6

Primary

Based on Latest Math Syllabus

+hinkingMath@™
onSponge

CONQUER PROBLEM SUMS

- Proven strategies used by top performing schools to conquer problem sums
- Based on latest MOE syllabus
- Challenging questions to excel in PSLE

Answer Booklet

P6 Solutions

Note: In all solutions, u represents units

Chapter 1 More Than/Less Than

Unit 1.1 – More Than/Less Than (Model Drawing)

Qn 1

L – Left R – Remained

75% = $\frac{3}{4}$ = $\frac{15}{20}$ 60% = $\frac{3}{5}$ = $\frac{12}{20}$ $\frac{3}{4}$ × 40 = 30

Total number of children

[30 (L) 10(R)]

Boys	15u (L)	5u(R)	40
Girls	12u (L)	8u (R)	

Total number of children remained

Boys	5u(R)	10	8
Girls	8u (R)		

From the model, 3 units = 18

1 unit = 18 ÷ 3

= 6

Total number of girls at first = 20 × 6

= 120

Qn 2

G – Gave L – Left

$\frac{4}{9}$ = $\frac{8}{18}$ $\frac{1}{2}$ = $\frac{9}{18}$ $\frac{4}{9}$ × 36 = 16

G = 16 L = 36 –16 = 20

Chocolate	8u (G)	10u (L)	36
Banana	9u (G)	9u (L)	

Left

Chocolate	10u	20
Banana	9u	25 ⟷

1 unit = 5

Total chocolate muffins at first = 18 units + 36

= (18 × 5) + 36

= 126

Qn 3

60% = $\frac{3}{5}$ 25% of \$72

$\frac{3}{5}$ × \$120 = \$72 $\frac{1}{4}$ × \$72 = \$18

\$120 – \$72 = \$48 \$72 – \$18 = \$54

Charles			x	x	x	\$120	
Benedict						\$72	+ \$48

Charles						+\$48		
Benedict							x	x	+ \$72

Charles					+\$48 +\$18	⟷ \$20	
Benedict							+ \$54

2 □ = \$48 + \$18 + \$20 – \$54 = \$32

□ = \$16

Charles at first = 5 □ + \$120

= (5 × \$16) + \$120

= \$200

Qn 4

$\frac{1}{4}$ × 80 = 20 60% = $\frac{3}{5}$ $\frac{3}{5}$ × 20 = 12

Dennis					80
Karen					

Dennis				+60		
Karen						+20

In the end

Dennis							+ 60 +12
Karen			+8	⟷		92	⟷

4 units + 72 = 92 + 8

4 units = 100 – 72

= 28

1 unit = 28 ÷ 4

= 7

Dennis at first = 4 units + 80

= (4 × 7) + 80

= 108

Qn 5

At first

Boys		–4		–4		–4
Girls		4	+8			

In the end

Boys				}	Left
Girls		4 + 8	⟷ 4		

2 units = 4 + 8 + 4

= 16

1 unit = 16 ÷ 2

= 8

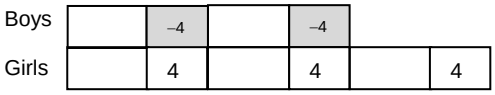
Total boys at first = 3u + 12

= (3 × 8) + 12

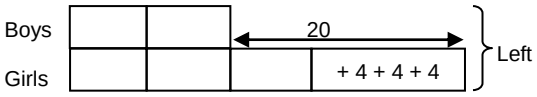
= 36

Qn 6

<u>At first</u>

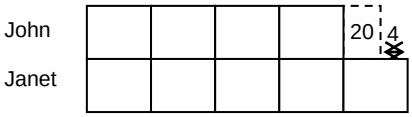


<u>In the end</u>



1 unit + 12 = 20
1 unit = 20 – 12
= 8
Number of boys at first = 2 units + 8
= 2 × 8 + 8
= 24

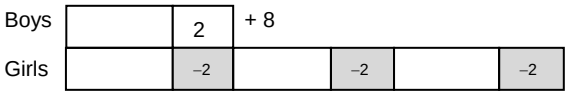
Qn 7



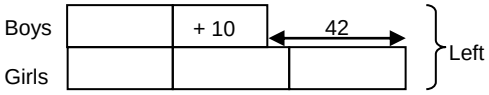
1 unit = 20 + 4
= 24
Total number of stickers John had at first = 4 units
= 4 × 24
= 96

Qn 8

<u>At first</u>



<u>In the end</u>



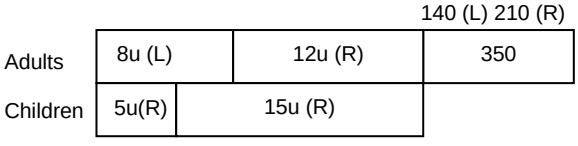
2 units = 42 + 10
= 52
1 unit = 52 ÷ 2
= 26
No. of boys at first = 1 unit + 2
= 26 + 2
= **28**

Qn 9

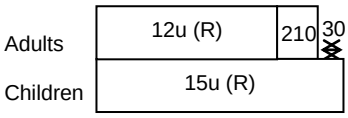
(L) – Left (R) – Remained

$\frac{2}{5} = \frac{8}{20}$ 25% = $\frac{1}{4} = \frac{5}{20}$ $\frac{2}{5} \times 350 = 140$

<u>At first</u>



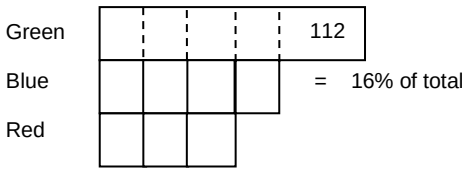
<u>Total remained in the end</u>



Qn 9 (Cont.)

3 units = 210 + 30
= 240
1 unit = 240 ÷ 3
= 80
Number of children in the end = 15u
= 15 × 80
= 1200

Qn 10



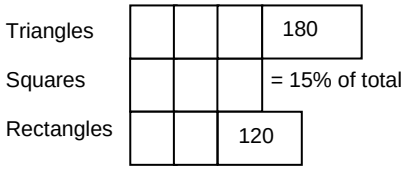
4 ☐ = 16% total
☐ = 4% total

Total 11 ☐ = 44% total

100% – 44% = 56%
56% = 112
1% = 2
Total in bag = 100%
100 × 2 = 200

Qn 11

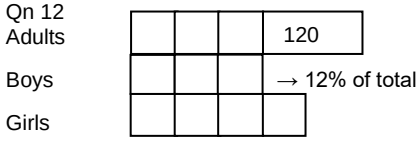
$\frac{2}{3} \times 180 = 120$



3 ☐ = 15% of total
☐ = 5% of total

8 ☐ = 40% of total
100% – 40% = 60%
60% of total → 300
15% of total → 75
Total number of triangles = 75 + 180
= 255

Qn 12



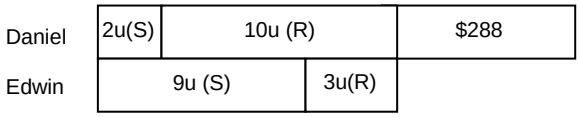
3 units = 12% of total
1 unit = 4% of total
10 unit = 40% of total
Remaining 60% of total → 120
1% of total → 2
Total number of adults = 12% of total + 120
= (12 × 2) + 120
= 144

Qn 13

(S) – Spent (R) - Remained

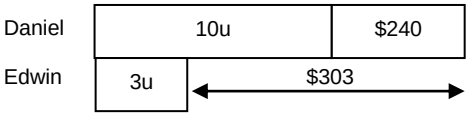
$\frac{1}{6} = \frac{2}{12}$ $\frac{3}{4} = \frac{9}{12}$ $\frac{1}{6} \times \$288 = \$48$

<u>At first</u> [$48(S) $240(R)]



Qn 13 (Cont.)

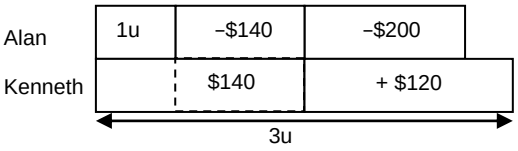
In the end



7 units = \$303 – \$240
= \$63
1 unit = \$63 ÷ 7
= \$9
Daniel had at first = 12 units + \$288
= (12 × \$9) +288
= **\$396**

Qn 14

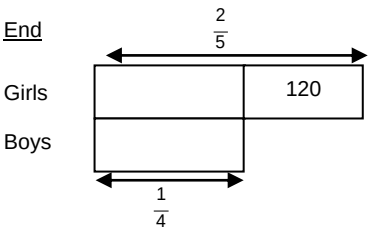
At first



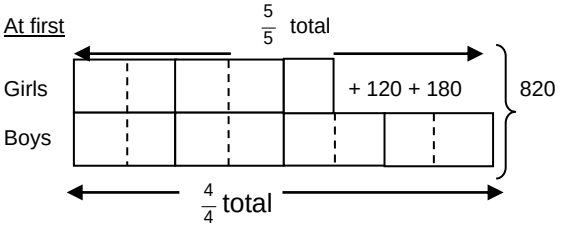
2u = \$140 + \$120
= \$260
1u = \$130
Total at first = 1u + \$340 + 1u + \$140
= 2u + \$480
= (2 × \$130) + \$480
= **\$740**

Qn 15

End



At first



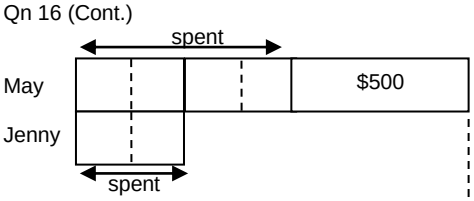
Therefore,
Total = 13 □ + 300 = 820
13 □ = 520
□ = 40

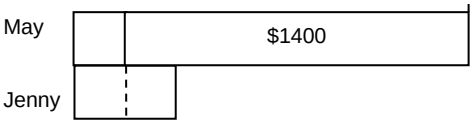
Boys at first = 8 □
= (8 × 40)
= **320**

Qn 16

Please change the 3rd sentence to "If May spends \$30 each day and Jenny spends \$60 each day, May would have ~~\$1700~~ **\$1400** left by the time Jenny spends all her money."

Qn 16 (Cont.)



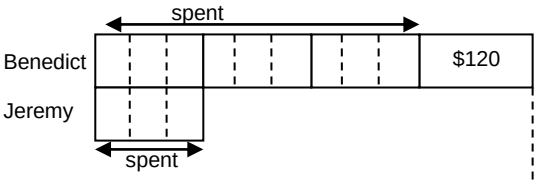


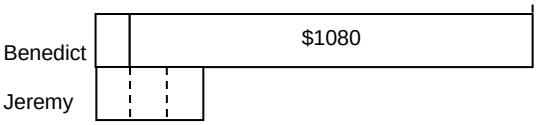
3 □ = \$1400 - \$500

□ = \$300

May = \$1400 + \$300
= **\$1700**
Jenny = **\$600**

Qn 17





8 □ + \$120 = \$1080

8 □ = \$960

□ = \$120

Each at first Benedict = \$120 + \$1080
= **\$1200**
Jeremy = \$120 × 3
= **\$360**

Chapter 2 Patterns

Unit 2.1 – Equal Intervals

Qn 1

(a)

Diagram	1	2	3	4	5
No. of dots	6	10	14	18	22
		+4	+4	+4	+4

(b) 9th diagram = 6 + (8 × 4)
= 6 + 32 = 38
450th diagram = 6 + (449 × 4)
= 6 + 1796
= **1802**

Qn 2

(a)

Diagram	1	2	3	4	5
No. of dots	3	5	7	9	11
		+2	+2	+2	+2

(b) 20th diagram = 3 + (19 × 2)
= 3 + 38
= 41 dots
200th diagram = 3 + (199 × 2)
= 3 + 398
= **401**

Qn 3
(a)

T	1	2	3	4		15		22
P	4	6	8	10		32		46

+2 +2 +2

(b) No. of people around 100 tables = (100 × 2) + 2
= **202**

Qn 4
(a)

Fig.	No. of squares	No. of triangles	Perimeter	No. of sticks
1	1	2	6	8
2	2	4	10	15
3	3	6	14	22
4	4	8	18	29
: ;	: :	: :	: :	: :
8	8	16	6 + (7 × 4) = 6 + 28 = 34	8 + (7 × 7) = 8 + 49 = 57

(b) Perimeter for Figure 50 = 6 + (49 × 4)
= **202**
(c) No. of sticks for figure 100 = 8 + (99 × 7)
= **701**
(d) 254 – 6 = 248
248 ÷ 4 = 62
Figure No = 62 + 1
= 63
No. of squares = **63**

Qn 5
(a)

T-shaped array	Number of coins
1st	5 +3
2nd	5 + (1 × 3) = 8 +3
3rd	5 + (2 × 3) = 11 +3
4th	5 + (3 × 3) = 14
5th	5 + (4 × 3) = 17
6th	5 + (5 × 3) = 20
7th	5 + (6 × 3) = 23

(b) No. of coins for 100th array = 5 + (99 × 3)
= **302**
(c) No. of coins for 200th array = 5 + (199 × 3)
= **602**

Qn 6
(a) 2nd structure = 12 + (1 × 8)
= 20
3rd structure = 12 + (2 × 8)
= 28
(b) 10th structure = 12 + (9 × 8)
= 84
(c) 100th structure = 12 + (99 × 8) = 12 + 792
= 804
(d) 252 – 12 = 240
240 ÷ 8 = 30
Structure = 30 + 1
= 31 (31st structure)

Qn 7
(a) Figure 20 = 7 + (19 × 3)
= 64
(b) Figure 90 = 7 + (89 × 3)
= 274
(c) 1st row = 21 dots
Figure = 21 – 2
= 19 (Figure 19th)
Total dots = 7 + (18 × 3)
= 61

Qn 8
(a) Total seats = (4 × 4) + 2
= 18
(b) Total seats = (20 × 4) + 2
= 82
(c) Total seats = (100 × 4) + 2
= 402
(d) 370 – 2 = 368
368 ÷ 4 = 92
Diagram 92 could seat 370 students.

