$ (\angle on a straight line)
Qn 7	$ \angle x + \angle y + 84^{\circ} = 180^{\circ} (\angle \text{ on a straight line}) \angle x + \angle y = 180^{\circ} - 84^{\circ} = 96^{\circ} 4 units = 96^{\circ} 1 unit = 24^{\circ} \angle x \qquad 3 units = 3 \times 24^{\circ} = 72^{\circ} \angle y \qquad 1 unit = 24^{\circ} \angle z = \angle x = 72^{\circ} (vertically opposite \angle) $
Unit	6.3 – Alternate, Corresponding & Interior
	Angles
Qn 1	
	$ \angle BFC = 130^{\circ} \text{ (corresponding } \angle) \angle y = 180^{\circ} - 130^{\circ} = 50^{\circ} (\angle \text{ on a straight line}) \angle EFC = 130^{\circ} - 75^{\circ} = 55^{\circ} \angle ECF = 180^{\circ} - 55^{\circ} - 112^{\circ} = 13^{\circ} \angle x = 180^{\circ} - 13^{\circ} - 130^{\circ} = 37^{\circ} (\text{sum of } \angle \text{s in a } \Delta) $
Qn 2	
	$\angle z$ + 20° = 82°- 35° (alternate \angle)
	$\angle z + 20^\circ = 47^\circ$
	$\angle z = 47^\circ - 20^\circ$

= **27**°

```
Qn 3
         \angle z = 180^{\circ} - 56^{\circ} - 34^{\circ}
              = 90 ° (\angles on a straight line)
         2x = 180^{\circ} - 34^{\circ} - 90^{\circ} (alternate \angle)
             = 56°
         x = 28°
         3y = 180^{\circ} - 90^{\circ} (alternate \angle)
              = 90°
         y = 30°
Qn 4
         180^{\circ} - 58^{\circ} = 122^{\circ} (interior \angle)
         ∠BCP
                       = 122° + 29°
                        = 151° (alternate∠)
Qn 5
         180° – 135° = 45° (corresponding \angle)
                         = 105° - 45°
         ∠x
                         = 60° (alternate \angle)
                         = 180^{\circ} - 60^{\circ}
         ∠y
                         = 120° (∠ on a straight line)
Qn 6
                         = 37° (alternate \angle)
         ∠y
         360° – 37° – 285°= 38°
         ∠x
                         = 38° + 37°
                         = 75° (alternate ∠)
Qn 7
         \angle BDE = 50^{\circ} (alternate \angle)
         \angle p = 50^{\circ} \div 2
                  = 25° (∠ bisector)
         ∠BGD = 180° - 105°
                  = 75°
                 = 180^{\circ} - 75^{\circ} - 25^{\circ}
         ∠q
                  = 80° (sum of \angles in a \triangle)
Qn 8
         \angle BEG = 60^{\circ} (alternate \angle)
         \angle x = 60^{\circ} \div 2
                 = 30^{\circ} (\angle bisector)
= 180^{\circ} - 30^{\circ}
         ∠z
                  = 150° (interior \angle)
                 = 180° - 30° - 55°
         ∠y
                  = 95 °
Unit 6.4 – Isosceles Triangle
Qn 1
         \angle CBE = 85^{\circ} (isosceles \triangle)
         \angle CAD = 180^{\circ} - 85^{\circ} - 85^{\circ}
                   = 10° (sum of \angles in a \triangle)
         \angle FBA = 180^\circ - 85^\circ
                   = 95° (\angle on a straight line)
         \angle BFA = 180^{\circ} - 95^{\circ} - 10^{\circ}
                   = 75° (sum of \angles in a \triangle)
                   = 180° - 75°
         ∠m
                    = 105° (∠ on a straight line)
Qn 2
         \angle ABC = \angle ACB
                   = 180^{\circ} - 110^{\circ}
                   = 70° (\angle on a straight line)
         \angle XBA = 180^{\circ} - 70^{\circ}
                   = 110° (\angle on a straight line)
                   = 180^{\circ} - 45^{\circ} - 110^{\circ}
         ∠a
                   = 25° (sum of \angles in a \triangle)
```

Qn 3 $\angle PQR = 55^{\circ}$ (isosceles \triangle) $\angle PRQ = 180^{\circ} - 55^{\circ} - 55^{\circ}$ (sum of Δ) = 70° $\angle PRS = 180^{\circ} - 70^{\circ} (\angle s \text{ on a straight line})$ = 110 ° $\angle SRT = 180^{\circ} - 110^{\circ}$ = 70° (∠s on straight line) $\angle RST = 180^{\circ} - 70^{\circ} - 70^{\circ}$ = 40°

Qn 4

 $\angle PQT = 70^{\circ} \text{ (isosceles } \Delta\text{)}$ $\angle QTU = 70^{\circ}$ (alternate \angle) $\angle QTR = 70^\circ - 50^\circ$ = 20°

Qn 5

∠x	$=\frac{180^{\circ}-130^{\circ}}{2}$
	$= 23$ (isosceles Δ)
∠ACF	$= 180^{\circ} - \angle x$
	= 180°- 25°
	= 155° (sum of interior ∠s)
∠DCF	= 180° - 110°
	= 70° (sum of interior ∠s)
∠v	= 155° – 70° – 25°
2	= 60°

Qn 6

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

Qn 7

 $180^{\circ} - 75^{\circ} = 55^{\circ}$ $180^{\circ} - 30^{\circ} - 30^{\circ} = 120^{\circ}$ $\angle y = 360^{\circ} - 120^{\circ}$ = **240** ° $\angle x = 55^{\circ} - 30^{\circ}$ = 25 °

Qn 8

 $\angle KEF = 60^{\circ} - 38^{\circ}$ = 22° $\angle KFE = 60^{\circ} - 25^{\circ}$ = 35° $\angle EKF = 180^{\circ} - 22^{\circ} - 35^{\circ}$ = 123° (vertically opp. \angle s, sum of \angle s in a \triangle) $\angle HKG = 123^{\circ}$ (vertically opp. $\angle s$)

Qn 9

 $\angle PQR = 55^{\circ}$ (isosceles Δ) $\angle PRQ = 180^{\circ} - 55^{\circ} - 55^{\circ}$ (sum of triangle) = 70° (a) $\angle PRS = 180^{\circ} - 70^{\circ}$ (angle on straight line) = 110° $\angle SRT = 180^{\circ} - 110^{\circ}$ = 70° (angle on straight line) (b) $\angle RST = 180^{\circ} - 70^{\circ} - 70^{\circ}$ = 40° (isosceles Δ)

