Mathematics Companion

ANSWER BOOK

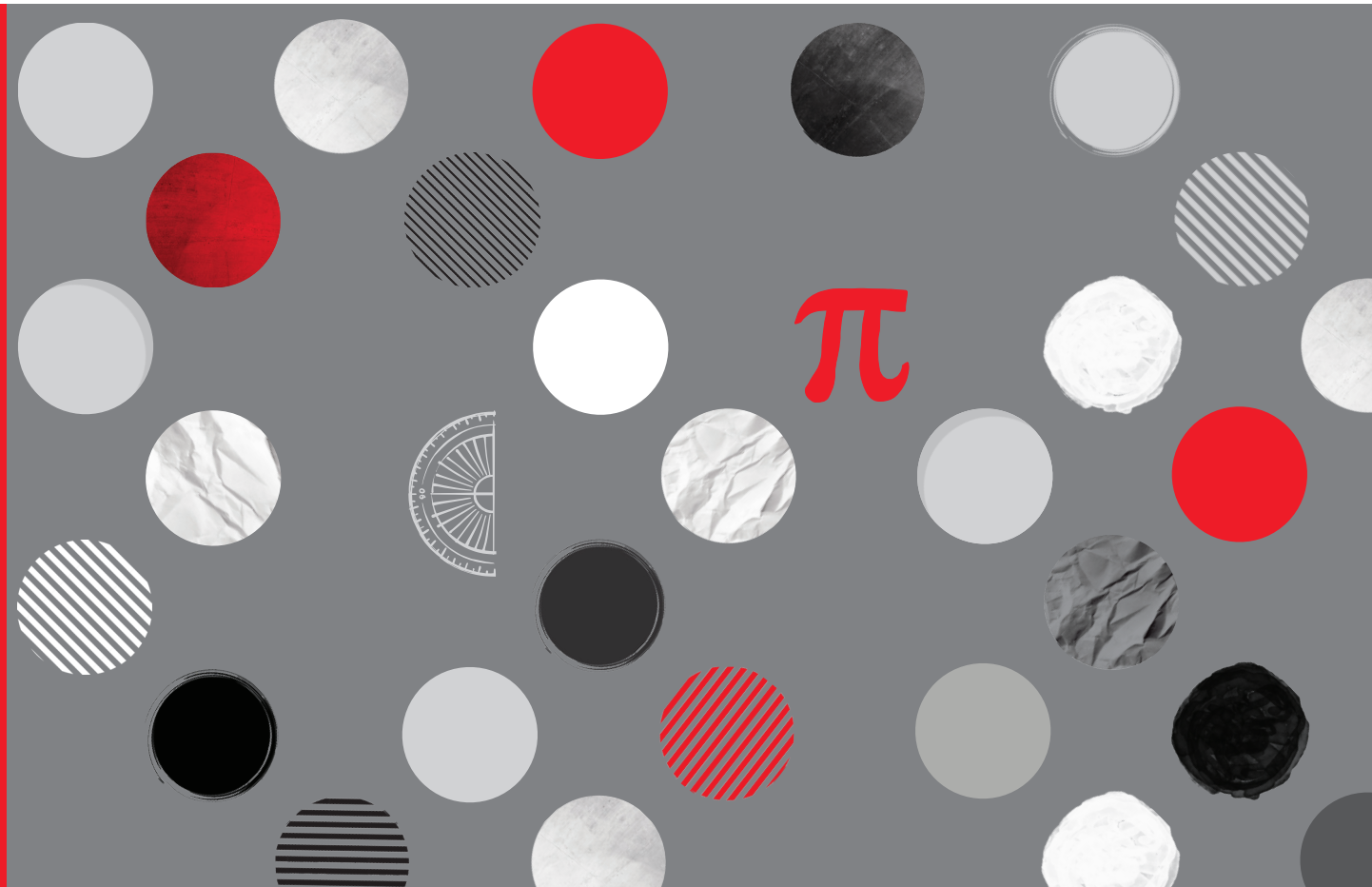
Marilyn Buchanan, *et al.*

GRADE

8

CAPS

All Terms



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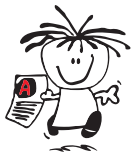