Qn 9
(a)

Block.	1-T	2-T	3-T	4-T
Perimeter (cm)	10	14	18	22

+4 +4 +4

(b) Perimeter of a 20-T block = 10 + (19 × 4)
= 86
(c) Perimeter of a 100-T block = 10 + (99 × 4)
= 406
(d) 106 – 10 = 96
96 ÷ 4 = 24
24 + 1 = 25-T block
No. of squares = 25 × 4
= 100

Unit 2.2 – Square Numbers

Qn 1
(a)

Diagram, n	1	2	3	4	5
No. of shaded squares, S	1 +4	5 +4	9 +4	13 +4	17
No. of unshaded squares	0	4	16	36	64
Total no. of squares, T	1	9	25	49	81

(b) Total squares in diagram 30 = $(30 + 29)^2$
= 3481
(c) Total unshaded squares = $(49 \times 2)^2$
= 9604
(d) 29 – 1 = 28
28 ÷ 4 = 7
7 + 1 = 8
Diagram 8 has 29 shaded squares

Qn 2
(a)

	No. of squares	Total
Fig. 1	1 = 1	1
Fig. 2	1 + 4 = 5	5
Fig. 3	1 + 4 + 9 = 14	14
Fig. 4	1 + 4 + 9 + 16 = 30	30

(b) 1 + 4 + 9 + 16 + 25 + 36 + 49 + 64 + 81 = 285
Figure 9 since 9 × 9 = 81.

Qn 3
(a)

Diagram	No. of shaded triangles	No. of unshaded triangles	Total no. of triangles
1	1	15	16
2	4	21	25
3	9	27	36
4	16	33	49
:	:	:	:
6	36	15 + (5 × 6) = 45	9 × 9 = 81

Qn 3 (Cont.)

(b) 135 – 15 = 120
120 ÷ 6 = 20
Diagram = 20 + 1 = 21

(c) No. of shaded triangles in diagram 50
= 50 × 50
= 2500

(d) Total triangles in Diagram 80 = (83 × 83)
= 6889

Qn 4

(a)

Figure	1	2	3	4	5
No. of white squares	1	4	9	16	25
No. of coloured squares	8	12	16	20	24
Total no. of squares	9	16	25	36	49

(b) 100 ÷ 4 = 25
Figure no. = 25 – 1
= 24

(c) No. of white squares in Figure 90 = 90 × 90
= 8100

(d) Total = 102 × 102
= 10 404

Qn 5

(a)

Length of side of given big square (cm)	1	2	3	4	5
No. of small black squares	1	2	5	8	13
No. of small white squares	0	2	4	8	12
Total no. of small squares	1	4	9	16	25

(b) Side 11 cm = side has 11 squares
Total squares = 11 × 11
= 121
Total white squares = (121 – 1) ÷ 2
= 60

(c) Length of side = 14 cm
Since 14 × 14 = 196

(d) Side 18 cm = side has 18 squares
Total squares = 18 × 18
= 324
Total black squares = 324 ÷ 2
= 162

Unit 2.3 – Sum of Odd Numbers

Qn 1

(a) 10^{th} line = 1 + 3 + 5 + … + 19 = 10^2 = 100
(b) 50^{th} line = 1 + 3 + 5 + … + 99 = 50^2 = 2 500
(c) 100^{th} line = 1 + 3 + 5 … + 199 = 100^2 = 10 000

Qn 2

(a)

Figure	1	2	3	4	5
No. of shaded squares	1	6	6	15	15
No. of unshaded squares	3	3	10	10	21
Total no. of squares	4	9	16	25	36

(b) Figure 4 = 1+ 3 + 5 + 7 + 9 = 25 = 5 × 5
Figure 5 = 1+ 3 + 5 + 7 + 9 +11 = 36 = 6 × 6

(c) Figure no. × 2 + 1 = last digit
Figure no. = $\frac{39-1}{2}$
= 19
The sum = $(19 + 1)^2$
= 400

(d) Figure no. = $\frac{79-1}{2}$
= 39
Total sum = $(39 +1)^2$
= 1600

Qn 3

(a) 13 and 49

(b) Total tiles in bottom layer = (29 × 2) – 1
= 57

(c) Total tiles = 50 × 50
= 2500

(d) Total tiles = 100 × 100
= 10 000

Qn 4

(a) No. of bricks = 1 + 3 + 5 + 7 + 9
= 5^2
= 5 × 5
= 25

(b) No. of bricks = 40 × 40
= 1600

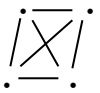
(c) 144 = 12 × 12
No. of steps = 12

(d) 576 = 24 × 24
No. of steps = 24

Unit 2.4 – Sum Of Consecutive Numbers

Qn 1

(a) q → 1 + 2 + 3 + 4 = 10

(b) 

(c) No. of handshakes = 1 + 2 + 3 + 4 + 5 + 6
= $\frac{6\times7}{2}$
= 21

(d) No. of handshakes = 1 + 2 + … + 49
= $\frac{49\times50}{2}$
= 1225

Qn 2

(a) 4 × 4 = 16
5 × 5 = 25
16 = 1 + 15
7 × 7 = 49
$\frac{7\times6}{2}$ = 21
29 = 1 + 28

(b) Maximum no. of intersections = $\frac{30\times29}{2}$
= 435

(c) Maximum no. of regions = 1 + $\frac{40\times41}{2}$
= 821

(d) 210 × 2 = 420
21 × 20 = 420
No. of lines = 21
No. of line segments = 21 × 21
= 441

Qn 3

(a) Area = $\frac{20\times21}{2}$ × 4 cm²
= 840 cm²
Perimeter = 20 × 2cm × 4
= 160 cm

(b) No. of cubes for figure 40 = $\frac{40\times41}{2}$
= 820

(c) Area = $\frac{90\times21}{2}$ × 4 cm²
= 16 380 cm²
Perimeter = 90 × 2 cm × 4
= 720 cm

Unit 2.5 – Sum of Even Numbers

Qn 1

(a)

Figure	1	2	3	4	5
No. of bricks	1	3	7	13	21
		+2	+4	+6	+8

(b) Figure 20 = (20 × 19) + 1
= 381

(c) Figure 100 = (100 × 99) + 1
= 9901

Qn 2

(a)

Figure	1	2	3	4	5
No. of circles	3	7	13	21	31
		+4	+6	+8	+10

(b) Figure 30 = (30 × 31) + 1
= 931

(c) Figure 90 = (90 × 91) + 1
= 8191

Qn 3

(a) 5^{th} line = 2 + 6 + 10 + 14 + 18 + 22
= 72
= 2 × 6²

(b) 38 – 2 = 36
36 ÷ 4 = 9
Line 9 = 2 × 10²
= 2 × 100
= 200

(c) p² = 512 ÷ 2
= 256
p = 16
= Line 15
Last digit q = (line no.) × 4 + 2
= (15 × 4) + 2
= 62

(d) 50^{th} line sum = 2 × 51²
= 2 × 2601
= 5202

Unit 2.6 – Multiples of Sum of Consecutive Numbers

Qn 1

Day 1 = 3 × 1 = 3
Day 2 = 5 × 3 = 3 + 12 = 15
Day 3 = 7 × 5 = 3 + 12 + 20 = 35
Day 4 = 9 × 7 = 3 + 12 + 20 + (9 + 9 + 10) = 63

(a) No. of cubes added on Day 5 = (11 × 2) + (7 × 2)
= 22 + 14 (36 cubes)

(b) Total blocks on Day 10 = (10 × 2 + 1) × (10 × 2 + 1 – 2)
= 21 × 19
= 399

(c) Total blocks on Day 30 = (30 × 2 + 1) × (30 × 2 + 1 – 2)
= 61 × 59
= 3599

Qn 2

(a) No. of small triangles = 16
No. of sticks = 30
= 3 × 10

(b) Figure 5 = 50 × 50 = 2500 triangles
Sticks = 3 × (1 + 2 + 3 + …. + 50)
= $3 \times \frac{50 \times 51}{2}$
= 3825

Qn 2 (Cont.)

(c) Figure 100 = 100 × 100 (10 000 triangles)
Sticks = 3 × (1 + 2 + 3 + … + 100)
= $3 \times \frac{100 \times 101}{2}$ (15 150 sticks)

(d) 84 ÷ 3 = 28
28 × 2 = 56
Since 7 × 8 = 56
Figure 7, no. of triangles = 7 × 7
= 49

Qn 3

(a) Line 4 = 16 + 17 + 18 + 19 + 20
= 21 + 22 + 23 + 24

(b) Line 50 = 50 × 2 + 1 (101 numbers)

(c) 135 – 1 = 134
134 ÷ 2 = 67^{th} line

Qn 4

(a) No. of shaded triangles = 12, 15 and 60
Total no. of triangles = 36, 441
No. of unshaded triangles =13, 21 and 381

(b) No. of shaded triangles in Diagram 40 = 40 × 3
= 120

(c) No. of unshaded triangles in diagram 50
= 1 + (50 × 49)
= 2451

(d) Total triangles in Diagram 80 = 81 × 81
= 6561

Qn 5

(a) Total no. of dots; No of small right angled triangles
T4 = 25; 32,
T10 = 11 × 11 = 121; 10 × 20 = 200

(b) Total dots for figure 20 = 21 × 21 = 441

(c) Total no. of small right angled triangles in figure 50
= 50 × 100
= 5000

(d) No, because 340 ÷ 2 = 170 is not a square number.
(E.g. 49 is a square number because 7 × 7 = 49)

Qn 6

(a) $s = 16$, $t = 20$

(b) Number of unshaded rhombuses in Figure 40
= (8 + 39 × 4)
= 164

Chapter 3 Circles

Unit 3.1 – Composite Figure (Square – Quadrant)

Qn 1

Area of $\frac{1}{2}$ shaded part = square – quadrant
= (14 × 14) – $\frac{1}{4}\pi \times 14^2$
≈ 42.1 cm²

Shaded part = 42.1 cm² × 2
≈ 84 cm²

Qn 2

Area of $\frac{1}{4}$ shaded part = square – quadrant
= (10 × 10) cm² – ($\frac{\pi}{4} \times 10^2$) cm²
≈ 21.5 cm²

Shaded part = 21. 5 cm² × 4
≈ 86 cm²

Perimeter = 1 big circle + 40 cm
= 2π(10 cm) + 40 cm
≈ 103 cm

Alternatively, area = square – circle
= (20 × 20) – π(10 × 10)
≈ 86 cm²

Qn 3

Area of $\frac{1}{4}$ shaded part = square – quadrant

$= (15 \times 15)\ cm^2 - (\frac{1}{4}\pi \times 15^2)\ cm^2$

$\approx 48.3\ cm^2$

Shaded part $= 48.3\ cm^2 \times 4$

$\approx 193\ cm^2$

Perimeter = 1 big circle

$= 2\pi(15\ cm)$

$\approx 94\ cm$

Alternatively, area = square – circle

$= (30 \times 30)\ cm^2 - \pi(15 \times 15)\ cm^2$

$\approx 193\ cm^2$

Qn 4

Area of $\frac{1}{8}$ shaded part

= square – quadrant

$= (12 \times 12)\ cm^2 - (\frac{1}{4}\pi \times 12^2)\ cm^2$

$\approx 30.9\ cm^2$

Shaded part $= 30.9\ cm^2 \times 8$

$\approx 247\ cm^2$

Perimeter = 2 circles + 4(12)

$= 2(2\pi)(12) + 48$

$\approx 199\ cm$

Alternatively, area = (square – circle) × 2

$= [(24 \times 24) - \pi(12 \times 12)] \times 2$

$\approx 247\ cm^2$

Qn 5

Area = square – circle

$= (32 \times 32)\ cm^2 - (\pi \times 16^2)\ cm^2$

$\approx 220\ cm^2$

Perimeter = circle + square

$= 2\pi(16\ cm) + 4(32\ cm)$

$\approx 229\ cm$

Qn 6

Perimeter = 1 big circle

$= 2\pi\ (20)$

$\approx 126\ cm$

Area = square – circle

$= (40 \times 40)\ cm^2 - \pi(20)^2\ cm^2$

$\approx 343\ cm^2$

Qn 7

Area = square + 3 circles

$= (24 \times 24)\ cm^2 + 3\pi(12)^2\ cm^2$

$\approx 1933\ cm^2$

Qn 8

Outer perimeter = 1 circle + 12 (4 cm)

$= 2\pi(12\ cm) + 48\ cm$

$\approx 123\ cm$

Area of shaded part = (squares – circle)

$= (24 \times 24) - \pi(12)^2$

$\approx 124\ cm^2$

Unit 3.2 – Composite Figure (Rugby ball = 2 × (Quadrant – Triangle))

Qn 1

$\frac{1}{2}$ shaded part = quadrant – triangle

$= \frac{\pi r^2}{4} - \left(\frac{1}{2} \times b \times h\right)$

$= \frac{\pi}{4} \times 14^2 - \frac{1}{2}(14)^2$

$\approx 55.9\ cm^2$

Qn 1 (Cont.)