Chapter 7 Angles II (Closed Figures) Unit 7.1 – Interior and Exterior Angles Within A Triangle Qn 1 $\angle x = 125^{\circ} - 70^{\circ}$

= 55° (2 interior \angle = 1 exterior \angle)

Qn 2

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

Qn 3

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

Qn 4

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

Qn 5

 $\angle a + \angle b + 20^\circ = \angle c + \angle d + 20^\circ = 180^\circ$ (sum of \angle s in \triangle) $=(180^{\circ} \times 2) - 20^{\circ} - 20^{\circ}$ $\angle a + \angle b + \angle c + \angle d$ $= 360^{\circ} - 40^{\circ}$ = 320°

```
Qn 6
             60^{\circ} + 60^{\circ} = 120^{\circ}
            180^{\circ} - 110^{\circ} - 20^{\circ} = 50^{\circ}
            \angle x = 180^{\circ} - 100^{\circ} - 70^{\circ}
                   = 10° (sum of \angles in a \triangle)
```

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) $\angle a + \angle b + \angle c + \angle d + 20^\circ = 180^\circ (\text{sum of } \Delta)$ $\angle a + \angle b + \angle c + \angle d = 160^{\circ}$

Qn 8

 $\angle a + \angle b + \angle c + \angle d + \angle e + \angle f$ $= (180^{\circ} \times 3) - 180^{\circ}$ = **360** ° since the sum of \angle of \triangle RSV = 180 °

Qn 9

 $\angle PQS = \frac{80^{\circ} - 34^{\circ}}{2}$ 2 = 73° (isosceles Δ) = 180° - 73° - 15° ∠x = 92° (sum of \angle s in \triangle) ∠PTR = 180° - 92° = 88° $\angle y = 34^\circ + 88^\circ$

= 122° (2 interior $\angle s = 1$ exterior \angle)

Unit 7.2 – Angle Properties Within A Rhombus

Qn 1

 $\angle DAB = 180^{\circ} - 30^{\circ} - 30^{\circ}$

= 120° (sum of \angle s in a \triangle) $\angle x = \frac{120^{\circ}}{2}$ 2

= 60°

Qn 2

$$\angle QPB = 180^{\circ} - 114^{\circ}$$

 $= 66^{\circ}$
(a) $\angle QPR = \frac{66^{\circ}}{2}$
 $= 33^{\circ}$
(b) $\angle QCB = 96^{\circ}$
(c) $\angle RSC = 180^{\circ} - 84^{\circ} - 33^{\circ}$
 $= 63^{\circ}$
Qn 3
 $\angle ADC = 180^{\circ} - 130^{\circ}$
 $= 50^{\circ}$
 $\angle x = \frac{50^{\circ}}{2}$
 $= 25^{\circ}$
Qn 4
 $180^{\circ} - 45^{\circ} - 90^{\circ} - 30^{\circ} = 15^{\circ}$
 $\angle x = 15^{\circ}$
Qn 5
 $\angle FBE = 90^{\circ}$
(a) $\angle BFE = \angle DFC$
 $= 180^{\circ} - 90^{\circ} - 35^{\circ}$
 $= 55^{\circ}$
 $\angle DBF = 45^{\circ}$ (diagonal of square)

 $\angle BDF + 45^{\circ} = \angle DFC$

(b) $\angle BDF = 55^{\circ} - 45^{\circ}$

 $\angle x = 180^{\circ} - 108^{\circ}$

Qn 6

Qn 7

Qn 8

Qn 9

∠FBD

∠x

∠y

= 10°

= 72° (interior \angle s)

 $\angle y = 43^{\circ}$ (alternate $\angle s$)

 $= 65^{\circ}$ $=65^{\circ} \div 2$

= 32.5 °

= 115° - 70°

 $\angle BDE = 180^{\circ} - 65^{\circ}$ = 115°

= 45°

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

∠ADC = 180° - 110°

 $= 180^{\circ} - 110^{\circ}$

2

= 55° $\angle y = 55^{\circ} + 20^{\circ} + 20^{\circ}$

∠y = ∠2x

∠*x* = 17.5°

∠y = **35**°

 $= 180^{\circ} - 70^{\circ} - 45^{\circ}$

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

= 95° (2 interior \angle s = 1 exterior \angle)

BD diagonal, bisector $\rightarrow \angle y = \angle 2x$

= 70° (interior \angle)

= $\frac{70^{\circ}}{10^{\circ}}$ (sum of \angle s in a \triangle)

 $180^{\circ} - 90^{\circ} - 47^{\circ} = 43^{\circ}$

 $\angle DAO = 45^{\circ}$ (diagonal of square) $\angle DAE$ $= 180^{\circ} - 90^{\circ} - 60^{\circ}$ = 30° (sum of Δ) $=45^{\circ}-30^{\circ}$ $\angle y$ = 15° $\angle x = 15^{\circ} + 90^{\circ}$ = **105**° (2 internal \angle = 1 external \angle) Unit 7.3 - Angles Properties Within a Parallelogram Qn 1 $\angle y = 60^{\circ}$ (alternate \angle) $= 180^{\circ} - 35^{\circ} - 70^{\circ} - 60^{\circ}$ ∠x = 15° (sum of \angle s in a \triangle) $\angle z = \angle x + \angle y$ $= 60^{\circ} + 15^{\circ}$ = **75°** (2 interior $\angle s = 1$ exterior \angle) Qn 2 $\angle x = 25^{\circ}$ (alternate \angle) $\angle y = 42^{\circ} + 25^{\circ}$ = 67° (2 internal \angle = 1 external \angle) $\angle z = 180^{\circ} - 80^{\circ} - 42^{\circ} - 25^{\circ}$ = 33° (sum of Δ) Qn 3 $\angle RSU = 180^\circ - 88^\circ = 92^\circ$ (corresponding \angle) (a) $\angle SRU = \frac{180^\circ - 92^\circ}{1000}$ 2 = 44° (isosceles \triangle) $\angle PSR = 360^{\circ} - 144^{\circ} - 92^{\circ}$ (b) = 124° Qn 4 $\angle BAC = 30^{\circ}$ (alternate \angle) $\angle CAD = 180^{\circ} - 30^{\circ} - 20^{\circ} = 130^{\circ}$ (a) $\angle ADC = 180^{\circ} - 130^{\circ} - 30^{\circ}$ = **20** ° (sum of Δ) (b) ∠CAD =130° (c) $\angle ACB = 180^{\circ} - 20^{\circ} - 30^{\circ}$ = 130° Unit 7.4 – Angle Properties Within A Trapezium Qn 1 $\angle CDB = \frac{180^\circ - 120^\circ}{100}$ 2 = 30° (isosceles Δ) $\angle BDE = 78^\circ - 30^\circ$ (a) = **48**° \angle BEA = 78° (corresponding \angle) (b) $\angle EBC = 180^\circ - 120^\circ$ = 60° (interior \angle) $\angle EBA = 130^\circ - 60^\circ$ = 70° $\angle BAE = 180^{\circ} - 78^{\circ} - 70^{\circ}$ = **32°** (sum of \angle s in a \triangle) Qn 2

```
180^{\circ} - 118^{\circ} = 62^{\circ} (\angle on straight line)
\angle y = 180^{\circ} - 84^{\circ} - 62^{\circ}
    = 34° (sum of \Delta)
\angle x = \angle y
     = 34° (alt. ∠)
```