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CONTENTS: TERM-BY-TERM

WORKBOOK 1

TERM 1

TERM 2

WORKBOOK 2

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TERM 4

2.11 $12 + (8 - 4)$

$= \mathbf{12 + 4}$

$= \mathbf{16}$

2.12 $12 - (4 + 8)$

$= \mathbf{12 - 12}$

$= \mathbf{0}$

2.13 $2 \times (3 + 1)$

$= \mathbf{2 \times 4}$

$= \mathbf{8}$

2.14 $2 \times 3 + 2 \times 1$

$= \mathbf{6 + 2}$

$= \mathbf{8}$

2.15 $3 \times (2 + 5)$

$= \mathbf{3 \times 7}$

$= \mathbf{21}$

2.16 $3 \times 2 + 3 \times 5$

$= \mathbf{6 + 15}$

$= \mathbf{21}$

2.17 $5 \times (4 - 2)$

$= \mathbf{5 \times 2}$

$= \mathbf{10}$

2.18 $5 \times 4 - 5 \times 2$

$= \mathbf{20 - 10}$

$= \mathbf{10}$

2.19 $7 \times (3 - 1)$

$= \mathbf{7 \times 2}$

$= \mathbf{14}$

2.20 $7 \times 3 - 7 \times 1$

$= \mathbf{21 - 7}$

$= \mathbf{14}$

EXERCISE 1.1.3

1.1 $7 \times (5 - 4)$

$= \mathbf{7 \times 1}$

$= \mathbf{7}$

1.2 $(6 - 5) \times 3$

$= \mathbf{1 \times 3}$

$= \mathbf{3}$

1.3 $4 \div (12 - 11)$

$= \mathbf{4 \div 1}$

$= \mathbf{4}$

1.4 $8 + 4 + 0$

$= \mathbf{12 + 0}$

$= \mathbf{12}$

1.5 $7 - (5 - 5)$

$= \mathbf{7 - 0}$

$= \mathbf{7}$

1.6 $54 \times (76 - 76)$

$= \mathbf{54 \times 0}$

$= \mathbf{0}$

1.7 $(12 - 12) \times 8$

$= \mathbf{0 \times 8}$

$= \mathbf{0}$

1.8 $(12 - 12) \div 8$

$= \mathbf{0 \div 8}$

$= \mathbf{0}$

1.9 $(25 - 15) \div 0$

$= \mathbf{10 \div 0}$

$= \mathbf{undefined}$

1.10 $(7 - 6) \div (5 - 5)$

$= \mathbf{1 \div 0}$

$= \mathbf{undefined}$

3.7 $2\frac{1}{4} \div 1\frac{1}{2} - \frac{1}{2}$

(2 terms)

$= \frac{9}{4} \div \frac{3}{2} - \frac{1}{2}$

$= \frac{{}^{3}\cancel{9}}{{}_{2}\cancel{4}} \times \frac{\cancel{2}^{1}}{\cancel{3}_{1}} - \frac{1}{2}$

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

$= \frac{2}{2}$

$= 1$

3.8 $2\frac{1}{6} + 1\frac{1}{2} \times 1\frac{2}{3} - 4\frac{1}{3}$

(3 terms)

$= \frac{13}{6} + \frac{\cancel{3}}{2} \times \frac{5}{\cancel{3}} - \frac{13}{3}$

$= \frac{13 + 15 - 26}{6}$

$= \frac{2}{6}$

$= \frac{1}{3}$

3.9 $1\frac{1}{3} - 1\frac{1}{2} \div 1\frac{1}{3} \times \frac{2}{3}$

(2 terms)

$= \frac{4}{3} - \frac{3}{2} \div \frac{4}{3} \times \frac{2}{3}$

$= \frac{4}{3} - \frac{3}{2} \times \frac{{}^{1}\cancel{3}}{{}_{2}\cancel{4}} \times \frac{\cancel{2}^{1}}{\cancel{3}_{1}}$

$= \frac{4}{3} - \frac{3}{4}$

$= \frac{16 - 9}{12}$

$= \frac{7}{12}$

3.10 $2\frac{1}{4} + 3\frac{1}{2} \div 1\frac{1}{2} - 5\frac{1}{12}$

(3 terms)

$= \frac{9}{4} + \frac{7}{2} \div \frac{3}{2} - \frac{61}{12}$

$= \frac{9}{4} + \frac{7}{2} \times \frac{2}{3} - \frac{61}{12}$

$= \frac{9}{4} + \frac{14}{6} - \frac{61}{12}$

$= \frac{27 + 28 - 61}{12}$

$= \frac{-6}{12}$

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

SQUARES, CUBES AND ROOTS OF COMMON FRACTIONS

EXERCISE 1.4.3

1.1 $11\frac{1}{9} \times \left(\frac{3}{10}\right)^2$

$= \frac{{}^{1}\cancel{100}}{{}_{1}\cancel{9}} \times \frac{\cancel{9}^{1}}{\cancel{100}_{1}}$