Shaded part (rugby) $= 55.9\ cm^2 \times 2$

$\approx 112\ cm^2$

Qn 2

Radius = 7 cm

Area = circle – square

= circle – 2 triangles

$= \pi r^2 - 2(\frac{1}{2} \times 14 \times 7)$

$= \pi(7)^2 - (14 \times 7)$

$\approx 56\ cm^2$

Qn 3

$\frac{1}{8}$ shaded part = quadrant – triangle

$= [\frac{\pi}{4} \times \left(\frac{7}{2}\right)^2] - [\frac{1}{2} \times \left(\frac{7}{2}\right)^2]$

$\approx 3.5\ cm^2$

Shaded part $= 3.5\ cm^2 \times 8$

$= 28\ cm^2$

Qn 4

Area = circle – square

$= \pi(8)^2\ cm^2 - (16 \times 8)\ cm^2$

$\approx 73\ cm^2$

Qn 5

Area = (circle – square) × 2

= (circle – 2 triangles) × 2

$= [\pi(10)^2 - (20 \times 10)]\ cm^2 \times 2$

$\approx 228\ cm^2$

Qn 6

Area = (circle – square) × 2

= (circle – 2 triangles) × 2

$= [\pi(8)^2 - (16 \times 8)]\ cm^2 \times 2$

$\approx 146\ cm^2$

Qn 7

Area = $\frac{1}{4}$ big circle

$= \frac{1}{4}(20)^2\ cm^2$

$\approx 314\ cm^2$

Qn 8

Perimeter = 1 small circle + 1 big quadrant

$= 2\pi(7) + \frac{2\pi(14)}{4}$

$\approx 66\ cm$

Area = quadrant – triangle

$= [\frac{\pi(14)^2}{4} - [\frac{1}{2} \times (14)^2]$

$\approx 56\ cm^2$

Unit 3.3 – Similar Figures

Qn 1

Perimeter $= 2\pi rs + 2\pi rb$

$= 2\pi(5) + 2\pi(8)$

$\approx 82\ cm$

Area $= \pi(8)^2 - \pi(5)^2$

$= 64\pi - 25\pi$

$= 39\pi$

$\approx 123\ cm^2$

Qn 2

Perimeter = 1 big circle

$= 2\pi(30\ cm)$

$\approx 189\ cm$

Qn 2 (Cont.)

Area of small semicircle $= \frac{\pi(10)^2}{2}$
$\approx 157 \text{ cm}^2$

Diameter (small) : Diameter (big) = 1 : 3
Area (small semicircle) : Area (big semicircle) = 1 : 9
Area of shaded part = 9u – 3u
= 6u
Since 1u = 157 cm²
Shaded = 6 × 157 cm²
= 942 cm²

Qn 3
Diameter (S) : Diameter (M) : Diameter (B)
= 4 : 8 : 12
= 1 : 2 : 3
Area (S) : Area (M) : Area (B)
= 1 : 4 : 9
Shaded part = 9u – 4u – 1u
= 4u

Area of small semi-circle $= \frac{\pi(2)^2}{2}$
≈ 6.3
Area of shaded = 4 × 6.3 cm²
≈ 25 cm²

Perimeter of shaded part = 1 big circle = $2\pi r$
= 2π(6 cm)
≈ 38 cm

Qn 4
Perimeter of shaded part = 2 circles (B)
= 2 × 2π*r*
= 4π(8)
≈ 101 cm

Diameter (S) : Diameter (B) = 1 : 2
Area (S) : Area (B) = 1 : 4

Area of small circle = π(4)² (1unit)
≈ 50.3 cm²
Area of shaded part = 4u – 2u
= 2 × 50.3 cm²
≈ 101 cm²

Qn 5
Radius (S) = 10 cm ÷ 2
= 5 cm
Radius (B) = Diameter (S) + Radius (M)
= 10 cm + 10 cm
= 20 cm

(a) Perimeter of shaded part = 2 circles (big)
= 2 × 2π(20 cm)
= 80π cm
(b) Radius (S) : Radius (M) : Radius (B) = 5 : 10 : 20
= 1 : 2 : 4
Area (S) : Area (M) : Area (B) = 1 : 4 : 16
Shaded part = 16U – 1U – 1U – 4U = 10U
Fraction shaded $= \frac{10}{16} = \frac{5}{8}$

Qn 6
Diameter (S) : Diameter (M) : Diameter (B) = 1 : 2 : 4
Area (S) : Area (M) : Area (B) = 1 : 4 : 16
Shaded part = 16u – 4u – (1 × 4)u
= 8u
Diameter (S) = 72 ÷ 4
= 18 cm
Radius = 9 cm

Qn 6 (Cont.)
Area of small circle = 1u
= π(9)²
= 81π cm²
Area of shaded part = 81π × 8
= 648π cm²

Qn 7
Perimeter = 2 big circles
= 4π(9 cm)
≈ 113 cm
Diameter (S) : Diameter (M) : Diameter (B)
= 6 : 12 : 18
= 1 : 2 : 3
Area (S) : Area (M) : Area (B) = 1 : 4 : 9
Area of (small) = π(3)²
≈ 28.3 cm²
Area of (shaded) = 9u – 5u
= 4u
= 4 × 28.3
≈ 113 cm²

Qn 8
Perimeter = 1 quadrant + 1 semicircle + 16
= 1 semicircle (big) + 16
= π(16 cm) + 16 cm
≈ 66 cm

Area of (quadrant) $= \frac{\pi(16)^2}{4}$
$\approx 201.1 \text{ cm}^2$
Area of (semicircle) ≈ 100.6 cm²
Shaded = 201.1 cm² – 100.6 cm²
≈ 101 cm²

Qn 9
Perimeter = 1 big semicircle + 1 small circle
= 1 big circle
= 2π(22 cm)
≈ 138 cm

Area of small semicircle $= \frac{\pi(11)^2}{2}$
$\approx 190.1 \text{ cm}^2$

Area of shaded part = 4u – 1u – 1u
= 2u
= 2 × 190.1 cm²
≈ 380 cm²

Qn 10
Perimeter of shaded
= 1 big semicircle + 1 small circle + 32 cm
= 1 big circle + 32 cm
= 2π(16 cm) + 32 cm
≈ 133 cm
Area of small semicircle = 1u
= π(8)²
= 64π cm²
Area of shaded part = 4u – 1u – 1u
= 2u
= 2 × 64π
≈ 201 cm²

Qn 11
Perimeter of shaded = 4 × (8 + 1 quadrant + 1 semicircle)
= 4 × (8 + 1 big semicircle)
= 4 × (8 + π(8))
≈ 133 cm

Qn 11 (Cont.)
Area of small semicircle = 1u

$= \frac{\pi(4)^2}{4}$ cm²

≈ 25.1 cm²

Area of shaded part = 4u
= 25.1 cm² × 4
≈ 101 cm²

Qn 12
Perimeter = 1 big circle
= 2π(9 cm)
≈ 57 cm
Area = 1 big semicircle

$= \frac{\pi(9)^2}{2}$ cm²

≈ 127 cm²

Unit 3.4 – Cut And Paste

Qn 1
There are 2 equal semicircles formed by the 2 equal sides of the isosceles triangle. Since the small unshaded part overlaps on both semi circles, we could cut and paste the remaining shaded semicircle onto the remaining unshaded semi circle to form a sector.
Area of shaded part = area of sector

$= \frac{60}{360} \times \pi(12)^2$

≈ 75 cm²

Qn 2

Area of shaded part = 1 big semicircle $= \frac{\pi r^2}{2}$

$= \frac{\pi(12)^2}{2}$

≈ 226 cm²

Qn 3
Area of shaded part = 1 square
= (8 × 8) cm²
= 64 cm²
Perimeter of shaded = Perimeter of semicircle
= π(8 cm) + 16 cm
≈ 41 cm

Qn 4
Perimeter of shaded part = 1 circle + 10 cm
= 2π (5 cm) + 10 cm
≈ 41 cm
Area of shaded part = square – circle
= (10 × 10) cm² – π(5)² cm²
≈ 21 cm²

Qn 5

Area of shaded part = area of sector $= \frac{120}{360} \times \pi(10)^2$ cm²

≈ 105 cm²

Qn 6
Area of shaded part = rectangle
= (18 × 9) cm²
= 162 cm²

Qn 7
Area of shaded part = area of triangle
= ($\frac{1}{2}$ × 16 × 8) cm²
= 64 cm²

Qn 8
Perimeter = πr + 10 + 10 + 20
= π(10 cm) + 40 cm
≈ 71 cm

Qn 9
Area of shaded part
= (square – circle) + triangle

= (16 × 16) cm² – π(8)² cm² + $\frac{1}{2}$(16)(8) cm²

= 256 cm² + 64 cm² – 64π cm²
≈ 119 cm²

Qn 10

Square – quadrant = (12)² cm² – $\frac{\pi(12)^2}{4}$ cm²

≈ 30.9 cm²
Area of region Z = 30.9 cm² ÷ 2
≈ 15.5 cm²
Shaded area = semi-circle – Region Z

$= \frac{\pi(12)^2}{2}$ cm² – 15.5 cm²

≈ 211 cm²

Qn 11

Area of shaded part = large semicircle – $3\frac{1}{2}$ small circles

$= \frac{\pi(30)^2}{2}$ cm² – $\frac{7}{2}$(π)(10)² cm²

≈ 314 cm²

Qn 12

$\frac{1}{2}$ rugby = quadrant – triangle

$= \frac{\pi(8)^2}{4}$ cm² – $\frac{1}{2}$(8)(8) cm²

≈ 18.3 cm²
Shaded area = big circle – rugby
= π(8)² cm² – 2(18.3) cm²
≈ 165 cm²

Qn13
Area of shaded
= big semi – triangle + rectangle(after cut N paste)

$= \frac{\pi(14)^2}{2}$ cm² – $\frac{1}{2}$(28)(10) cm² + (14 × 7) cm²

≈ 266 cm²
Shaded area is 266 cm²

Unit 3.5 Overlapping Method

Qn 1
Area of small semicircle + medium semicircle + Area of triangle

$= \frac{\pi(2.5)^2}{2}$ cm² + $\frac{\pi(6)^2}{2}$ cm² + ($\frac{1}{2}$ × 5 × 12) cm²

≈ 96.4 cm²

Shaded area = total area – big semicircle

$= 96.4 - \frac{\pi\left(\frac{13}{2}\right)^2}{2}$

≈ 30 cm²

Qn 2
Region A = square – quadrant

$= (8 \times 8)\ \text{cm}^2 - \frac{\pi(8)^2}{4}\ \text{cm}^2$

$\approx 13.7\ \text{cm}^2$

Shaded area $= \left(\frac{1}{2} \times 20 \times 8\right)\ \text{cm}^2 - 13.7\ \text{cm}^2$