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Qn 10

Qn 3

$$\angle DAB = 180^{\circ} - 86^{\circ}$$

$$= 94^{\circ}$$

$$\angle ABD = \frac{180^{\circ} - 94^{\circ}}{2}$$

$$= 43^{\circ}$$

$$\angle y = 180^{\circ} - 88^{\circ} - 43^{\circ}$$

$$= 49^{\circ} (interior \angle s)$$

$$\angle x = 180^{\circ} - 86^{\circ}$$

$$= 94^{\circ} (interior \angle s)$$
Qn 4

$$\angle y = 90^{\circ} - 48^{\circ}$$

$$= 42^{\circ} (2 \text{ interior } \angle s = 1 \text{ exterior } \angle)$$
Qn 5

$$\angle BFC = 54^{\circ} (alternate \angle)$$
(a) $\angle t = 180^{\circ} - 57^{\circ} - 54^{\circ}$

$$= 69^{\circ}$$
(b) $\angle y = 69^{\circ} - 54^{\circ}$

$$= 15^{\circ}$$
(c) $\angle BAF = 54^{\circ} (isoceles \Delta)$

$$\angle x = 180^{\circ} - 54^{\circ} - 54^{\circ}$$

$$= 72^{\circ} (sum of isosceles \Delta)$$
(d) $\angle u = \angle CBE$

$$= 57^{\circ} (alternate \angle)$$
Chapter 8 Area of Triangle
Unit 8.1 - Area of Triangle
Unit 8.1 - Area of Triangle
Qn 1
Height = AB
Height = DC
Height = AF
Height = 16 cm
Qn 3
Base = 4 cm
Height = 7 cm
Qn 4
Base = 5 cm
Height = 7 cm
Qn 7
Area of $\triangle BCD$

$$= (\frac{1}{2} \times 18 \times 8)$$

$$= (\frac{1}{2} \times 8 \times DF)$$
DF = $\frac{18 \times 8}{12}$

$$= 12 cm$$
Qn 8
Area of shaded $\triangle BCD$

$$= (\frac{1}{2} \times 16 \times 15)$$
CE = $\frac{16 \times 15}{20}$

Qn 9 Area of $\triangle ABC$ = $(\frac{1}{2} \times 15 \times 20)$ = $(\frac{1}{2} \times 30 \times BD)$ BD = $\frac{15 \times 20}{30}$ = 10 cm

Qn 10 Area of shaded $\triangle ABC$ = $(\frac{1}{2} \times 12 \times AB)$ = $(\frac{1}{2} \times 28 \times 18)$ $AB = \frac{28 \times 18}{2}$

12 = **42 cm**

Unit 8.2 – Finding the Area of a Triangle in Unit Squares Qn 1 (a) Triangle = $(6 \times 6) - (\frac{1}{2} \times 4 \times 2) - (\frac{1}{2} \times 6 \times 2) - (\frac{1}{2} \times 4 \times 6)$ = $36 \text{ cm}^2 - 4 \text{ cm}^2 - 6 \text{ cm}^2 - 12 \text{ cm}^2$ = 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 cm² - 12 cm² - 3 cm² - 9 cm² = **12 cm²**

Qn 2

(a) Triangle = $(4 \times 6) - (\frac{1}{2} \times 6 \times 1) - (\frac{1}{2} \times 3 \times 4) - (\frac{1}{2} \times 4 \times 2)$ = $24 \text{ cm}^2 - 3 \text{ cm}^2 - 6 \text{ cm}^2 - 4 \text{ cm}^2$ = 11 cm^2 (b) Triangle = $(6 \times 5) - (\frac{1}{2} \times 6 \times 2) - (\frac{1}{2} \times 6 \times 3)$ = $30 \text{ cm}^2 - 6 \text{ cm}^2 - 9 \text{ cm}^2$ = 15 cm^2

Qn 3

(a) Shaded = $(6 \times 6) - (\frac{1}{2} \times 4 \times 2) - (\frac{1}{2} \times 3 \times 2) - (\frac{1}{2} \times 3 \times 1) - (\frac{1}{2} \times 4 \times 2)$ = $36 \text{ cm}^2 - 4 \text{ cm}^2 - 3 \text{ cm}^2 - 1.5 \text{ cm}^2 - 4 \text{ cm}^2$ = 23.5 cm^2 (b) Shaded = $(6 \times 6) - (\frac{1}{2} \times 5 \times 4) - (4 \times 2) - (\frac{1}{2} \times 2 \times 2) - (\frac{1}{2} \times 6 \times 1)$ = $36 \text{ cm}^2 - 10 \text{ cm}^2 - 8 \text{ cm}^2 - 2 \text{ cm}^2 - 3 \text{ cm}^2$ = 13 cm^2

Qn 4

- (a) Area of rectangle = $6 \text{ cm} \times 5 \text{ cm}$
 - = 30 cm² Area of Region A = $\frac{1}{2} \times 6$ cm \times 1 cm = 3 cm²

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= 12 cm

Qn 4 (Cont.) Area of Region B = $\frac{1}{2} \times 5 \text{ cm} \times 3 \text{ cm}$ = 7.5 cm² Area of region C = $\frac{1}{2}$ x 2 cm x 3 cm $= 3 \text{ cm}^{2}$ Shaded area = 30 cm² - 3 cm² - 7.5 cm² - 3 cm² = **16.5 cm²** Area of rectangle = $6 \text{ cm} \times 6 \text{ cm}$ (b) = 36 cm² Area of Region A = $\frac{1}{2}$ × 4 cm × 2 cm $= 4 \text{ cm}^2$ Area of Region B = $\frac{1}{2} \times 2 \text{ cm} \times 3 \text{ cm}$ $= 3 \text{ cm}^2$ Area of region C = $\frac{1}{2} \times 6 \text{ cm} \times 3 \text{ cm}$ $= 9 \text{ cm}^2$ Shaded area $= 36 \text{ cm}^2 - 9 \text{ cm}^2 - 4 \text{ cm}^2 - 3 \text{ cm}^2$ = 20 cm²