$= 1$

1.2 $\left(\frac{2}{3}\right)^2 \div 4\frac{1}{2}$

$= \frac{4}{9} \div \frac{9}{2}$

$= \frac{4}{9} \times \frac{2}{9} = \frac{8}{81}$

1.3 $\left(1\frac{2}{3}\right)^2 \div 5\frac{5}{9}$

$= \left(\frac{5}{3}\right)^2 \div \frac{50}{9}$

$= \frac{{}^{1}\cancel{25}}{{}_{1}\cancel{9}} \times \frac{\cancel{9}^{1}}{\cancel{50}_{2}}$

$= \frac{1}{2}$

1.4 $\left(1\frac{2}{3}\right)^2 \div 2\left(1\frac{2}{3}\right)^2$

$= \left(\frac{5}{3}\right)^2 \div 2\left(\frac{5}{3}\right)^2$

$= \frac{25}{9} \div 2\left(\frac{25}{9}\right)$

$= \frac{{}^{1}\cancel{25}}{{}_{1}\cancel{9}} \times \frac{\cancel{9}^{1}}{\cancel{50}_{2}}$

$= \frac{1}{2}$

2.1 $\frac{\sqrt{4}}{3} \times \frac{\sqrt{9}}{2}$

$= \frac{{}^{1}\cancel{2}}{{}_{1}\cancel{3}} \times \frac{\cancel{3}^{1}}{\cancel{2}_{1}}$

$= 1$

2.2 $\frac{\sqrt{16}}{\sqrt{9}} \times \frac{\sqrt{81}}{\sqrt{36}}$

$= \frac{{}^{2}\cancel{4}}{{}_{1}\cancel{3}} \times \frac{\cancel{9}^{3}{}^{1}}{\cancel{6}_{3}{}_{1}}$

$= 2$

QUESTION 3

3.1 $2 + (-5)$

$= \mathbf{2 - 5}$

$= \mathbf{-3}$ (1)

3.2 $2 - (-5)$

$= \mathbf{2 + 5}$

$= \mathbf{7}$ (1)

3.3 $-2 - (-5)$

$= \mathbf{-2 + 5}$

$= \mathbf{3}$ (2)

3.4 $-2 \times 3 + 8 - 1$

$= \mathbf{-6 + 8 - 1}$

$= \mathbf{1}$ (2)

3.5 $(2 - 5)(1 - 3) + 2(-3)$

$= \mathbf{(-3)(-2) + 2(-3)}$

$= \mathbf{6 - 6}$

$= \mathbf{0}$ (3)

3.6 $-2 \times 5 + 9 - 3 \times 1 + 4$

$= \mathbf{-10 + 9 - 3 + 4}$

$= \mathbf{0}$ (3)

3.7 $\dfrac{-2 + 3 \times (-4)}{-5 - 2}$

$= \dfrac{\mathbf{-2 - 12}}{\mathbf{-5 - 2}}$

$= \dfrac{\mathbf{-14}}{\mathbf{-7}}$

$= \mathbf{2}$ (3)

3.8 $\dfrac{5 - (-7)}{-5 - (-7)}$

$= \dfrac{\mathbf{5 + 7}}{\mathbf{-5 + 7}}$

$= \dfrac{\mathbf{12}}{\mathbf{2}}$

$= \mathbf{6}$ (4)

3.9 $\dfrac{-6 - 2(-3)}{4 - 2(-2)}$

$= \dfrac{\mathbf{-6 + 6}}{\mathbf{4 + 4}}$

$= \dfrac{\mathbf{0}}{\mathbf{8}}$

$= \mathbf{0}$ (3)

3.10 $\dfrac{6 - 1}{3 - 3}$

$= \dfrac{\mathbf{5}}{\mathbf{0}}$

$=$ **undefined** (4)

3.11 $-\frac{2}{3} - \left(\frac{-5}{6}\right) + \frac{1}{2} - \left(\frac{-1}{-6}\right)$

$= \dfrac{\mathbf{-2}}{\mathbf{3}} + \dfrac{\mathbf{5}}{\mathbf{6}} + \dfrac{\mathbf{1}}{\mathbf{2}} - \dfrac{\mathbf{1}}{\mathbf{6}}$

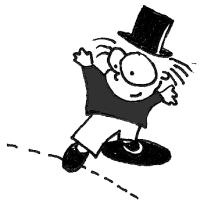
$= \dfrac{\mathbf{-4 + 5 + 3 - 1}}{\mathbf{6}}$