$\approx 66\ \text{cm}^2$

Qn 3
Region A = rectangle – small quadrant

$= (12 \times 5)\ \text{cm}^2 - \frac{\pi(5)^2}{4}\ \text{cm}^2$

$= 60\ \text{cm}^2 - 19.63\ \text{cm}^2$

$\approx 40.4\ \text{cm}^2$

Shaded area = big quadrant – Region A

$= \frac{\pi(12)^2}{4}\ \text{cm}^2 - 40.4\ \text{cm}^2$

$\approx 73\ \text{cm}^2$

Qn 4
Triangle $= 48\ \text{cm}^2$

$\frac{1}{3}$ triangle $= 16\ \text{cm}^2$

Area of 1 circle $= \pi \times 6 \times 6$

$\approx 113.1\ \text{cm}^2$

$113.1 - 48 = 65.1\ \text{cm}^2$

$65.1 \div 3 = 21.7\ \text{cm}^2$

Area of 1 shaded $= 21.7\ \text{cm}^2 - 16\ \text{cm}^2$

$= 5.7\ \text{cm}^2$

Area of shaded parts $= 5.7\ \text{cm}^2 \times 3$

$= 17.1\ \text{cm}^2$

Qn 5
Area of Region A = rectangle – quadrant

$= (8 \times 4)\ \text{cm}^2 - \frac{\pi(4)^2}{4}\ \text{cm}^2$

$\approx 19.4\ \text{cm}^2$

Shaded region = Big semicircle – (2 × region A)

$= \frac{\pi(8)^2}{2}\ \text{cm}^2 - (2 \times 19.4)\ \text{cm}^2$

$\approx 62\ \text{cm}^2$

Qn 6
Area of unshaded part = 4 squares

$= (7.5 \times 7.5) \times 4$

$= 225\ \text{cm}^2$

Perimeter of unshaded part = 2 circles + 4 radius

$= 2(2\pi)(7.5\ \text{cm}) + 4(15\ \text{cm})$

$\approx 154\ \text{cm}$

Qn 7
Areas X + A = quadrant – small semicircle

$= \frac{\pi(14)^2}{4}\ \text{cm}^2 - \frac{\pi(7)^2}{2}\ \text{cm}^2$

$\approx 77.0\ \text{cm}^2$

Areas Y + A = square – quadrant

$= (14 \times 14)\ \text{cm}^2 - \frac{\pi(14)^2}{4}\ \text{cm}^2$

$\approx 42.1\ \text{cm}^2$

Difference between X and Y $= 77\ \text{cm}^2 - 42.1\ \text{cm}^2$

$\approx 35\ \text{cm}^2$

Qn 8
Areas X + A = quadrant

$= \frac{\pi(20)^2}{4}\ \text{cm}^2$

$\approx 314.2\ \text{cm}^2$

Areas Y + A = square – quadrant

$= (20 \times 20)\ \text{cm}^2 - \frac{\pi(20)^2}{4}\ \text{cm}^2$

$\approx 85.8\ \text{cm}^2$

Difference between X and Y $= 314.2\ \text{cm}^2 - 85.8\ \text{cm}^2$

$\approx 228\ \text{cm}^2$

Chapter 4 Speed

Unit 4.1 - Journey By Parts

Qn 1

D1 $\left(\frac{2}{5}\right)(140\ \text{km})$ D2 $\left(\frac{3}{5}\right) = 60 \times \frac{7}{2} = 210\ \text{km}$

S1 = 80 km/h S2 = 60 km/h

T1 $= \frac{140}{80} = 1\frac{3}{4}$ h T2 $= 3\frac{1}{2}$ h

(a) Distance travelled $= 140\ \text{km} + 210\ \text{km}$

$= 350\ \text{km}$

(b) Time travelled $= 1\frac{3}{4}\ \text{h} + 3\frac{1}{2}\ \text{h}$

$= 5\frac{1}{4}\ \text{h}$

5h 15 min

8.15 a.m. ← 1.30 p.m.

He started his journey at 8.15 a.m.

Qn 2
(a) Total distance travelled

$= (60\ \text{km/h} \times 2\ \text{h}) + (40\ \text{km/h} \times \frac{1}{2}\ \text{h})$

$= 120\ \text{km} + 20\ \text{km}$

$= 140\ \text{km}$

(b) Average speed for the journey $= 140\ \text{km} \div 2\frac{1}{2}\ \text{h}$

$= 56\ \text{km/h}$

Qn 3

Since $\frac{4}{5}$ journey $= 160\ \text{km}$

$\frac{1}{5}$ journey $= 40\ \text{km}$

Total journey $= 160\ \text{km} + 40\ \text{km}$

$= 200\ \text{km}$

Time taken to complete 1st part of journey $= \frac{40\ \text{km}}{20\ \text{km}}$

$= 2\ \text{h}$

Time taken to complete 2nd part of journey $= \frac{160\ \text{km}}{80\ \text{km}}$

$= 2\ \text{h}$

Total time taken = 4 h

Average speed for whole journey $= 200\ \text{km} \div 4\ \text{h}$

$= 50\ \text{km/h}$

Qn 4

Total distance = 70 km/h × 5 h
= 350 km

Distance (1st part) = $\frac{2}{5}$ × 350 km
= 140 km

Speed (1st part) = $\frac{140\text{ km}}{2\frac{1}{2}\text{ h}}$
= 56 km/h

Qn 5

$\frac{3}{4}$ journey = 50 km/h × 3 h = 150 km

$\frac{1}{4}$ journey = 50 km

Journey = 200 km

Total time taken = $\frac{200\text{ km}}{50\text{ km/h}}$ = 4 h

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Qn6

To find the average speed for the whole journey, we must first find the total distance from Town A to B.

Distance (1st 2h) = 24 km/h × 2 h
= 48 km

$\frac{4}{5}$ Distance = 48 km

$\frac{1}{5}$ Distance = 12 km

Whole distance = 12 km × 5
= 60 km

Average speed for whole journey = $\frac{60\text{ km}}{3\text{ h}}$
= 20 km/h

Unit 4.2 – Journey In Opposite Direction

Qn 1

In 1 min, A + B jogged 250 km.

Time taken to meet = $\frac{3000\text{ m}}{250\text{ m}}$
= 12 min

Distance Andy travelled = 100 m/min × 12 min
= 1200 m

Qn 2

In 1 hour, Mr Tan and Mr Krishnan travelled = 150 km

Time taken to meet = $\frac{225\text{ km}}{150\text{ km}}$
= $1\frac{1}{2}$ h

$1\frac{1}{2}$ h later

9 a.m. ⟶ 10.30 a.m.

They will meet at 10.30 a.m.

Qn 3

In 1 hour, Tommy and Jerry travelled 105 km

Time taken to meet = $\frac{210\text{ km}}{105\text{ km}}$
= 2 h

2 h later

8.30 a.m. ⟶ 10.30 a.m.

They will meet at 10.30 a.m.

Qn 4

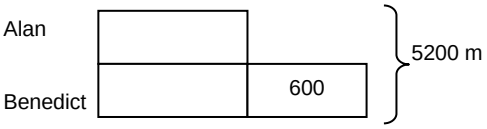
Distance (Janet) = 80 km/h × 2 h
= 160 km

Distance (Tommy) = 310 km – 160 km
= 150 km

Speed (Tommy) = 150 km ÷ 2
= 75 km/h

Qn 5

In 30 min, Benedict jogged 1.2 km × $\frac{1}{2}$ = 600 m more than Alan.



2 units + 600 = 5200

2 units = 5200 – 600
= 4600

1 unit = 4600 ÷ 2
= 2300 m

Speed (Alan) = 2.3 km ÷ $\frac{1}{2}$ h
= 4.6 km/h

Unit 4.3 – Common Distance Or Time

Qn 1

Time (Alex) : Time(Calvin) = 4 : 3
Speed (Alex) : Speed (Calvin) = 3 : 4
Speed difference = 18 km/h (1 unit)
Speed (Alex) = 3 × 18 km/h
= 54 km/h

Qn 2

Time (car A) : Time (car B) = 1 h : $\frac{1}{2}$ h = 2 : 1

Speed (car A) : Speed (car B) = 1 : 2
Speed difference = 20 km/h
Speed (car A) = 20 km/h

Qn 3

Speed (Jason) : Speed (Carl) = 11 : 8
Time (Jason) : Time (Carl) = 8 : 11

Time difference = $1\frac{1}{2}$ h (3 units)

1 unit = $\frac{1}{2}$ h

Time (Jason) = 8 × $\frac{1}{2}$ h
= 4 h

Qn 4

Speed (Yen Ming) : Speed (Leon) = 70 : 100 = 7 : 10
Time (Yen Ming) : Time (Leon) = 10 : 7

Time difference = 3u = $\frac{3}{4}$ h

1u = $\frac{1}{4}$ h

Qn 4 (Cont.)
Time (Leon) = 7u

$= 7 \times \frac{1}{4}$ h

$= 1\frac{3}{4}$ h

$1\frac{3}{4}$ h later

10.15 a.m. ⟶ 12 p.m.

Qn 5
$T_1 : T_2 = 3 : 2$
$S_1 : S_2 = 2 : 3$
Speed difference = 1u = 30 km/h
Distance = $T_1 \times S_1$ or $T_2 \times S_2$
= 3 h × 2 × 30 or 2 h × 3 × 30 = 180 km

Qn 6
$S_1 : S_2 = 5 : 4$
$T_1 : T_2 = 4 : 5$
Total time = 9u = 54 min
1u = 6 min
T_1 = 4u = 4 × 6 min = 24 min

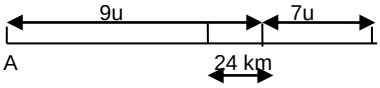
Qn 7
$T_A : T_B = 10 : 12 = 5 : 6$
$S_A : S_B = 6 : 5$
Speed difference = 1u = 9 km/h
Speed (A) = 6u = 6 × 9 = 54 km/h

Qn 8
Ronnie,
$\frac{2}{3}$ of journey = 3 h; $\frac{1}{3}$ of journey = $\frac{3}{2}$ h; Journey = $\frac{9}{2}$ h

$T_J : T_R = 4 : \frac{9}{2} = 8 : 9$

$S_J : S_R = 9 : 8$

Qn 9
$S_C : S_L = 72 : 56 = 9 : 7$
When time is the same,
$D_C : D_L = 9 : 7$



The car covered (24 km × 2 = 48km) more than the lorry from the time they left the towns to the time they passed each other
2units = 48 km
1unit = 24 km
Distance from A to B = 16 units
= 16 × 24
. = 384 km

Chapter 5 Simultaneous

Unit 5.1 – Simultaneous (Fraction of Different Quantities

Qn 1
$\frac{3}{8}$ of boys + $\frac{3}{7}$ of girls = 48

$\frac{1}{8}$ of boys + $\frac{1}{7}$ of girls = 16

Qn 1 (Cont.)
(Multiply by 7)
$\frac{7}{8}$ of boys + $\frac{7}{7}$ of girls = 112 (16 × 7)

$\frac{8}{8}$ boys + $\frac{7}{7}$ girls = 124

$\frac{1}{8}$ of boys = 124 – 112 = 12

Boys = 12 × 8
= 96

Qn 2
$\frac{4}{7}$ of English + $\frac{1}{2}$ of Chinese = 55 } ×2

$\frac{8}{7}$ of English + $\frac{2}{2}$ of Chinese = 110

English + Chinese = 100

$\frac{1}{7}$ of English = 110 – 100
= 10
English = 7 × 10
= 70
Chinese = 100 – 70
= 30

Qn 3
$\frac{4}{7}$ of men + $\frac{4}{9}$ of women = 240

$\frac{1}{7}$ of men + $\frac{1}{9}$ of women = 60 } ×9

$\frac{9}{7}$ of men + $\frac{9}{9}$ of women = 540

But men + women = 490

Extra $\frac{2}{7}$ men = 50

$\frac{1}{7}$ men = 25

Number of men at first = 25 × 7
= 175

Qn 4
$\frac{1}{4}$ circle + $\frac{1}{3}$ rectangle = $\frac{2}{5}$ square } ×3

$\frac{3}{4}$ circle + $\frac{3}{3}$ rectangle = $\frac{6}{5}$ square

Circle + rectangle = $\frac{7}{5}$ square

$\frac{1}{4}$ circle = $\frac{1}{5}$ square

Circle : Square
4 : 5

4u + rectangle = $\frac{7}{5} \times 5$
= 7u
Rectangle = 3u

Circle : Square : Rectangle
4 : 5 : 3

Qn 5
$\frac{1}{5}$ of circle + $\frac{1}{3}$ of rectangle = $\frac{3}{5}$ of square } ×3

$\frac{3}{5}$ of circle + rectangle = $\frac{9}{5}$ of square

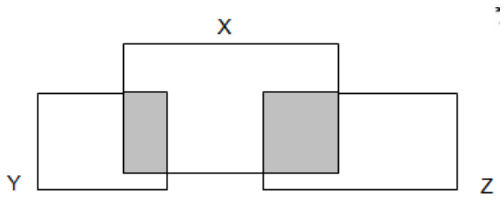
Circle + rectangle = 2 squares

$\frac{2}{5}$ of circle = $\frac{1}{5}$ of square

$\frac{2}{5}$ of circle = $\frac{2}{10}$ of square

Qn 5 (Cont.)
Circle : Square
5 : 10
5u + rectangle = 20u
Rectangle = 15u
Circle : Square : Rectangle
5 : 10 : 15

Qn 6



Z : X
5 : 12

$Y + 5u = \frac{3}{4}(12u)$

$Y = 4u$

$\frac{1}{4}Y + \frac{1}{5}Z = \frac{1}{6}X$ } $\times 4$

$Y + \frac{4}{5}Z = \frac{4}{6}X$

$Y + Z = \frac{3}{4}X$

$\frac{1}{5}Z = \frac{1}{12}X$

Z : X : Y
5 : 12 : 4
1u = 24 cm²
Total area of figure = Area (X + Y + Z) – Shaded Area
= 5u + 12u + 4u – 2u
= 19u
= 19 × 24
= 456 cm²

Qn 7

$\frac{1}{2}A + \frac{1}{2}B = 840 - 620$
$= 220$
$A + B = 440$
$C = 840 - 440$
$= 400$
Since 4u = 400
1u = 100
Bernard = 100

Qn 8

$\frac{1}{2}$ girls $- \frac{1}{4}$ boys $= 120$ } $\times 2$

Girls $- \frac{2}{4}$ boys $= 240$

Girls + Boys $= 720$

Difference $\frac{4}{4}$ boys $+ \frac{2}{4}$ boys $= 720 - 240$
$= 480$

$\frac{6}{4}$ boys $= 480$

$\frac{3}{2}$ boys $= 480$

$\frac{1}{2}$ boys $= 160$

Boys $= 160 \times 2$
$= 320$

Chapter 6 Percentage

Unit 6.1 – Percentage Of Different Bases

Qn 1
Boys = 45%
Girls = 100%
Adults $= \frac{120}{100} \times 45\%$
$= 54\%$
Difference between adults and boys = 54% – 45%
= 9%
9% = 63
1% = 7
Total = 45% + 100% + 54%
= 199%
= 199 × 7
= 1393
There were **1393** people at the fun fair altogether.