Unit 8.3 – Triangle with Common Base or Height

Qn 1 Area of rectangle = (11×8) = 88 cm² Area of 3 Δ s = $(\frac{1}{2} \times 11 \times 3) + (\frac{1}{2} \times 8 \times 8) + (\frac{1}{2} \times 5 \times 3)$ = 16.5 cm² + 32 cm² + 7.5 cm² = 56 cm² Area of shaded triangle = 88 cm² - 56 cm² = **32 cm²**

Qn 2

$= \frac{1}{2} \times b \times h$
$=\frac{1}{2} \times 10 \text{ cm} \times 10 \text{ cm}$
= 50 cm ²
= 2 triangles = 2 × 50 cm ² = 100 cm²

Qn 3

Area of big triangle	$=\frac{1}{2} \times 20 \text{ cm} \times 10 \text{ cm}$
	= 100 cm ²
Area of small triangle	$=\frac{1}{2} \times 10 \text{ cm} \times 10 \text{ cm}$
Area of shaded parts	= 50 cm ² = 100 cm ² + 50 cm ² = 150 cm²

Qn 4

Area of 1 triangle = $\frac{1}{2} \times b \times h$ = $\frac{1}{2} \times 20 \text{ cm} \times 10 \text{ cm}$ = 100 cm² Area of shaded parts = 2 triangles = 2 × 100 cm² = **200 cm²** Qn 5

Area of 1 triangle $= \frac{1}{2} \times b \times h$ $= \frac{1}{2} \times 10 \text{ cm} \times 10 \text{ cm}$ $= 50 \text{ cm}^{2}$ Area of shaded parts = 2 triangles $= 2 \times 50 \text{ cm}^{2}$ $= 100 \text{ cm}^{2}$

Qn 6

```
\Delta DEC \text{ is } \frac{1}{4} \text{ of square ABCD.}
\Delta CBF \text{ is } \frac{1}{4} \text{ of square ABCD.}
\Delta AEF \text{ is } \frac{1}{8} \text{ 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} \text{ square ABCD}
= \frac{3}{8} \times 48 \text{ cm}^2
= 18 \text{ cm}^2
```

Qn 7

Area of shaded triangle

igle $= \frac{1}{2} \times 7 \times 5$ = 17.5 cm²

Unit 8.4 – Triangles with Common Bases Qn 1

Area of shaded parts = $\frac{1}{2} \times 20$ cm × 6 cm = **60** cm²

Qn 2

Area of shaded parts = $\frac{1}{2} \times 20 \text{ cm} \times 12 \text{ cm}$ = **120 cm**²

Qn 3 Since the 2 Δ s share the same base AC BE : DF = Area of Δ ABC : Area of Δ ADC = 1 : 3 Difference in area = shaded part = 2 units 2 units = 64 cm² 1 unit = 32 cm² $\frac{1}{2} \times AC \times BE = 32 cm²$ $\frac{1}{2} \times AC \times 4 = 32 cm²$ AC = 32 cm² ÷ 2 cm = 16 cm

Qn 4

Since the two Δs share the same base, AC BE : DF = Area of ΔABF : Area of ΔADC = 1 : 4

Qn 4 (Cont.)
Difference in area = shaded part
= 3 units
3 units = 48 cm²
1 unit = 16 cm²

$$\frac{1}{2} \times AC \times BE = 16 cm2$$

 $\frac{1}{2} \times AC \times 2 cm = 16 cm2$
AC = **16 cm**

Qn 5

Since the 2 Δ s share the same base BD AE : FC = 5 : 3 Area of Δ ABD : Area of Δ BCD 5 : 3 Area of Δ ABD = 30 cm² : 18 cm² Entire quadrilateral = 30 cm² + 18 cm² = **48 cm²**

Qn 6

Area of shaded region = $(\frac{1}{2} \times 8 \times 20) + (\frac{1}{2} \times 12 \times 25)$ = 80 cm² + 150 cm² = **230 cm²**

Qn 7

Area of shaded parts = $(\frac{1}{2} \times 18 \times 10) + (\frac{1}{2} \times 12 \times 10)$ = 90 cm² + 60 cm² = **150 cm²**

Qn 8

5 units 30 cm = 1 unit = 6 cm AB = 1 unit 6 cm = 4 units = DE 24 cm = Area of shaded parts $= (\frac{1}{2} \times 24 \times 10) + (\frac{1}{2} \times 6 \times 10)$ = 120 cm² + 30 cm² = 150 cm²

Unit 8.5 – Composite Figures Involving Triangles Qn 1

Area of 1 triangle $=\frac{1}{2} \times 12 \text{ cm} \times 8 \text{ cm}$ = 48 cm² Area of figure = 48 cm² × 5 = **240 cm²**

Qn 2

Area of 1 triangle = $\frac{1}{2} \times 12 \text{ cm} \times 10 \text{ cm}$ = 60 cm² Area of 8 triangles = 60 cm² × 8 = **480 cm²**

Qn 3

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

Qn 4

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

Qn 5

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

Chapter 9 Percentage

Unit 9.1 – Percentage Increase

Qn 1

20% of original \rightarrow 85 100% of original \rightarrow 5 × 85 = **425**

Qn 2	
100% of original	→ 1800
1% of original	→ 1800 ÷ 100 = 18
15% of original	→ 18 × 15 = 270

Qn 3

At firstIn the endGirls $\rightarrow 40\%$ Girls $\rightarrow 40\% + 12$
(50% of total)Boys $\rightarrow 60\%$ Boys $\rightarrow 60\% - 60$
(50% of total)20% of the total $\rightarrow 60 + 12 = 72$ 10% of the total $\rightarrow 36$ Total pupils at first $\rightarrow 10 \times 36 = 360$

Qn 4

Aaron \rightarrow 30% of the sum Bernard \rightarrow 70% of the sum Difference \rightarrow 40% of the sum = \$120 1% of the sum \rightarrow \$120 \div 40 = \$3 Sum of money \rightarrow 100 x \$3 = **\$300**

Qn 5

Qn 6

Unit 9.2 – Multiplication in Percentage

Qn 1

Janice \rightarrow 120% David \rightarrow 100% Decrease in Janice's savings \rightarrow 20% of 120%