$= \dfrac{\mathbf{3}}{\mathbf{6}}$

$= \dfrac{\mathbf{1}}{\mathbf{2}}$ (5)

[29]

TOTAL: [40]



END-OF-UNIT 1.6 TEST

MULTIPLYING INTO A BRACKET (THE DISTRIBUTIVE LAW)

EXERCISE 2.2.4

1.1 $7 \times (a + b)$ **Compared to…** 1.2 $7 \times a + 7 \times b$

$= \mathbf{7 \times (2 + 3)}$ $= \mathbf{7 \times 2 + 7 \times 3}$

$= \mathbf{7 \times 5}$ $= \mathbf{14 + 21}$

$= \mathbf{35}$ $= \mathbf{35}$

1.3 $4(a + b + c)$ **Compared to…** 1.4 $4a + 4b + 4c$

$= \mathbf{4(2 + 3 + 5)}$ $= \mathbf{4(2) + 4(3) + 4(5)}$

$= \mathbf{4(10)}$ $= \mathbf{8 + 12 + 20}$

$= \mathbf{40}$ $= \mathbf{40}$

1.5 $a \times (b + c)$ **Compared to…** 1.6 $a \times b + a \times c$

$= \mathbf{2 \times (3 + 5)}$ $= \mathbf{2 \times 3 + 2 \times 5}$

$= \mathbf{2 \times 8}$ $= \mathbf{6 + 10}$

$= \mathbf{16}$ $= \mathbf{16}$

1.7 $a(b + c + d)$ **Compared to…** 1.8 $ab + ac + ad$

$= \mathbf{2(3 + 5 + 7)}$ $= \mathbf{2(3) + 2(5) + 2(7)}$

$= \mathbf{2(15)}$ $= \mathbf{6 + 10 + 14}$

$= \mathbf{30}$ $= \mathbf{30}$

2.1 $2 \times (a + 1) + 3 \times a - 2$

$= \mathbf{2a + 2 + 3a - 2}$

$= \mathbf{5a}$

2.2 $3(b + 1) + 2b - 3$

$= \mathbf{3b + 3 + 2b - 3}$

$= \mathbf{5b}$

2.3 $3 \times x + 2 \times (x + 3) - 3 \times (x + 3)$

$= \mathbf{3x + 2x + 6 - 3x - 9}$

$= \mathbf{2x - 3}$

2.4 $4y + 3(y+2) - 2(y+3)$

$= \mathbf{4y + 3y + 6 - 2y - 6}$

$= \mathbf{5y}$

2.5 $a \times 3 + 2 \times (a + 3b) - 5 \times a$

$= \mathbf{3a + 2a + 6b - 5a}$

$= \mathbf{6b}$

2.6 $(2 + 3)(a + b) - 5a + b$

$= \mathbf{5(a + b) - 5a + b}$

$= \mathbf{5a + 5b - 5a + b}$

$= \mathbf{6b}$

2.7 $(3+4) \times (x + y) - 7 \times x + y$

$= \mathbf{7(x + y) - 7x + y}$

$= \mathbf{7x + 7y - 7x + y}$

$= \mathbf{8y}$

2.8 $(5 - 2)(3x + 4y) - 3 \times 3(x + y)$

$= \mathbf{3(3x + 4y) - 9(x + y)}$

$= \mathbf{9x + 12y - 9x - 9y}$

$= \mathbf{3y}$

3.1 $6 + 15 \div 3$

$= \mathbf{6 + 5}$

$= \mathbf{11}$

3.2 $(6 + 15) \div 3$

$= \mathbf{21 \div 3}$

$= \mathbf{7}$

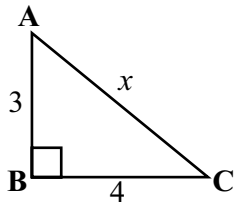
6.1

Section of Journey		Distance	
AC:	AC^2 = **$AB^2 + BC^2$**	∴ AC =	**≈ 214 m**
CD:		CD =	400 m
DF:	DF^2 = **$DE^2 + EF^2$**	∴ DF =	**≈ 2 119 m**
FG:		FG =	250 m
GI:	GI^2 = **$GH^2 + HI^2$**	∴ GI =	**≈ 781 m**
IJ:		IJ =	800 m
JL:	JL^2 = **$JK^2 – LK^2$**	∴ JL =	**≈ 194 m**
LM:		LM =	5 000 m
MO:	MO^2 = **$MN^2 + NO^2$**	∴ MO =	**≈ 583 m**
OP:	OP^2 = **$OQ^2 – PQ^2$**	∴ OP =	**≈ 566 m**
PQ:		PQ =	200 m
QS:	QS^2 = **$QR^2 – SR^2$**	∴ QS =	**9 m**
Total distance (A to S):			**11 116 m**