Qn 2
At first, pears = 40%
oranges = 60%
Left, oranges = 70% of 60%
$= \frac{7}{10} \times 60\% = 42\%$
End, pears increase = 60% of 40%
$= \frac{6}{10} \times 40\%$
$= 24\%$
Total pears = 24% + 40%
= 64%
Total in the end = 42% + 64%
= 106%
6% of fruits = 24
1% of fruits = 4
Total at first = 100%
= 100 × 4
= 400
There were **400** fruits in the box at first.

Qn 3
(a) Adults = 80%
Children = 20%
Female = 30% of 80%
$= \frac{3}{10} \times 80\%$
= 24%
Male = 80% – 24%
= 56%
Girls = 60% of 20%
$= \frac{6}{10} \times 20\%$
= 12%
Boys = 20% – 12%
= 8%
Boys – Girls = 12% – 8%
= 4%
4% of audience → 40
1% of audience → 10
100% of audience → 1000
(b) The number of children and men remained the same,
Children + male = 76%
76% of audience → 760
If 80% of remaining people → 760
1% of remaining people → 9.5
20% of remaining people → 9.5 × 20
= 190
Woman at first = 240
Women who left = 240 – 190
= 50

Qn 4
At first, pears → 60% (3u) } ×7 = 21u
apples → 40% (2u) } ×7 = 14u

End, pears → 30% (3u) } ×2 = 6u
apples → 70% (7u) } ×2 = 14u
Since the number of apples remained unchanged, the units for apples were made the same in both scenarios.

Decrease in pears = 21u – 6u = 15u
15u = 45
1u = 3
Apples = 14u = 14 × 3 = 42
There are 42 applies in the basket.

Qn 5
Fixed = 40% (2u) } × 5 = 10u
Unfixed = 100% (5u) } × 5 = 25u

Fixed = 80% (4u) } × 7 = 28u
Unfixed = 20% (1u) } × 7 = 7u

Transfer = 18u = 180 pieces
1u = 10 pieces
Total = 35u = 35 × 10 = 350 pieces

Qn 6
Daryl + Chelsia = 75% (3u) } ×5 = 15u
John = 25% (1u) } ×5 = 5u

Chelsia + John = 60% (3u) } ×4 = 12u
Daryl = 40% (2u) } ×4 = 8u

Chelsia : Daryl : John
7 : 8 : 5

Difference between Daryl and John = 3
3u = $48
1u = $48 ÷ 3
= $16
Total at first = 20u
= 20 × $16
= $320
The amount of money shared was $320.

Qn 7

Roy spent $\frac{3}{4}$ of his money → left with $\frac{1}{4}$ of his money

Dennis spent $\frac{2}{5}$ of his money → left with $\frac{3}{5}$ of his money

At the end
Dennis = 2 × Roy's money

$\frac{3}{5}$ D = 2 × $\frac{1}{4}$ R

$\frac{3}{5}$ D = $\frac{1}{2}$ R

$\frac{3}{5}$ D = $\frac{3}{6}$ R

Total 11u = $660
1u = $60

Dennis at end = 3u
= 3 × $60
= $180

Qn 8
50% of A → 30% of B

$\frac{1}{2}$ A = $\frac{3}{10}$ B

$\frac{3}{6}$ A = $\frac{3}{10}$ B

Qn 8 (Cont.)
A : B = 6 : 10

C is 50% of A + B

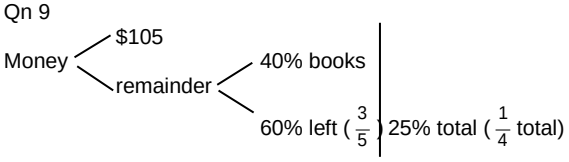
C = $\frac{1}{2}$ × 16u
= 8u

Removed $\frac{1}{4}$ × 8u = 2u (in C)

A : B : C
6 : 10 : 6

4u = 12
1u = 3
No. of oranges in A = 6 × 3
= 18

Qn 9



$\frac{3}{5}$ of remainder = $\frac{1}{4}$ of total

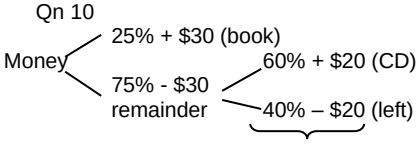
Remainder = $\frac{1}{4} \div \frac{3}{5}$
= $\frac{1}{4} \times \frac{5}{3} = \frac{5}{3}$ of total

$\frac{7}{12}$ of total = $105

$\frac{1}{12}$ of total = $105 ÷ 7
= $15
Total = $15 × 12 = $180

She had **$180** at first.

Qn 10



40% remainder → $20 + $64 = $84
20% remainder → $42
Remainder → $42 × 5 = $210
75% total – $30 → $210
75% total → $240
25% total → $80
Total = $80 × 4 = $320

Qn 11
First 2 bags, selling price = 125% of $80
= $\frac{125}{100}$ × $80
= $100
3rd bag, selling price = 60% of $80
= $\frac{6}{10}$ × $80
= $48
Amount of money = $100 × 2 + $48
= $248
She received **$248** from selling the three bags.

Qn 12
Jenny = 80%
Daryl = 100%
Jenny left = 80% of 80% = 64%

Qn 12 (Cont.)
Daryl (end) = 64% × 2 = 128%
Increase (Daryl) = 28%
28% of cards → 56
1% of cards → 2
Jenny at first, 80% of cards → 80 × 2 = 160

Qn 13
Red = 120% (6u) } = 18u
Blue = 100% (5u) } ×3 = 15u

Red = 90% (9u) } = 18u
Green = 100% (10u) } ×2 = 20u

	No.	×	Value	Total
Red	18u	×	2	36u
Green	20u	×	5	100u
Blue	15u	×	3	45u
	Total			181u

181u = 724
1u = 4
Red balls, 18u = 18 × 4
= 72

Qn 14

		Jason	:	Susan	
At first	75%	3u	:	4u	100%
Change	×5	+48		+4	×6
End	(120%)	5 × 6p	:	5p × 6	(100%)

Jason	15u	240
Susan	24u	24

9u = 240 – 24
= 216
1u = 24
Jason at first, 3u = 3 × 24
= 72

Qn 15
Amos = 120%
Daniel = 100%
30% of Amos's → $\frac{3}{10} \times 120\% = 36\%$
Amos, 120% – 36% = 84%
Daniel, 100% + 36% = 136%
$\frac{3}{4}$ of Daniel's = $\frac{3}{4} \times 136\%$
= 34%
End
Amos, 84% + 34% = 118%
Daniel, 136% – 34% = 102%
Difference = 16%
16% of total → 32
1% of total → 32 ÷ 16 = 2
Amos at first, 120% of total → 120 × 2 = 240
Amos had **240** sweets at first.

Chapter 7 Pie Chart

Qn 1
(a) $\frac{72}{360} \times 100\% = 20\%$
20% of the students like oranges.
(b) $\frac{30}{100} \times 360° = 108°$
Pear = 360° – 108° – 72° – 144°
= 36°
$\frac{36}{360} \times 200 = 20$
20 students like pears.

Qn 2
(a) 4u = 360° – 160°
= 200°
1u = 50°
Percentage of cricket = $\frac{50}{360} \times 100\%$
= 13.89%
(b) 70° of total = 35
2° of total = 1
360° of total = 180

Qn 3
(a) $\frac{140}{360} \times 720 = 280$
(b) 5u = 360° – 140°
= 220°
1u = 44°
Spiders, 2u = 88°
% of housewives who dislike spider → $\frac{88}{360} \times 100$
= 24.44%

Qn 4
(a) 6u = 360° – 240°
= 120°
1u = 20°
% teachers → $\frac{20}{360} \times 100\%$
= 5.56%
(b) 20° of total = 45
240° of total = 45 × 12
= 540

Qn 5
(a) 14u = 360° – 150°
= 210°
1u = 15°
TV sets = 7u = 105°
Diff = 5º = 10
1º = 2
Radios = 4 × 15º
= 60º
60º = 60 × 2
=120
(b) Total = 360°
360˚ = 360 × 2
= 720
(c) Irons sold = 3u
= 3 × 15°
= 45°
% of iron sold = $\frac{45}{360} \times 100\%$
= 12.5%

Qn 6
(a) Total angle sector = 160° + 90°
= 250°
Amount spend = $\frac{250}{360} \times \$1800$
= $1250
(b) Fare → 120% (6u)
Miscellaneous → 100% (5u)
11u = 360° – 90° – 160°
= 110°
1u = 10°
Miscellaneous = 5u
5u = 50°
$\frac{50}{360} \times \$1800 = \$250$

Qn 7

(a) % of girls who chose diet coke → $\frac{126}{360} \times 100\% = 35\%$

(b) 90% of total → 112
Total number of girls, 360° = 4 × 112
= 448

Qn 8

(a) $\frac{90}{360} = \frac{1}{4}$

(b) 4u = 360° – 90° – 126°
= 144°
1u = 36°
Chinese, 3u = 3 × 36°
= 108°

(c) 126º – 90º = 36º
36º = 24
3º = 2
Total, 360° = 2 × 120
= 240

Qn 9

(a) Total, 6u= 360° – 240°
= 120°
1u = 20
5u =100

% of girls → $\frac{100}{360} \times 100\% = 27.78\%$

(b) 1u = 20°
20° = 30
2° = 3
Difference between boys and girls = 240° – 100°
= 140°
(140° ÷ 2) × 3 = 210

Qn 10

(a) 6u = 360° – 240°
= 120°
1u = 20°

% of students who walk to school → $\frac{20}{360} \times 100\% = 5.56\%$

(b) 20% of total → 125
i) Cars, 100% of total → 125 × 5 = 625 students
ii) Bus, 240% of total → 125 × 12 = 1500 students

Qn 11

(a) 20% of 360° = $\frac{20}{100} \times 360°$
= 72°
Others = 360° – 180° – 72° – 80°
= 28°
% on other expenditure → $\frac{28}{360} \times 100\% = 7.78\%$

(b) Amount spent on souvenir = $\frac{1}{2} \times \$8000$
= \$4000

Qn 12

60 yrs old and above : 40 - 59 yrs old
1 × 2 : 2 × 2
2 : 4
40 – 59 yrs old : 0 – 19 yrs old
4 : 5
Total = 5u + 4u + 2u
= 11u
11u = 360º –140º
= 220º
1u = 20º
(a) 60 years old and above, 2 units = 40º

Fraction of people 60 years old and above = $\frac{40}{360} = \frac{1}{9}$

(b) $\frac{140}{360} \times 10\,800 = 4200$

Chapter 8 Algebra

Unit 8.1 Introduction to Algebra

Qn 1

Breadth = w cm
Length = $3w$ cm
(a) Perimeter = $(w + 3w) \times 2$
= $8w$ cm
(b) Area = $3w \times w$
= $3 \times 5 \times 5$
= 75 cm²