 $=\frac{1}{5} \times 120\% = 24\%$

196% → \$980

1% → \$5

Janice's savings at first \rightarrow 120% \rightarrow 120 × \$5 = **\$600**

Qn 2 _{ Wife Self Wife 30% Income \rightarrow 100% 70% \rightarrow 30 $\rightarrow \frac{30}{100} \times 120\% = 36\%$ Wife Income 120% Self 120% - 36% = 84% \rightarrow +hinkingMath@onSponge

Qn 2 (Cont.) Increase in wife's income $\rightarrow 6\%$ → \$240 1% \rightarrow \$40 $= 100 \times 40$ Income before increase = \$4000 Qn 3 100% Salary \rightarrow Savings \rightarrow 45% Expenditure → 55% Salary 80% \rightarrow Savings $\rightarrow \frac{45}{100} \times 80\% = 36\%$ Decrease in savings = 45% - 36% = 9% → \$90 9% → **\$**10 1% Salary at first \rightarrow 100 x \$10 = **\$1000** Qn 4 $\rightarrow 60\%$ of 60% Amount of water left $\rightarrow \frac{3}{5} \times 60\% = 36\%$ $36\% \rightarrow 72$ litres $1\% \rightarrow 2$ litres Volume of water the tank can hold \rightarrow 100% \rightarrow 100 x 2 ℓ = 200 ℓ Qn 5 At first : 125% Red Blue 100% : <u>Decrease</u> $\frac{40}{100} \times 125\% \rightarrow \frac{2}{5} \times 125\% = 50\%$ Red <u>Increase</u> $\frac{10}{100} \times 100\% = 10\%$ Blue : End 125% - 50% = 75% : Red 100% + 10% = 110% Blue Difference 35%
ightarrow 701% → 2 Number of blue marbles at first $\rightarrow 100\%$ 100% → **200** Qn 6 <u>At first</u> 90% Muthu Esther 100% : Increase 20 $\frac{20}{100} \times 90\% = 18\%$ Muthu : <u>Decrease</u> Esther : 20% End 90% + 18% = 108% Muthu : : 100% - 20% = 80% Esther Difference $\mathbf{28\%} \rightarrow \560

 $28\% \rightarrow 560 $1\% \rightarrow 20 Muthu's salary in the end $\rightarrow 108\%$ $\rightarrow 108 \times $20 = 2160

Qn 7 C: M : E : Total 4 : 3 : 6 : 13 13u = 3900 1u = 3900 ÷ 13 = 300 C (at first) = 4 × 300 = 1200 C (increase) = $\frac{1}{c} \times 1200$ = 240 E (at first) = 6 × 300 = 1800 M (at first) = 3 × 300 = 900 M (increase) = $\frac{1}{10} \times 900$ = 90 E (increase) = 510 - 240 - 90 = 180 Percentage increase = $\frac{180}{1800} \times 100\%$ = 10% Qn 8 V : N : Total 3×5 : 4×5 : 7×5 15 ; 20 ; 35 V (new mass) = $\frac{7}{5} \times 15u$ = 21u N (new mass) = 35u - 21u = 14u Change in Nathaniel's mass = 20u - 14u = 6u Percentage decrease in Nathaniel's mass $=\frac{6}{20} \times 100\%$ = 30% Qn 9 New length = $\frac{7}{c} \times 25$ cm = 35 cm

New breadth = $\frac{3}{2} \times 20$ cm = 30 cm New perimeter = 35 cm + 30 cm + 35 cm + 30 cm = 130 cm

Qn 10

```
New length = \frac{s}{4} \times 20 cm
= 25 cm
New breadth = \frac{s}{4} \times 16 cm
= 20 cm
New area = 25 cm × 20 cm
= 500 cm<sup>2</sup>
Old area = 20 cm × 16 cm
= 320 cm<sup>2</sup>
```

```
Change in area = 500 cm<sup>2</sup> - 320 cm<sup>2</sup>
= 180 cm<sup>2</sup>
```

```
Percentage increase = \frac{180}{520} \times 100\%
```

```
= 56.25%
```

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Unit 9.4 – GST and Annual Interest

Qn 1 107% → \$513.60 1% → \$513.60 ÷ 107 = \$4.80 100% → \$4.80 × 100 = **\$480**

Qn 2

 $7\% \rightarrow \$129.50$ $1\% \rightarrow \$129.50 \div 7 = \18.50 $100\% \rightarrow \$18.50 \times 100 = \1850

Qn 3

Difference in GST \rightarrow 7% 7% \rightarrow = \$28 Difference in price without GST $\rightarrow \frac{100}{7} \times $28 = 400 Cost of dryer without GST $\rightarrow \frac{$2000-$400}{2} = 800 Cost of dryer with GST $\rightarrow \frac{107}{100} \times $800 = 856

Qn 4

GST of haversack $\rightarrow \frac{7}{107} \times \$85.60 = \$5.60$ GST of pants $\rightarrow \$2.10 + \$5.60 = \$7.70$ Price of pants inclusive of GST $\rightarrow \frac{107}{7} \times \$7.70 = \$117.70$

Qn 5 Total cost before GST \rightarrow 4 x \$180 = \$720

 $GST \rightarrow \frac{7}{100} \times \$720 = \$50.40$

Qn 6

Total cost without GST $\rightarrow 100\% \rightarrow \frac{100}{107} \times \$2568 = \$2400$ 1 unit = $\$2400 \div 4$ = \$600Cost of laptop without GST = $3 \times \$600$ = \$1800Cost of laptop inclusive of GST = $1.07 \times \$1800$ = \$1926

Unit 9.5 – 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 = $\$1440 \div 4$ = \$360Original sum = $\frac{100}{2.4} \times \$360$ = $\$15\ 000$

Qn 3

Interest for 4 years $\rightarrow \frac{3.5}{100} \times \$30000 \times 4 = \$4200$ Total owed to the bank $\rightarrow \$4200 + \$30\ 000 = \$34\ 200$

Qn 4

(Interest for 3 years) \rightarrow 12% 12% \rightarrow \$40 320 1% \rightarrow \$40 320 \div 12 = \$3360 (Principal amount) 100% \rightarrow \$3360 x 100 = **\$336 000**

Qn 5 (a) $2\% \rightarrow 72 $1\% \rightarrow $72 \div 2 = 36 $100\% \rightarrow $36 \times 100 = 3600 (b) Total sum after 4 years $\rightarrow $3600 + $72 \times 4 = 3888

Qn 6

Total amount owed (Mr Krishnan) \rightarrow 100% + 3.5 x 4 = 114% Total amount owed (Mr Lim) \rightarrow 100% + 3% x 4 = 112% Difference \rightarrow 114% - 112% = 2%