6.2 Convert your final answer to kilometres and then round it off to the nearest kilometre. **11 116** metres = **11,116** km ≈ **11** km

EXERCISE 3.1.2

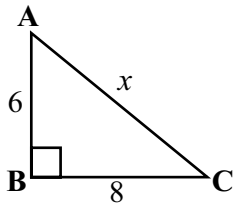
1.1



x **= 5**

Pythag triple (3:4:5)

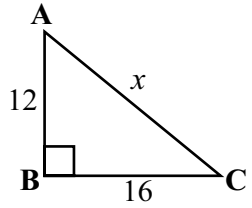
1.2



x **= 10**

Pythag triple (3:4:5)

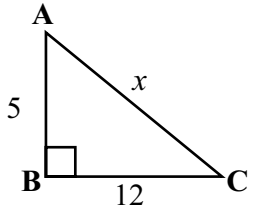
1.3



x **= 20**

Pythag triple (3:4:5)

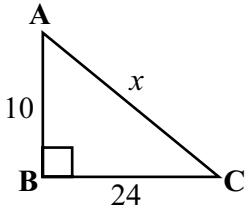
1.4



x **= 13**

Pythag triple (5:12:13)

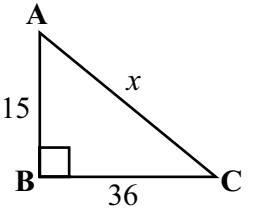
1.5



x **= 26**

Pythag triple (5:12:13)

1.6



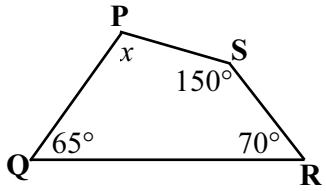
x **= 39**

Pythag triple (5:12:13)

UNIT 3.4
EUCLIDEAN GEOMETRY
PART 3: QUADRILATERALS

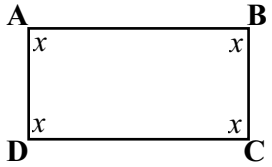
EXERCISE 3.4.1

1.1 $x + 65° + 70° + 150° = 360°$ (∠ of quad PQRS)



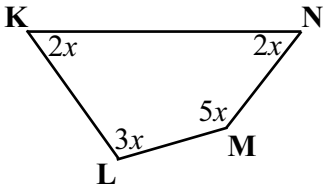
$\therefore x = 75°$

1.2 $4x = 360°$ (∠ of quad ABCD)

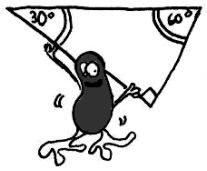


$\therefore x = 90°$

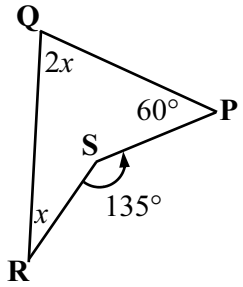
1.3 $12x = 360°$ (∠ of quad KLMN)



$\therefore = 30°$



1.4



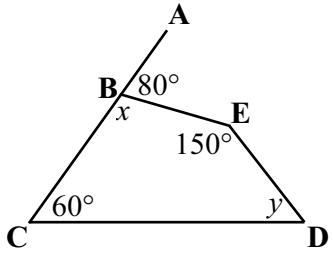
Reflex $R\hat{S}P = 225°$

$3x + 60° + 225° = 360°$ (∠ of quad PQRS)

$\therefore 3x = 75°$

$\therefore x = 25°$

2.1



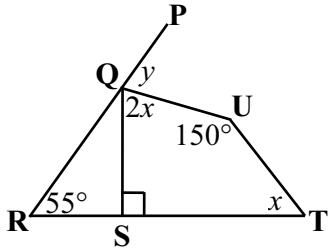
$x = 100°$ (∠'s on straight line ABC)

$y + 100° + 60° + 150° = 360°$

(∠ of quad BCDE)

$\therefore y = 50°$

2.2



$2x + x + 150° + 90° = 360°$

(∠ of quad QUTS)

$3x = 120°$

$\therefore x = 40°$

$\therefore R\hat{Q}S = 35°$ (∠ of ΔQRS)