Qn 2

Annie = b years old
Mother = $b \times 3$
= $3b$ years old
Father = $(3b + 5)$ years old
3 years' time, father = $(3b + 5 + 3)$ years old
= $(3b + 8)$ years old

Qn 3

Gary = 15 years old
Nathaniel = $15 - w$ years old
Daniel = $\frac{15-w}{2}$ years old

Qn 4

5 years ago,
Age difference = k years
Since age difference remains the same throughout,
John = $(k + 12) + 3$
= $(k + 15)$ years old

Qn 5

3 apples + 2 oranges = 240 cents
1 apple + 1 orange = w cents
2 apples + 2 oranges = $2w$ cents
1 apple = $(240 - 2w)$ cents
= $\$\frac{240-2w}{100}$ or $\$\frac{120-w}{50}$

Qn 6

Notebook = 1u
Pen = \$4 + 1u
CD = \$2 + \$4 + 1u
\$10 + 3u ($\$T$)

Notebook = $\$\frac{T-10}{3}$

Qn 7

(a) $\frac{x}{4}$ cm

Total perimeter = 12u = X cm

1u = $\frac{x}{12}$ cm

Shortest length, 3u = $3 \times \frac{x}{12} = \frac{x}{4}$ cm

(b) Since X = 24 cm; Shortest = 6 cm

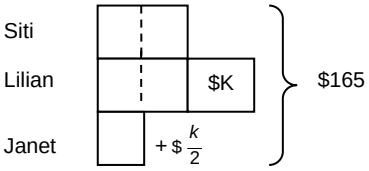
2nd shortest, 4u = $4 \times \frac{24}{12}$
= 8 cm

Area of triangle = $\frac{1}{2} \times 6 \times 8$
= 24 cm²

Qn 8

Total score = $78(x)$
= $78x$ points
Total new score = $80(x + 1)$
= $(80x + 80)$ points
Next test = $80x + 80 - 78x$
= $(80 + 2x)$ points

Qn 9



$5 \square + \frac{3k}{2} = 165$

$5 \square = 165 - \frac{3k}{2}$

$\square = \frac{330-3k}{10}$

Siti $\rightarrow 2\square \rightarrow 2(\frac{330-3k}{10}) = \frac{330-3k}{5}$

K = 8, Siti $= \frac{330-3(8)}{5}$

= $61.20

Qn 10

Total units = 6 units+ k units

(6 + k) units = $120

1U $= \frac{120k}{6+k}$

Amount by Mrs Lee = k units

$= \$\frac{120k}{6+k}$

Qn 11

(a) 1 box of chocolates = $\$(w + 4)$

(b) Amount of money Mrs Lim have

= $6(w + 4) - w$ or $5(w + 4) + 4$

= $6w + 24 - w$ or $5w + 20 + 4$

= $\$(5w + 24)$

Qn 12

80% of cost $\rightarrow \$n$

10% of cost $\rightarrow \$\frac{n}{8}$

100% of cost $\rightarrow 10 \times \frac{n}{8} = \$(\frac{5n}{4})$

Qn 13

(a) Total chairs = $12(3p) + 8$

= $36p + 8$

(b) Total chairs = $36(8) + 8$

= 296

Qn 14

Total work to be done = $w \times 30$

= $30w$

Total days taken with additional workers $= \frac{30w}{2w+w}$

$= \frac{30w}{3w}$ (10 days)

Qn 15

Cost of pen $= \$\frac{3}{4}m$

5 calculators = $\$5m$

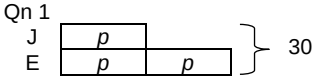
8 pens $= 8(\frac{3}{4}m)$

Total cost = $\$5m + \$6m$

= $\$11m$

Unit 8.2 Solving Simple Linear Equations Involving Whole Number Coefficient

Qn 1



$3p = 30$

$p = 10$

Janice has 10 sweets.

Qn 2

J = w

E = $w + 24$

E (end) $= \frac{1}{3}w + w + 24$

$= \frac{4}{3}w + 24$

$\frac{2}{3}w + 24 = 40$

$\frac{2}{3}w = 40 - 24$

= 16

Jason at first $= \frac{16}{2} \times 3$

= 24

Qn 3

D = $\$m$

T = $\$(m + 48)$

C $= \$(\frac{m}{4} + 12)$

Total $= \$(\frac{9m}{4} + 60)$

$\frac{9m}{4} = \$78 - \$60$

= $18

$\frac{m}{4} = \$2$

D = $8

Qn 4

J (now) = $(3x + 1)$ years old

B (now) = $(3x + 4)$ years old

J (in 3 years' time) = $(3x + 4)$ years old

B (in 3 years' time) = $(3x + 7)$ years old

$3x + 4 + 3x + 7 = 29$

$6x = 29 - 4 - 7$

= 18

$x = 3$

Joy (now) = $(3 \times 3 + 1)$ years old

= 10 years old

Chapter 9 Revision of Key Constructs

Qn 1

Square	:	Round	Square	:	Oval
3	:	2	4	:	3
×4		×4	×3		×3

	Square	:	Round	:	Oval
(a)	12	:	8	:	9
(b)	Round	:	Square + Oval		
	30%		70%		
	= 3	:	7		
	×3		×3		
	9	:	21		

Increase in round cookies = 120

Square cookies = $12 \times 120 = 1440$

Qn 2

Cost of a child's ticket $= \frac{50}{100} \times \$14$

= $7

	Number	×	Value ($)	=	Total cost ($)
Adults	60% (3u)	×	14	=	42u
Children	40% (2u)	×	7	=	14u
					56u

56u = 6720

1u = 6720 ÷ 56

= 120

Tickets for adults, 3u = 3 × 120

= 360

Qn 3

$10 tickets	:	$5 tickets
3	:	2
× 2		× 2
6	:	4

Number	×	Value ($)	=	Total amount ($)
5U	×	10	=	50u
4U	×	5	=	20u
				70u

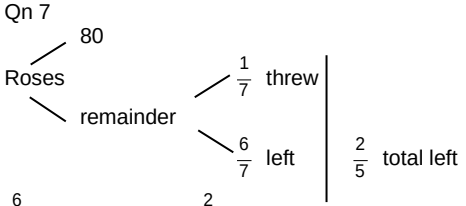
70u = $5600
1u = $5600 ÷ 70
= 80
1u = of adult tickets
= 80 × $10
= $800

Qn 4
Area of square = 10 × 10
= 100 cm²
Area of triangle CDE = $\frac{1}{2}$ × 10 × 10
= 50 cm²
Difference in square and triangle CDE
= difference in shaded area
= 100 cm² – 50 cm²
= 50 cm²

Qn 5
(a) 120% of total → $3000
20% of total → $500
Mr Soon's salary, 100% of total → $2500
(b) Difference currently = $500
New difference = $590
% increase in salary → % increase in difference
= $\frac{90}{500}$ × 100%
= 18%

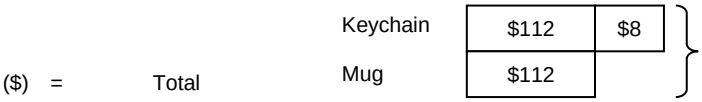
Qn 6
Difference in income = $250
Difference in savings = $1350 – $600
= $750
(a) Number of months Clayton take to save $600
= $\frac{750}{250}$
= 3 months
(b) Alvin's monthly income = $\$\frac{1350}{3}$ + $500
= $950

Qn 7



$\frac{6}{7}$ of remainder → $\frac{2}{5}$ total
Remainder → $\frac{2}{5} \times \frac{7}{6} = \frac{14}{30}$
$1 - \frac{14}{30} = \frac{16}{30}$ of total = 80 sold
$\frac{1}{30}$ of total = 80 ÷ 16
= 5
Total number of roses = 5 × 30
= 150
Total number of roses left = $\frac{2}{5}$ × 150
= 60

Qn 8
Total cost



$\frac{232-8}{2}$ = 112
3u of key chains cost $120.
1u of key chains cost $40.
1u of mugs cost $112.
Difference in 1u = $112 – $40 = $72
No. of items in 1u = $72 ÷ $4.50 = 16
16 mugs cost $112.
1 mug cost = $\$\frac{112}{16}$
= $7

Qn 9
A = 60% (3u) } = 15u
B + C = 100% (5u) } × 5 = 25u

B = 25% (1u) } = 8u
A + C = 100% (4u) } × 8 → 32u

A	:	B	:	C
15	:	8	:	17

Difference between A and B → 2u
2u → 4
1u → 2
Total in box → 40u → 40 × 2 → 80

Qn 10
In 1 day, Imran can paint $\frac{1}{12}$ house.
Hence in 3 days, he can paint = $\frac{1}{4}$ of the house
(Imran painted alone as John rested on these 3 days).
In 1 day, John can paint $\frac{1}{15}$ house.
Hence, in 5 days, he can paint $\frac{1}{3}$ of the house
(John painted alone as Imran rested on these 5 days.)
Remaining part of the house for both to paint together
→ $1 - \frac{1}{4} - \frac{1}{3} = \frac{5}{12}$ house
Number of days for both = $\frac{5}{12} \div (\frac{1}{12} + \frac{1}{15}) = \frac{5}{12} \div \frac{9}{60}$
= $\frac{5}{12} \times \frac{60}{9} = \frac{25}{9} = 2\frac{7}{9}$
Total number of days = 3 + 5 + $2\frac{7}{9}$ = $10\frac{7}{9}$

Qn 11

A	:	B
3u	:	5u
–2u		–2u
1u	:	3u

40% of B → 40% of 5u
= 2u
% figure unshaded
→ $\frac{1u+3u}{1u+3u+2u}$ → $\frac{4}{6} \times 100\%$ → $66\frac{2}{3}$ % or 66.67%

Qn 12
Case 1 : + 10 red beads
Ratio Red : Blue
2 : 3
Case 2 : +10 red beads + 30 blue beads
1 : 3 (×2)
2 : 6
Blue changed by 3 units,
3u = 30 beads
1u =10 beads
Red beads,
2u = 2 × 10
= 20
Number of beads = 20 – 10
= 10

Qn 13
80% male → 90% female
$\frac{8}{10}$ male = $\frac{9}{10}$ female
$\frac{72}{90}$ male = $\frac{72}{80}$ female
Total = 90u + 80u
= 170u
170u = 170 members
1u = 1 member
Total this year, 144u = 144 members

Qn 14
Performers 30% → 70% of 70% → $\frac{7}{10}$ × 70% → 49% (7350)
male
Spectators 70%
70% – 49% = 21% female
Difference 28% of total → 4200
1% of total → 150
Performers + female spectators (remains constant)
→ 51% → 51 × 150 = 7650
100% – 40% = 60%
60% of total → 7650
20% of total → 2550
40% of total → 5100 male spectators left
Number of male that must leave = (49 × 150) – 5100
= 7350 – 5100
= 2250

Qn 15
(a) Total number of rectangles in Figure 90
= 4 + 89(3)
= 271
(b) 451 – 4 = 447
447 ÷ 3 = 149 → Figure 150 (151 shaded rectangle)
Unshaded rectangles = 451 – 51 = 300
(c) 697 – 4 = 693
693 ÷ 3 = 231 → Figure 232 (233 shaded rectangle)
Unshaded rectangles = 697 – 233 = 464

Qn 16
$834 – $66 = $768
$768 ÷ 2 = $384
Pants = $384 + $66
= $450
Shirts = $384
3u of pants cost $450
4u of shirts cost $384
1u of pants cost $150
1u of shirts cost $96
Difference in 1u = $54

Qn 16 (Cont.)
No. of items in 1u = $54 ÷ 9
= 6
Total shirt + pants bought = 7u × 6
= 42

Qn 17

Item	No. of Boxes	×	Item	Total
Blue	Red + 12	×	120	120Red + 1440
Red	Red	×	150	150Red

Comparing the total of items (plates vs cups)
Cups = Plates + 120
150 Red = 120 Red + 1440 + 120
30 Red = 1560
Number of Red boxes = 1560 ÷ 30
= 52
Number of Blue boxes = 52 + 12
= 64
Total Plates = 64 × 120
= 7680

Qn 18
$\frac{1}{3}$ Lim = $\frac{3}{4}$ Zhang
$\frac{3}{9}$ Lim = $\frac{3}{4}$ Zhang

	Lim	:	Zhang	
	9u	:	4u	
5×	–150		+ 50	×6
	6p	:	5p	

Lim	45u		
Zhang	24u	300	750

(45 – 24)u = 21u
= 1050
1u = 50
Total ducks = 13u
= 13 × 50
= 650

Qn 19
Total shaded area = $\frac{1}{2}$ × 20 × 17 × 4
= 680 cm²
Since AB = BE but AB = BC
Therefore EB = BC = CF = 60 cm ÷ 3
= 20 cm

Qn 20
Initial extra = 6 × 50-cent
= $3
After using eight 50-cent coins, 8 × 50-cent = $4
$4 – $3 = $1
Difference in value of 50-cent coins and 20-cents coin
= $7.40 + $1
= $8.40

Qn 20 (Cont.)