Amount each borrowed $\rightarrow \frac{100}{2} \times \$250 = \$12\ 500$

Unit 9.6 – Discount and Percentage Discount Qn 1 Discounted price of 1 torch = \$200 ÷ 25 = \$8 100 Original price of 1 torch $=\frac{100}{80}\times$ \$8 = \$10 Qn 2 100 $=\frac{100}{80} \times 144 Usual price of wallet = \$180 Discount given to wallet = \$180 - \$144 = \$36 Discount given to handbag = \$78 - \$36 = \$42 Original price of handbag = \$42 + \$238 = \$280 42 $=\frac{1}{280} \times 100\%$ Percentage discount for the handbag = 15% Qn 3 100 Discounted bill without GST $=\frac{100}{107} \times 269.64

= \$252Original bill $= \frac{100}{90} \times 252 = \$280

Qn 4

100% of usual price = \$1501% of usual price = $$150 \div 100$ = \$1.5090% of usual price = $90 \times 1.50 = \$135100% of discounted price = $$135 \div 100$ = \$1.3595% of discounted price = $95 \times 1.35 = \$128.25

Qn 5

Discounted price of 1 muffin = $\$10 \div 5$ = \$2Original price of 1 muffin = $\frac{100}{80} \times \$2$ = \$2.50

Qn 6

At first, Sells at 10% discount \rightarrow sell at 90% of the usual selling price Sells at 30% discount \rightarrow sell at 70% of the usual selling price Difference in the selling price \rightarrow 20% of selling price = \$30 + \$10 20% of selling price \rightarrow \$40 1% of selling price \rightarrow \$2 Qn 6 (Cont.) Cost price of watch \rightarrow 90 × 2 – 30 or 70 × 2 + 10 = \$150 \$150 + \$100 = **\$250**

Unit 9.7 – Equal Fractions

Qn 1 45% of Calvin's stickers = 25% of Brian's stickers 9 of Calvin's stickers = $\frac{1}{4}$ of Brian's stickers 20 $\frac{9}{20}$ of Calvin's stickers = $\frac{9}{36}$ of Brian's stickers 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 $\frac{'}{20}$ of Joanna 3 of Kelvin 5 21 21 $\frac{1}{60}$ of Joanna $\frac{-1}{35}$ of Kelvin Joanna = 60 units Kelvin = 35 units Difference = 25 units = 125 = \$125 ÷ 5 1 unit = \$5 Amount of money Joanna had at first 60 × \$5 = = \$300 Qn 3

40% of boys

of boys

of boys

2

5

2

5

Boys

Girls

Difference

1 unit = 34

15 units = 510

Total students in the end

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

10% of girls

1 of girls

of girls

= 4 × 34

= 136

10

2

20

=

=

5 units

20 units

15 units

```
\frac{2}{5} of Carena's money
  of Rahim's money =
5
 2
\frac{-}{10} of Rahim's money =
                           of Carena's money
                        5
        Rahim's money
                          = 10 units
        Carena's money
                           = 5 units
        Difference
                           = 5 units
5 units =
           $85
            $85 ÷ 5
1 unit
       =
        _
           $17
Rahim at first = 10 × $17
                = $170
```

Qn 5 Chocolate left is equal to twice cheese left 20% chocolate = $2 \times 25\%$ 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 $= 4 \times 50$ = 200

Qn 6

The number of girls left is twice the number of boys left. 70% of girls = $2 \times 20\%$ 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 = 20 units Girls Difference = 15 units 15 units = 901 unit = 90 ÷ 15 = 6 Total students = 35 units + 20 units = 55 units 55 units = 55 × 6 = 330 Unit 9.8 – External Unchanged Qn 1 At first : 60% (3 units) x 7 (21 units) Boys 40% (2 units) x 7 (14 units) Girls : End Boys : 70% (7 units) x 3 (21 units) : 30% (3 units) × 3 (9 units) Girls Decrease = 5 units 5 units = 51 unit = 1Total number of students in the end = 30 × 1 = 30Qn 2 At first





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Qn 4 Boys 40% (2 units) × 5 : 100% (5 units) × 5 А : B Girls • G 42 : 10 : 25 Adults : 120% (6 units) × 7 100% (5 units) × 7 Children : Difference = 42 units - 25 units 17 units = 17 units = 34 1 unit = 2 Total people at the party = 77 units $= 77 \times 2$ = 154 Qn 5 Red : 75% (3 units) × 4 Blue : 100% (4 units) × 4 R : B : G 12 : 16 : 15 Red : 80% (4 units) × 3 : 100% (5 units) × 3 Green Difference between blue marbles and green marbles = 16 units - 15 units = 1 unit 1 unit = 35 Total number of marbles in the bag = 43×35 = 1505 Qn 6 Shop A : 120% (6 units) × 4 : В : C Shop B : 100% (5 units) × 4 А 24 : 20 : 25 Shop B : 80% (4 units) x 5 Shop C : 100% (5 units) × 5 Total number of log cakes sold = 24 units + 20 units + 25 units = 69 units 69 units = 345 1 unit = 345 ÷ 69 = 5 Difference between C and A = 5 Shop C sold 5 more log cakes than Shop A. Qn 7 Yeo : 160% (8 units) Lim : 100% (5 units) Y : L : T 8u : 5u : 6u Tang: 75% (3 units) × 2 Yeo : 100% (4 units) \times 2 Tang : $6u \times 1.5 = 9u$ (Difference of 3u) Yeo & Lim gave away in ratio of 3 :1 (Total of 4p) Υ : T L Since $3u^{\times 4} = 4p$ 8u×4 5u×4 6u×4 12u = 4p32u 20u 24u 3u = 1p –9u –3u +12u 23u 17u 36u Difference = 23 units - 17 units = 6 units 6 units = 240 1 unit = 409 units $= 9 \times 40$ = 360 Unit 9.10 – Unchanged Total Qn 1 Adults 170% (17 units) · Children 100% (10 units) : Total 27 units

Qn 1 (Cont.) Adults 80% (4 units) x 3 12 units Children 100% (5 units) x 3 <u>15 units</u> 27 units Total 17 units - 12 units Transfer 5 units = 125 5 units = 1 unit 125 ÷ 5 = 25 = Total number of adults in the end 12 units = 12 × 25 = 300 = 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 = 601 unit = 10 Total pieces in puzzle = 20 units $= 20 \times 10$ = 200 Qn 3 1st day 20% (1 unit) × 9 9 units Fixed Unfixed 80% (4 units) × 9 <u>36 units</u> Total 45 units 2nd day 80% (4 units) × 5 20 units Fixed Unfixed 100% (5 units) × 5 <u>25 units</u> Total 45 units Transfer = 20 units - 9 units = 11 units 11 units = 44= 44 ÷ 11 1 unit = 4 Total number of pieces in the puzzle $= 45 \times 4$ = 180 Qn 4 Read 40% (2 units) Unread 60% (3 units) Total 5 units 80% (4 unit) Read Unread 20% (<u>1 unit</u>) Total 5 units Transfer 4 units - 2 units = = 2 units 2 units =60 60 ÷ 2 1 unit = 30 = Total number of pages $= 5 \times 30$ = 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) x 7 14 units