$y + 2(40°) + 35° = 180°$

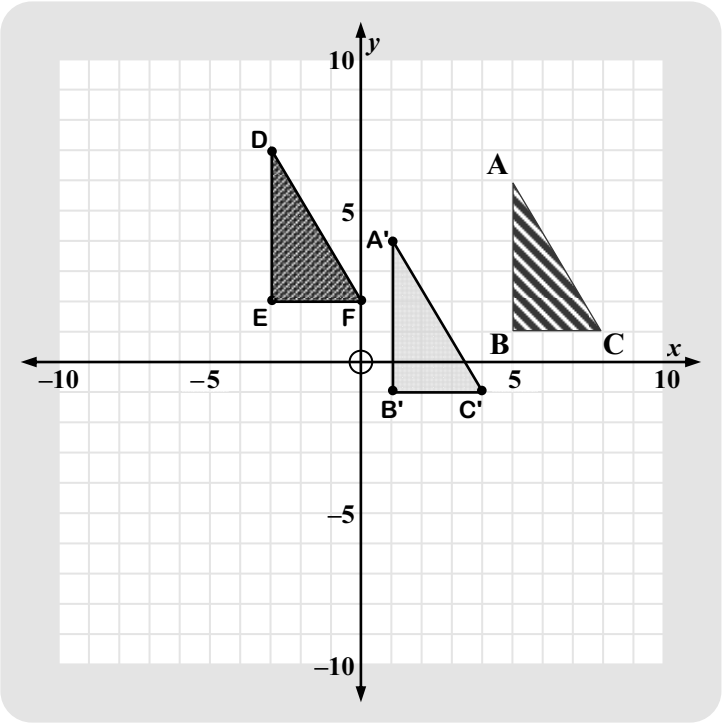
(∠'s on straight line PQR)

$\therefore y = 65°$

END-OF-UNIT 3.7 TEST

40 marks
40 minutes

QUESTION 1



1.1 A (**5**; **6**) B (**5**; **1**) C (**8**; **1**) (3)

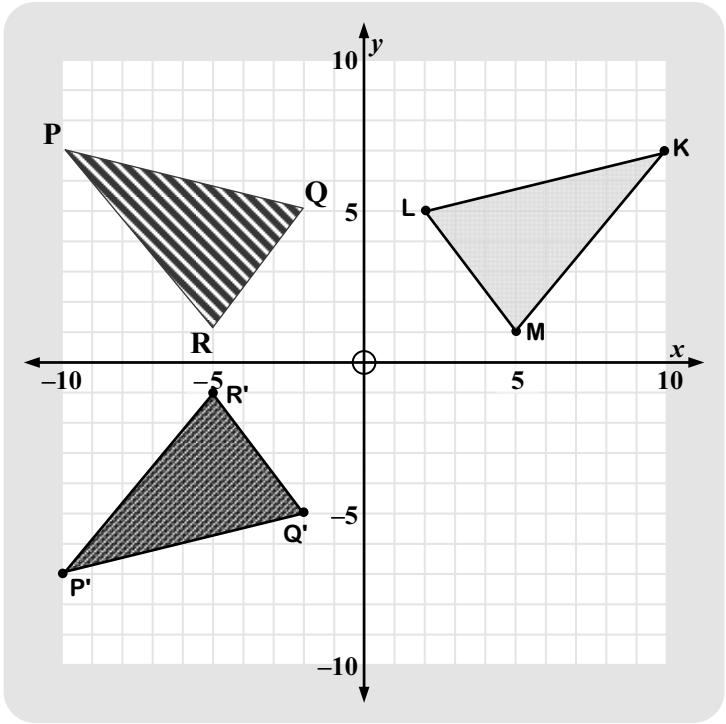
1.2.1 **ΔA′B′C′ on diagram.** (3)

1.2.2 A′ (**1**; **4**) B′ (**1**; **–1**) C′ (**4**; **–1**) (3)

1.3 **ΔDEF on diagram.** (3)

1.4 **Translation 4 units right and 3 units down.** (3)
[15]

QUESTION 2



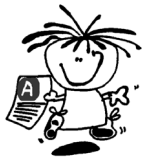
2.1 P (**–10**; **7**) Q (**–2**; **5**) R (**–5**; **1**) (3)

2.2.1 **ΔP′Q′R′ on diagram.** (3)

2.2.2 P′(**–10**; **–7**)

2.3.1 **ΔKLM on diagram.** (3)