Difference in value of 1 50-cent coin and 1 20-cent coin

= \$0.50 – \$0.20

= \$0.30

\$8.40 ÷ \$0.30 = 28

At first, he had **28** 20-cent coins and 28 + 6 = **34** 50-cent coins.

Qn 21

Green	:	Blue
5u	:	3u
×4		×4
20u	:	12u

Green markers sold, 25% of 20u = $\frac{1}{4} \times 20u = 5u$

	Number	×	Value (\$)		Total (\$)
Green	15u	×	4	=	60u
Blue	12u	×	5	=	60u
					120U

120u = 480
1u = 480 ÷ 120
= 4
Green markets at first, 20u = 20 × 4
= 80

Qn 22

Yeo	120% (6u) × 5	Yeo : Lim : Tang
Lim	100% (5u) × 5	30u : 25u : 18u
Tang	60% (3u) × 6	–3u –6u +9u
Yeo	100%(5u) × 6	27u : 19u : 27u

50% of 18u → 9u
3p = 9u
1p = 3u
Difference between Lim and Tang = 8u
8u = 96
1u = 96 ÷ 8
= 12
Mrs Yeo gave Miss Tang 3u of books = 3 × 12
= 36

Qn 23

Terry loses $\frac{4}{9}$, Alex left $\frac{5}{9}$

Terry	:	Alex
2	:	3
×5		×5
10u	:	15u
+8u		–8u

(a) 18 : 7
(b) At first = T : A = 18 : 7
2nd stage = T : A = 10 : 15
Since $\frac{5}{9}$ of Terry = 10u
$\frac{1}{9}$ of Terry = 2u
$\frac{4}{9}$ of Terry = 8u
Finally T : A = 1 : 4 = 5 : 20
Transfer = 5u = 35
1u = 7
Terry in the end = 5u = 35

Qn 24

(a) No. of shaded tiles = 20
No. of plain tiles = 16

(b) Shaded 8 + 8 (4) = 40
Plain 9 × 9 = 81
Total = 40 + 81
= 121

Qn 25

Assume all delivered successfully,
Total earned = \$25 × 500
= \$12500
Amount refunded = \$12 500 – \$9500
= \$3000
No. of parcels damaged = \$3000 ÷ (\$25 +\$15)
= 75
No. of parcels delivered successfully = 500 – 75
= 425

Qn 26

Area of unshaded part = $\frac{1}{2} \times 7 \times (12 + 7)$
= $66\frac{1}{2}$ cm²
Shaded = quadrant + square – unshaded
= $\frac{\pi(12)^2}{4} + (7 \times 7) – 66.5$
= 96 cm²

Qn 27

	Spent
Anna	40%
Isabel	–\$30
Kenneth	80% Anna

Total amount spent = \$640 – \$370
= \$270
120% of Anna + \$30 → \$270
120% of Anna → \$240
1% of Anna → \$2
100% of Anna → \$200
Isabel + Kenneth at first = \$640 – \$200
= \$440

Qn 28

Total (Alan + Charles) = 120 × 2
= 240
Total (Charles + Gavin) = 95 × 2
= 190
Difference between Alan + Gavin = 50
Gavin = 5u
Alan = 7u
Qn 28 (Cont.)
Difference, 2u = 50
1u = 25
Gavin, 5u = 5 × 25
= 125
Charles =190 – 125
= 65

Qn 29

Square X	= 1u × 3 = 3u	Difference 6u
Rectangle Y	= 3u × 3 = 9u	
Unshaded X	= 1u × 2 = 2u	Difference 6u
Unshaded Y	= 4u × 2 = 8u	

Decrease each, 1u = 27 cm²
Area (Square X), 3u= 3 × 27 cm²
= 81 cm²
Length of square = 9 cm

Qn 30

$\angle AFG = 115^\circ$

$\angle DFE = 180^\circ - 50^\circ - 50^\circ$
$= 80^\circ$

$\angle AFD = 360^\circ - 115^\circ - 75^\circ - 80^\circ$
$= 90^\circ$

$\angle BFC = \frac{90}{3}$
$= 30^\circ$

$\angle FBC = \frac{180-30}{2}$
$= 75^\circ$

Qn 31

Find the ratio of speed for the remaining journey from home to school.

Original speed, S_1 : Increased speed, S_2
40 : 50
4 : 5

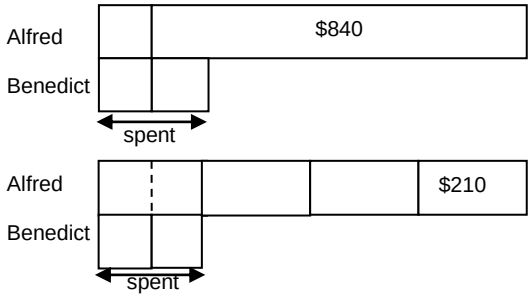
Since the distance for the remaining journey is the same, the ratio of the time taken to complete the rest of the journey is opposite to the speed.

Original time, (T_1): New time, (T_2)
5 : 4

Difference in time, 1u = 3 min + 1 min
= 4 min
5u = 4 min × 5
= 20 min

Total distance = (2 × 40) m + (40 m/min × 20 min)
= 880 m

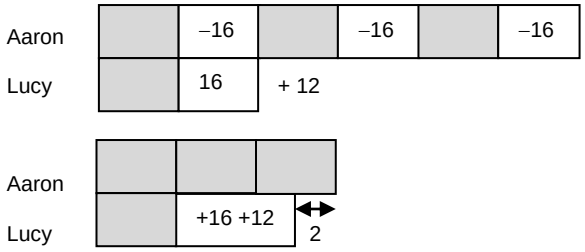
Qn 32



(a) Amount Alfred received = $210 + $840
= $1050

(b) 3u = $840 – $210
= $630
1u = $210
Benedict = $210 × 2
= $420

Qn 33



2u = 16 + 12 + 2
= 30
1u = 15
Lucy at first = 15 + 16
= 31

Qn 34

A	=	1u	× 4
B + C + J	=	4u	× 4
B	=	1u	× 5
A + C + J	=	3u	× 5

A : B : C : J
4 : 5 : 6 : 5

Qn 34 (Cont.)

C	=	3u	× 2
A + B + J	=	7u	× 2

Difference 1u = $14
Cost of present = 20u
= 20 × $14
= $280

Qn 35

A	=	4u	
B + C + D	=	11u	
B	=	5u	
C + D	=	6u	
C	=	1u	× 2
D	=	2u	× 2

A : B : C : D
4 : 5 : 2 : 4

Difference 2u = $400
1u = $200

Total sum = 15u
= 15 × $200
= $3000

Qn 36

	Number	×	Value ($)	=	Total ($)
On time	18u	×	6	=	108u
Late	2u	×	4	=	8u
					116u

116u = 2320
1u = 20

(a) Number of parcels delivered on time, 18u = 20 × 18
= 360

(b) Amount did not collect = 2u × 20 × $(6 – 4)
= $80

Qn 37

W	=	1u × 2	
X + Y + Z	=	5u × 2	
X	=	1u × 2	
Y + Z	=	4u × 2	
Y	=	3u	
Z	=	5u	

W : X : Y : Z
2 : 2 : 3 : 5

Difference 3u = $24
1u = $8

Total cost of present, 12u = 12 × $8
= $96

Qn 38

$\frac{3}{5}$ of Joel's = $\frac{2}{3}$ of Matthew's

$\frac{6}{10}$ of Joel's = $\frac{6}{9}$ of Matthew's

Joel	=	10u	
Matt	=	9u	
Ben	=	5u	

Difference
5u = $35
1u = $7

(a) J : M : B = 10 : 9 : 5

(b) Total savings, 24u = 24 × $7
= $168

Qn 39

A	=	2u	× 10
B + C	=	5u	× 10
B	=	3u	× 7
A + C	=	7u	× 7

A : B : C
20 : 21 : 29

1u = $12

Total cost of present = 70u
= 70 × $12
= $840

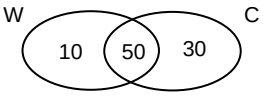
Qn 40

A, 50% of total → 1u × 9
B + C, 100% of total → 2u × 9
B, 35% of total → 7u
A + C, 100% of total → 20u

A : B : C
9 : 7 : 11

2u = 18
1u = 9
Total = 27u
= 27 × 9
= 243

Qn 41



Total no. of students who like either or both types of food
= 50 + 30 + 10
= 90
Number of students who do not like Western or Chinese
= 120 – 90
= 30

Percentage $= \frac{30}{120} \times 100\%$
$= 25\%$

Qn 42

A	:	B		B	:	C
$2^{\times 2}$	:	$3^{\times 2}$		$2^{\times 3}$	:	$3^{\times 3}$
4	:	6		6	:	9

Summary
A : B : C
4 : 6 : 9

Since all triangles have the same height,
area ratio = base ratio
area of triangle D = 9u + 4u – 6u
= 7u
7u = 70 cm²
1u = 10 cm²
Area of rectangle = (9u + 4u) × 2
= 26u
= 26 × 10
= 260 cm²

Qn 43
Perimeter = (16 × 2) + (*x* + 10) + (*x* + 10)
= (52 + 2*x*) m
Cost = 30(52 + 2*x*)
= $(1560 + 60*x*)

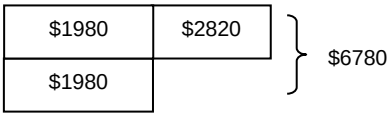
Qn 44
Perimeter of circle = 2π(10 cm)
= 20π cm
Perimeter of figure = 20π +(40 – 20) cm × 2 + 40 cm
= (80 + 20π) cm

Qn 45

D_E	:	D_F	:	D_G
100	:	80	:	60
5	:	4	:	3

Since time is the same,
$S_E : S_F : S_G = 5 : 4 : 3$
$D_F : D_G = 4 : 3$
$\div 4 \quad \div 4$
$= 1 : \frac{3}{4}$
For every unit that Faith travelled, George would travel
$\frac{3}{4}$ u. Faith would complete the race in 20 m,
so if 1u = 20 m,
$\frac{3}{4}$ u $= \frac{3}{4} \times 20$ m
= 15 m
When Faith completed the remaining 20 m, George would have travelled another 15 m.
Distance George was from finishing line
= 40 m – 15 m
= 25 m

Qn 46
Total cost



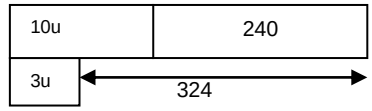
$\frac{\$6780 - \$2820}{2} = \$1980$
3u of clocks cost $1980 5u of watches cost $4800
1u of clocks cost $660 1u of watches cost $960
Difference in 1u = $300
1u $= \frac{\$300}{\$25}$ (12 items)
Total number of watches and clocks, 8u = 8 × 12 items
= 96 items

Qn 47
Area of shaded part = (12 × 12 × 3) cm² – ($\frac{1}{2}$ × 12²) cm²
= 432 cm² – 72 cm²
= 360 cm²

Qn 48
When both have the same height,
Ratio of volume = ratio of base area
Base Area (A) : Base Area (B)
(12 × 5) : (10 × 4)
3 : 2
Volume of water in Tank A = 12 × 5 × 12
= 720 cm³
720 cm³ is to be shared between Tank A and Tank B in the ratio 3 : 2 respectively.
5u = 720 cm³
1u = 720 cm³ ÷ 5
= 144 cm³
Volume of water transferred to tank B, 2u = 288 cm³

Qn 49

Left behind



$\frac{1}{6} = \frac{2}{12}$
$\frac{3}{4} = \frac{9}{12}$
$\frac{1}{6} \times 288 = 48$
7u = 84
1u = 12
Total sweets Calvin had at first = 12u + 288
= 12 × 12 + 288
= 432

Qn 50
Total 5 numbers = 60 × 5
= 300
Total 6 numbers = 65 × 6
= 390
Total 7 numbers = 63 × 7
= 441
7th number = 441 – 390
= 51

Qn 51

B : C

5 : 4

$\frac{1}{2}$ of A + $\frac{1}{2}$ of B = 640 – 420

= 220

A + B = 440

C = 640 – 440 = 200

Since 4u = 200

1u = 50

B + C, 9u = 9 × 50

= 450

Number of sweets Annie had at first = 640 – 450

= 190

Qn 52

Since triangle A, B and C have the same height, ratio of their areas is equal to ratio of their bases.