Transfer = 11 units

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

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```
Qn 5 (Cont.)
    11 units = 22
    1 unit
               = 2
    Total pages = 35 × 2
               = 70
Qn 6
                      : 50% (1 unit) × 13 =
    Cherie
                                                   13 units
                                                                      Qn 3
    Daniel + Elias
                      :100% (2 units) x 13 =
                                                   26 units
    Daniel
                      : 30% (3 units) × 3
                                                   9 units
    Cherie + Elias
                      :100% (10 units) x 3 =
                                                   30 units
                             Daniel :
                Cherie
                          : Daniel
: 9
                                          Elias
                   13
                                           17
                                      1
Difference between Daniel and Elias
= 17 units - 9 units
= 8 units
8 units = $32
                                                                      Qn 4
1 unit = $4
                                                                       <u>At first</u>
Cost of present = 39 \times $4
                = $156
Qn 7
    Gerald
                          : 45% (9 units)
    Xavier + Joshua
                         : 55% (11 units)
                          : 25\% (1 unit) × 4 = 4u
    Xavier
    Gerald + Joshua
                          : 100% (4 units) × 4 = 16u
                G :
                            Х
                                    :
                                            J
                9
                            4
                                            7
    Difference between Gerald and Xavier
    = 5 units
    5 units = 25
                                                                      Qn 5
    1 unit = 5
                    = 20 × 5
    Total cookies
                    = 100
Unit 9.11 – Constant Difference
Qn 1
    Boys :
                30% (3 units)
               70% <u>(7 units)</u>
    Girls :
    Difference
                     4 units
    Boys :
                 60\% (3 units) \times 2 = 6 units
    Girls : 100% (5 units) × 2 = 10 units
                      2 \text{ units } \times 2 = 4 \text{ units}
    Difference
                                                                       Qn 6
    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\% (<u>4 units</u>) \times 3 = <u>12 units</u>
    Difference =
                     1 unit \times 3 = 3 units
                 25% (1 unit)
    Alan
    Kumar : 100% (<u>4 units</u>)
    Difference =
                       3 units
                                                                       Qn 1
    Decrease each = 9 units - 1 unit
                    = 8 \text{ units}
                                                                              7 parts
```

Qn 2 (Cont.) 8 units = \$400 1 unit = \$400 ÷ 8 = \$50 Amount of money Alan had at first $= 9 \times 50 = \$450 At first X : Y = 10 : 12End $\frac{1}{X:Y} = 3:5$ 10 units = 1680 = 168 1 unit 3 units = 168 × 3 = 504 Shop X : 4 units × 3 12 units = Shop Y <u>7 units</u> × 3 = 21 units : Difference 3 units × 3 = 9 units Shop X 55% (11 units) Shop Y 100% (20 units) Difference 9 units Decrease each = 12 units - 11 units = 1 unit 1 unit = 75 Number of shirts Shop X had in the end = 11×75 = 825Small Square : 40% (2 units) × 2 = 4 units Big Square : 100% (5 units) × 2 = 10 units = 6 units Difference 3 units x 2 Unshaded small: 1 unit × 3 = 3 units Unshaded big : 3 units x 3 = 9 units Difference 2 units x 3 = 6 units Decrease each = 1 unit $1 \text{ unit} = 20 \text{ cm}^2$ Area (small square) = 4 × 20 cm² = 80 cm² Alexander : 40% (2 units) Brother : 100% <u>(5 units)</u> Difference 3 units Alexander : 75% (3 units) $\times 3 = 9$ units Brother : $100\% (4 \text{ unit}) \times 3 = 12 \text{ units}$ Difference 1 unit $\times 3 = 3$ units Increase each = 9 units - 2 units = 7 units 7 units = 21 1 unit = $21 \div 7$ = 3 Alexander 's age now $= 2 \times 3$ = 6 Unit 9.12 – External Changed 20-cent 50-cent 20-cent 50-cent 3 units 4 units 15 units 28 units × 7 +125 +25 _10 - 70

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5 parts

35 parts

35 parts





Un 1 Volume of cuboid	= L × B × H = 9 cm × 5 cm × 6 cm = 270 cm ³
Qn 2	
Volume of cuboid	= L × B × H = 5 cm × 4 cm ×12 cm = 240 cm ³
Qn 3 Capacity of tank	= L × B × H = 30 cm × 20 cm × 12 cm = 7200 cm ³
Qn 4	
Volume of water	= L × B × H = 40 cm × 25 cm × 10 cm = 10 000 cm ³
Qn 5	
Volume of water	= L × B × H = 20 cm × 20 cm × 25 cm = 10 000 cm ³

4 units = \$40

```
Qn 4 (Cont.)