2.3.2 M(**5**; **1**) (2)
[13]



UNIT 2.5
FORMAL ALGEBRA PART 4: GRAPHS

INTERPRETATION OF GLOBAL GRAPHS

EXERCISE 2.5.1

1.1.1 P (Q) R

1.1.2 P Q (R)

1.2.1 K (L) M

1.2.2 (K) L M

1.3.1 **Y** and **Z**

1.3.2 **X** and **Y**

2.1 A (B) C

2.2 (A) B C

3.1.1 **True** 3.1.2 **False** 3.1.3 **True**

3.2.1 **True** 3.2.2 **True** 3.2.3 **False**

3.3.1 **True** 3.3.2 **False** 3.3.3 **True**

3.4 **No**

EXERCISE 2.5.2

1.1

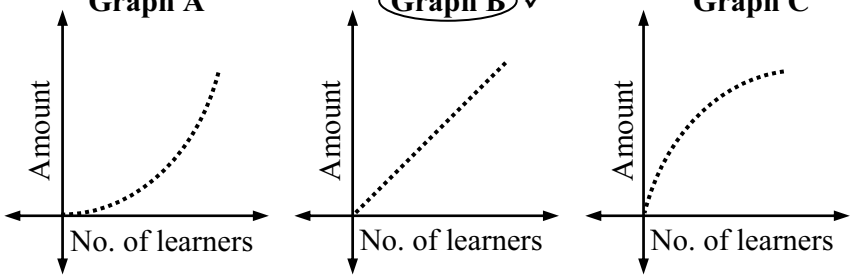
Donation per learner	Number of learners	Amount raised	Paired values
20	1	20	(1 ; 20)
20	2	40	(**2** : **40**)
20	3	**60**	(**3** : **60**)
20	4	**80**	(**4** : **80**)
20	5	**100**	(**5** : **100**)
20	10	**200**	(**10** ; **200**)
20	15	**300**	(**15** : **300**)
20	20	**400**	(**20** : **400**)
20	25	**500**	(**25** : **500**)
20	30	**600**	(**30** ; **600**)
20	40	**800**	(**40** : **800**)
20	50	**1 000**	(**50** : **1 000**)
20	100	**2 000**	(**100** ; **2 000**)
20	200	**4 000**	(**200** ; **4 000**)

1.2 **Yes**

1.3 Amount raised = **20 × Number of learners**

1.4 **Points**
The number of learners can only be whole numbers

1.5 **Graph A** **Graph B** ✓ **Graph C**



1.6 **No**
In reality we won't have 7,5 learners

4.1 **H and T are on different coins:**

HT → 1st coin HEADS, 2nd coin TAILS

TH → 1st coin TAILS, 2nd coin HEADS

4.2 **4**

4.3 $\frac{1}{4}$ = **0,25** = **25%**

4.4 $\frac{2}{4}$ = **0,5** = **50%**

4.5 $\frac{3}{4}$ = **0,75** = **75%**

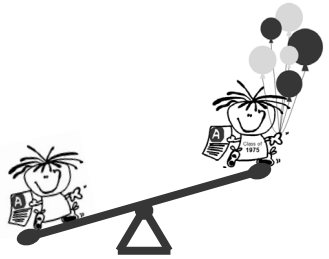
4.6 $\frac{2}{4}$ = **0,5** = **50%**

5.1 **12**

5.2.1 P(H and 6) = $\frac{1}{12}$

5.2.2 P(H and E) = $\frac{3}{12} = \frac{1}{4}$

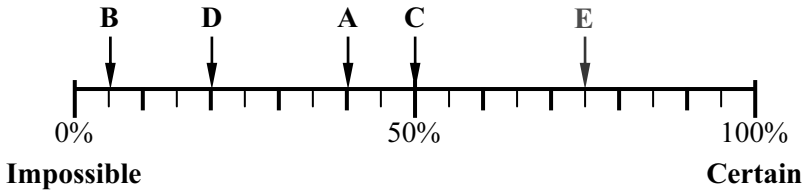
5.2.3 P(T and A) = $\frac{3}{12} = \frac{1}{4}$



END-OF-UNIT 5.2 TEST

40 marks
40 minutes

QUESTION 1



[4]

QUESTION 2

	Probability	Description		Description options
2.1	1	**Definite**		*No chance*
2.2	0	**No chance**		*Unlikely*
2.3	0,64	**More likely than not**		*Definite*
2.4	$\frac{3}{20}$	**Unlikely**		*Equally likely as not*
2.5	50%	**Equally likely as not**		*More likely than not*

[5]