Area A : Area B : Area C

= Base A : Base B : Base C,

so, Base A (YQ) : Base C (QZ)

1 : 3

Area A : Area C

1 : 3

Difference = (3 – 1)u

= 2u

2u = 24 cm²

Area B, 4u = 24 × 2

= 48 cm²

Sample Examination Paper 1 – Booklet A

1. (4)	2. (4)	3. (3)	4. (2)	5. (3)
6. (1)	7. (3)	8. (1)	9. (4)	10. (2)
11. (4)	12. (2)	13. (3)	14. (1)	15. (3)
16. 62°	17. $\frac{5}{14}$	18. 48	19. 1000	
20. 1 h 45 min		21. 50	22. 210 days	
23. 7 km		24. $72		
25. 39, 40, 41, 42, 43, 44,			45. 45	

26. $\frac{8}{12} = \frac{2}{3} = \frac{6}{9}$ Ans: 9

---

27. $\frac{3}{5}$ N = 48, $\frac{1}{5}$ N = 16

Number = 16 × 5

= 80

$\frac{1}{2}$ of number = 40 Ans : 40

---

28. $\frac{2}{5}$ of red = $\frac{3}{4}$ of blue

$\frac{6}{15}$ of red = $\frac{6}{8}$ of blue

red = 15u

blue = 8u Ans: $\frac{15}{8}$

---

29. Average = $\frac{9+(38\times2)+(23\times3)+(24\times4)}{100}$

= 2.5

---

30. D (75%) 3u × 4 } D : C : J

C (100%) 4u × 4 } 12 : 16 : 15

D (80%) 4u × 3 }

J (100%) 5u × 3 } 43u

43u = 172

1u = 172 ÷ 43

= 4

D = 12 × 4

= 48

Sample Examination Paper 1 – Booklet B

1. Area of shaded part = $\frac{1}{2}$ × 14 cm × 18 cm

= 126 cm²

---

2. Z + 35° = 82° – 28° (Alt ∠)

Z = 54° – 35°

= 19°

---

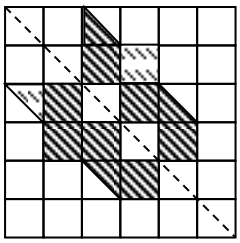
3. 85% of original → $\$d$

÷ 17 ÷ 17

5% of original → $\$\frac{d}{17}$

100% of original → $\$\frac{d}{17} \times 20 = \$\frac{20d}{17}$

4.



---

5. Difference = $120

End, Imran = (50%) 1u

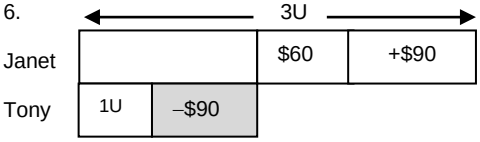
Jason = (100%) 2u

Difference, 1u = $120

Amount each spent = $200 – $120

= $80

6.



2u = $90 + $60 + $90

= $240

1u = $120

Janet at first, 3u – $90 = (3 × 120) – 90

= $270

---

7. $\angle c + \angle d$ = 180° – 25°

= 155° (sum of angles in a triangles)

$\angle a + \angle b$ = 180° – 25°

= 155° (2 interior ∠ = 1 exterior ∠)

$\angle a + \angle b + \angle c + \angle d$ = 155° × 2 = 310°

---

8. Area of shaded part = $\frac{1}{2}$ × 20 cm × 20 cm × 2

= 400 cm²

---

9. Total (A + B) = $5200 × 2

= $10 400

Total (B + C) = $3800 × 2

= $7600

Difference, 2u = $10 400 – $7600

= $2800

1u = $1400

Benson = $7600 – (3 × 1400)

= $3400

---

10 $\angle FBE$ = 90°

(a) $\angle DFC$ = 90° + 28°

= 118° (2 interior ∠ = 1 exterior ∠)

$\angle DFC$ = 180° – 118° = 62°

(b) $\angle BDF$ = 45° – 28° = 17°

11.

Before

Pears = 1u } ×3 = 3u

Oranges = 2u } = 6u

After

Pears = 3u

Oranges = 5u

Difference in oranges = 1u

1u = 8

Total number of fruits, 9u = 9 × 8

= 72

---

12. $\frac{1}{4}$ of total + \$10

Total

$\frac{3}{4}$ of total − \$10 —— $\frac{2}{5}$ of remainder + \$15

$\frac{3}{5}$ of remainder − \$15 = \$33

$\frac{3}{5}$ of remainder = \$33 + \$15

= \$48

$\frac{1}{5}$ of remainder = \$48 ÷ 3

= \$16

Remainder = \$16 × 5

= \$80

$\frac{3}{4}$ of total – \$10 = \$80

$\frac{3}{4}$ of total = \$90

$\frac{1}{4}$ of total = \$90 ÷ 3

= \$30

Total amount of money at first = \$30 × 4

= \$120

---

13. In 1 h, Mr Tan would paint $\frac{1}{6}$ of the house.

In 1 h, Mr Tan + Krishnan would paint $\frac{1}{4}$ of the house.

Krishnan would paint $\frac{1}{4} - \frac{1}{6} = \frac{1}{12}$ of the house in 1 h.

To paint the whole house, Krishnan would take 12 h.

14.

S_1	:	S_2
5	:	4

T_1	:	T_2
4	:	5

9u = 54 min

1u = 6 min

T_1 (home to nearby park) = 4u

= 4 × 6

= 24 min

---

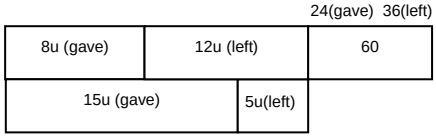
15. Area = big semicircle – $3\frac{1}{2}$ small circles

$= \frac{\pi(30)^2}{2} - \frac{7}{2}\pi(10)^2$

= 314 cm²

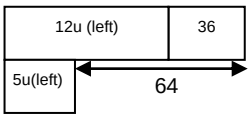
16.

At first



16. (Cont.)

Left



$\frac{2}{5} = \frac{8}{20}$

$\frac{3}{4} = \frac{15}{20}$

7u = 64 – 36

= 28

1u = 4

Chocolate pies at first = 20u + 60

= 20 × 4 + 60

= 140

---

17. (a) Number of shaded triangles in Figure 10

$= 1 + 2 + 3 + \ldots + 11 = \frac{11(12)}{2} = 66$

(b) Number of unshaded triangles in Figure 50

$= 1 + 2 + 3 + \ldots + 50 = \frac{50(51)}{2} = 1275$

(c) Total number of triangles in Figure 100

= 101 × 101

= 10 201

Sample Examination Paper 2 – Booklet A

1. (1)	2. (2)	3. (3)	4. (1)	5. (4)
6. (3)	7. (2)	8. (3)	9. (2)	10. (2)
11. (1)	12. (4)	13. (2)	14. (3)	15. (3)
16. $1\frac{1}{4}$	17. 1440	18. 144	19. 1264	20. $\frac{1}{2}$
21. 2 m	22. $20\frac{1}{4}$ h	23. 350	24. 126	

25. $\frac{1}{2}$ of total + 12 = 60

$\frac{1}{2}$ of total = 48

Total at first = 48 × 2

= 96

---

26. $\angle y = 180° - 90° - 20°$

= 70°

---

27. 2 apples + 3 oranges = \$2.10

1 apple + 1 orange = \$0.85

×2 ×2 ×2 Compare

2 apples + 2 oranges = \$1.70 1 orange = 40 cent

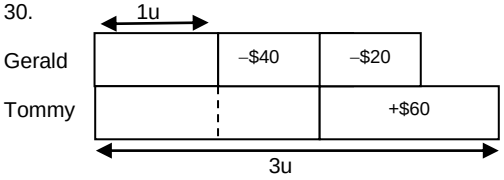
Ans: 40 cents or \$0.40

28. \$26 – 3(\$7) = \$5

3 + 3 + 3 + 2 = 11

29. Total = 20 + 2(30) + 3(60) + 4(20) + 5(40) = 540

30.



2u = \$60 + \$40 = \$100

1u = \$50

Gerald = 1u + \$60

= \$50 + \$60

= \$110

Sample Examination Paper 2 – Booklet B

1. Total sweets = 40 × 4 + w = 160 + w

Total needed for each student to receive 6 sweets

= 40 × 6

= 240

Extra sweets needed = 240 – 160 – w

= 80 – w

---

2. 1st watch $= \frac{70}{100} \times \$150$
$= \$105$
Loss $= \$45$
2nd watch $= \frac{120}{100} \times \$150$
$= \$180$
Profit $= \$30$
Overall loss = \$15

3. $\angle BCD = 180^o - 130^o$
$= 50^o$ (interior angles in a parallelogram)
(a) $\angle BCE = 50^o - 30^o$
$= 20^o$
(b) $\angle ACE = 360^o - 130^o - 20^o - 50^o$
$= 160^o$ (angles in a quadrilateral)

4. Volume of solid $= 12 \times 1\ cm^3$
$= 12\ cm^3$

5.

	Number	×	Value (legs)	=	Total Legs
Chickens	2u	×	2	=	4u
Horses	1u	×	4	=	4u
					8u

8u = 152
1u = 152 ÷ 8
= 19
Chickens, 2u = 19 × 2
= 38

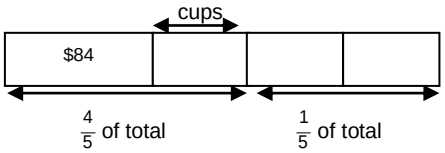
6.

Square			Rectangle		
Unshaded	:	shaded	Shaded	:	Unshaded
2	:	1	4	:	3
8	:	4			

Fraction of figure unshaded $= \frac{8+3}{8+3+4} = \frac{11}{15}$

7. Since all 3 triangles share the same height, area ratio will be equal to base ratio
14 : 6 : 14 = 7 : 3 : 7
7u = 56 cm²
1u = 8 cm²
Total unshaded, 10u = 80 cm²

8.



2u = $\frac{1}{5}$ of total

1u = $\frac{1}{10}$ of total

$\frac{4}{5}$ of total = \$84 + 1U → \$84 + $\frac{1}{10}$ of total

$(\frac{8}{10} - \frac{1}{10})$ of total = \$84

$\frac{7}{10}$ of total = \$84

$\frac{1}{10}$ of total = \$84 ÷ 7
= \$12

Total = \$12 × 10
= \$120

9. Volume = 5u × 3u × 3u
= 1215 cm³
1u × 1u × 1u = 1215 ÷ 45 = 27 cm³
1u = 3 cm
Area of base = 3 unit × 3 unit
= (3 × 3) × (3 × 3)
= 9 × 9
= 81 cm²

10.

John	=	1u	×2 =	2u
Sister	=	4u	=	8u
Difference	=	3u	×2	6u

In 14 yrs time,

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

Increase each = 7u = 14 years
1u = 2 years
John is now = 2 × 2 years
= 4 years old

11. $S_1 : S_2$ = 10 : 12 = 5 : 6
$T_1 : T_2$ = 6 : 5
11u = 55 min
1u = 5 min
T_1 (home to nearby park), 6u = 6 × 5
= 30 min

12.
100% → 40% wife
100% → 60% himself (remainder)
Increase
130% → wife $\frac{40}{100} \times 130\% = 52\%$
130% → himself 130% – 52% = 78%

Increase (wife), 12% of total → \$360
1% of total → \$30
Income before, 100% of total → 100 × \$30 = \$3000

13.
Total → 30% of total + 40% jewellery box
Total → 70% of total – \$40 → 50% remainder + \$10 CD
70% of total – \$40 → 50% remainder – \$10 left (\$54)

50% remainder → \$54 + \$10 = \$64
Remainder → \$64 × 2 = \$128
70% of total – \$40 → \$128
70% of total → \$168
10% of total → \$24
100% of total → \$24 × 10 = \$240

14. (a) P = 1 small circle + 1 big semicircle + 24 cm
$= 2\pi(6) + \pi(12) + 24$
= 99 cm
(b) Area = square – small circle – big semicircle
$= (24 \times 24) - \pi(6)^2 - \frac{\pi(12)^2}{2}$
= 237 cm²

15.

	Elias	:	Roy	
	(30%) 3u	:	10U (100%)	
×5	+50		+25	×4
×5	(80%) 4p	:	5p (100%)	×4

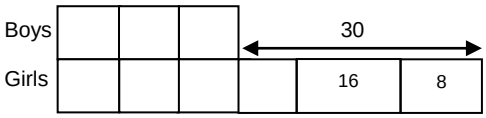
Elias	15u	250
Roy	40u	100

25u = 150
1u = 150 ÷ 25
= 6
Elias at first, 3u = 3 × 6
= 18

16.

<u>At first</u>

<u>In the end</u>



1u = 30 − 16 − 8
= 6

Number of boys at first = 6 × 3 + 12
= 18 + 12
= 30

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17 (a) Total unshaded in Figure 10= 10 × 11
= 110

(b) Total unshaded in Figure 50= 50 × 51
= 2550

(c) (Figure No.) × (Figure No. + 1) = 600
24 × 25 = 600
Therefore <u>Figure 24</u>.

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