Since length × breadth \rightarrow 5 units × 3 units = 240 cm<sup>2</sup>

1 unit × 1 unit \rightarrow 240 cm<sup>2</sup> ÷ 15 = 16 cm<sup>2</sup>

16 cm<sup>2</sup> = 4 cm × 4 cm

1 unit = 4 cm

Length = 5 × 4 cm

= 20 cm
```

Qn 5

Volume of water = $L \times B \times H$ 2880 cm³ = 3 units × 3 units × 5 units Therefore 1 unit x 1 unit x 1 unit 2880 = - $3 \times 3 \times 5$ 2880 = 45 = 64 cm³ 1 unit = 4 cmSince $(4 \times 4 \times 4)$ = 64 Area of base = 3 units × 3 units $= (3 \times 4) \times (3 \times 4)$ = 144 cm²

Unit 10.4 – Length, Area and Volume of Cubes

Gen i						
Length (A)	:	Length	(B)	Volume (A)	:	Volume (B)
3	:	1		(3 × 3 × 3)	:	$(1 \times 1 \times 1)$
				27	:	1
Since Volur	ne	(B)	= 1 unit			
1 unit = 64 d	cm	3				
Difference i	n v	olume	= 26 uni	ts		
			= 26 × 6	4 cm ³		
			= 1664 (cm³		

Qn 2

Volume of metal cube = $8 \text{ cm} \times 8 \text{ cm} \times 8 \text{ cm}$ = 512 cm^3 Volume of 1 cube = $512 \text{ cm}^3 \div 64$ = 8 cm^3 2 cm × 2 cm × 2 cm = 8 cm^3 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 cm^2

Qn 4

 $\begin{array}{ll} L \times L &= 81 \ {\rm cm}^2 \ (9 \ {\rm cm} \times 9 \ {\rm cm}) \\ L = 9 \ {\rm cm} \end{array} \\ \mbox{Volume of cube} &= 9 \ {\rm cm} \times 9 \ {\rm cm} \times 9 \ {\rm cm} \\ = 729 \ {\rm cm}^3 \end{array}$

Qn 5

 $\begin{array}{rll} \mbox{Volume X} & : & \mbox{Volume Y} = 27:1 \\ \mbox{Volume Y} & = 1 \ \mbox{cm}^3 \\ \mbox{Volume X} & = 27 \ \mbox{cm}^3 \\ \mbox{Edge of cube X} = 3 \ \mbox{cm} \end{array}$

Qn 6			
Volume A : Volume B	Length A	:	Length B
64 : 27	-		-
$(4 \times 4 \times 4) \qquad (3 \times 3 \times 3)$	4	:	3
Length of Cube $B = 6 \text{ cm}$			
1 unit = $6 \text{ cm} \div 3$			
= 2 cm			
Length of cube $A = 4 \times 2$ cm			
= 8 cm			

Qn 7				
Length A :	Length B	Volume A	:	Volume B
1 :	3	1 × 1 × 1	:	3×3×3
		1	:	27
Volume B \rightarrow				
1 unit = 3 cm^3				
Volume A = 3 cm ³				

Qn 8 Length C Length D = 3 4 Volume C Volume D $= (3 \times 3 \times 3)$ $(4 \times 4 \times 4)$ `27 64 Volume D 64 units 128 cm³ = 1 unit 2 cm³ Volume C 54 cm³ 27 x 2

Unit 10.5 – Volume and Area of Unit Cubes

Qn 1

Volume = $(1 + 3 + 8) \times 1 \text{ cm}^3$ = **12 cm**³

Qn 2

Volume of solid = $(1 + 2 + 3) \times 1 \text{ cm}^3$ = **6 cm³**

Qn 3

Volume of solid = $(1 + 1 + 6) \times 1 \text{ cm}^3$ = 8 cm³

Qn 4

Volume of solid = $(3 + 4) \times 1 \text{ cm}^3$ = 7 cm³

Qn 5

Volume of solid = $(1 + 1 + 3 + 9) \times 1 \text{ cm}^3$ = **14 cm**³

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 = $44 \times 1 \text{ cm}^2$ = 44 cm^2

Qn 7

Front = 8 faces, Back = 8 faces, Left = 9 faces, Right = 9 faces, Top = 10 faces, Bottom = 10 faces Total = 54 faces Qn 7 (Cont.) Total area to be painted = $54 \times 1 \text{ cm}^2$ = 54 cm^2

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 = $26 \times 1 \text{ cm}^2$ = 26 cm^2

Unit 10.6 – Volume = Base Area x Height Qn 1 Height = $\frac{Volume}{Base area}$ = $\frac{84 \text{ cm}^3}{28 \text{ cm}^2}$ = 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 x 3
= 144 000 cm³
Height = $\frac{144 000 \text{ cm}^3}{60 \text{ cm} \times 40 \text{ cm}}$

= 60 cm

Qn 3

Time taken to fill the tank = $\frac{110 \times 90 \times 50}{16500}$

= 30 min

Qn 4

Total volume = $3.5 \times 1000 \times 5 \times 60$ = 1 050 000 cm³ Depth at first = $\frac{1050000}{125 \times 84}$ = **100 cm**

Qn 5

In 1 min, both taps filled $= 140 \text{ cm}^3 + 100 \text{ cm}^3$

 $= 240 \text{ cm}^3$ Time taken for both taps to completely fill the tank

$$= \frac{30 \times 24 \times 20}{240}$$

= 60 min

- 00 11111

Qn 6 Volume of water leaked = $(400 + 300) \times 6$ = 4200 cm³ 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 $= \frac{4}{5} \times 40 \text{ cm} \times 30 \text{ cm} \times 25 \text{ cm}$ $= 24 \ 000 \text{ cm}^3 \text{ or } 24 \ \ell$ (b) Volume of water in class top(

(b) Volume of water in glass tank = $24\ 000 - 4\ 000$ = $20\ 000$

Height =
$$\frac{2000}{50 \times 25}$$

Qn 8

Length : 3 ^{×5} :	Breadth 2 ^{×5}		Breadth 5 ^{×2}	:	Height 4 ^{×2}
15 :	10		10	:	8
Length :	Breadth	: Heig	jht		
15 :	10	: 8			
Height	= 16 cm				
8 units	= 16 cm				
1 unit	= 2 cm				
Length	= 30 cm				
Breadth	= 20 cm				
Capacity	= 30 cm ×	20 cm ×	< 16 cm		
	= 9600 cm	3			

Unit 10.7 Volume with Common Base or Height

Qn 1 Volume of water = $(28 \text{ cm} \times 20 \text{ cm} \times 14 \text{ cm} \times \frac{3}{4})$ = 5880 cm^3 $\frac{1}{4}$ Height = $\frac{1}{4} \times 20$ = 5 cmBase area = $\frac{5880}{5}$ = **1176 cm**²

GILZ			
When height	is the san	ne,	
Base area A		:	Base area B
$= (25 \times 12)$:	(20 × 20)
= 300		:	400
3		:	4
Volume A		:	Volume B
3		:	4
Volume of A	= 25 cm = 6300 c	× 12 c m³	m × 21 cm
7units	= 6300 c	m³	
1 unit	= 900 cm	1 ³	
3 units	= 2700 c	m³	
Height	$=\frac{270}{25 \text{ cm}}$)0 cm 1 × 12	³ cm
	= 9 cm		

Qn 3

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

Volume of A = 40 cm × 15 cm × 22 cm = 13 200 cm³ 11 units =13 200 cm³ 1 unit =1200 cm³ Volume A = 6 units = 6 × 1200 cm³ = 7 200 cm³

Height =
$$\frac{7200 \text{ cm}^3}{40 \text{ cm} \times 15 \text{ cm}}$$

= 12 cm

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

= 48 cm²

Qn 5

4 units = 24 cm 1 unit = 6 cm

Base area of container B = $\frac{120}{6}$

= 20 cm²