3.7 $5y^0 \times (5y)^0$

$= \mathbf{5 \times 1}$

$= \mathbf{5}$

3.8 $(y + y^2 + y^3)^0$

$= \mathbf{1}$

3.9 $(3y^3)^0 \div (2y^2)^0$

$= \mathbf{1 \div 1}$

$= \mathbf{1}$

3.10 $(3y^3 \div 2y^2)^0$

$= \mathbf{1}$

4.1 $\frac{x^5}{x^5}$

$= \mathbf{1}$

4.2 $\frac{3x^2}{3x^2}$

$= \mathbf{1}$

4.3 $\frac{y^2+1}{y^2+1}$

$= \mathbf{1}$

4.4 $\frac{y^2.y^3.y^4}{y.y^3.y^5}$

$= \frac{\mathbf{y^9}}{\mathbf{y^9}}$

$= \mathbf{1}$

4.5 $\frac{2a-a}{a}$

$= \frac{\mathbf{a}}{\mathbf{a}}$

$= \mathbf{1}$

4.6 $\frac{a^0-1}{a}$

$= \frac{\mathbf{1-1}}{\mathbf{a}}$

$= \mathbf{0}$

4.7 $\frac{3y+2y+y}{y}$

$= \frac{\mathbf{6y}}{\mathbf{y}}$

$= \mathbf{6}$

4.8 $\frac{x^3+x^3}{x^3}$

$= \frac{\mathbf{2x^3}}{\boldsymbol{x^3}}$

$= \mathbf{2}$

5.1 $\frac{2ab+a}{a}$

$= \frac{\mathbf{2ab}}{\mathbf{a}} + \frac{\mathbf{a}}{\mathbf{a}}$

$= \mathbf{2b + 1}$

5.2 $\frac{x^2y+xy^2}{xy}$

$= \frac{\boldsymbol{x^2y}}{\boldsymbol{xy}} + \frac{\boldsymbol{xy^2}}{\boldsymbol{xy}}$

$= \boldsymbol{x + y}$

5.3 $\frac{x^7+x^3}{x^3}$

$= \frac{\boldsymbol{x^7}}{\boldsymbol{x^3}} + \frac{\boldsymbol{x^3}}{\boldsymbol{x^3}}$

$= \boldsymbol{x^4 + 1}$

5.4 $\frac{y^3+y^2+y}{y}$

$= \mathbf{y^2 + y + 1}$

5.5 $\frac{2m^6-m^5+2m^6-3m^5}{m^3+m^3}$

$= \frac{\mathbf{4m^6 - 4m^5}}{\mathbf{2m^3}}$

$= \mathbf{2m^3 - 2m^2}$

5.6 $\frac{m^6+m^6}{m^3 \times m^3}$

$= \frac{\mathbf{2m^6}}{\mathbf{m^6}}$

$= \mathbf{2}$

2.1 $A = \frac{1}{2} 9 \times 12 = 54\ cm^2$

2.2 $H^2 = \sqrt{9^2 + 12^2} = \sqrt{225}$

$\therefore H = 15\ cm$

2.3 $P = 36\ cm$

2.4.1 $A = \frac{1}{2} 3 \times 4 = 6\ cm^2$

$Factor = 54 \div 6 = 9$

2.4.2 $P = 12\ cm$

$Factor = 36 \div 12 = 3$

3.1 $A = 8^2 = 64\ cm^2$

3.2 $A = 4^2 = 16\ cm^2$ $\quad Factor = 64 \div 16 = 4$

4.1 $P = 4 \times 12 = 48\ cm$

4.2 $P_{small} = 4 \times 4 = 16\ cm = \frac{1}{3} \times$ perimeter of the larger square

4.3 $P_{rectangle} = 2(12 + 6) = 36\ cm = \frac{3}{4} \times$ perimeter of the square

= 75% of the perimeter of the square

4.4 $P_{rectangle} = 2(12 + 4) = 32\ cm = \frac{2}{3} \times$ perimeter of the square

END-OF-UNIT 4.1 TEST

40 marks
40 minutes

QUESTION 1

1.1.1 12,5 metres = **1 250** cm (1)

1.1.2 1,0275 m^2 = **10 275** cm^2 (1)

1.1.3 250 000 mm^2 = **2 500** cm^2 (1)

1.2.1 the perimeter **3** (1)

1.2.2 the area **9** (1)

[5]

QUESTION 2

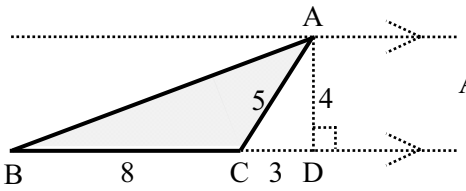
2.1 **d = 226 mm** $\therefore$ **C = πd = π(226) = 710 mm** (3)

2.2 **710 × 50 = 35 500 mm = 35,5 metres** (1)

[4]

QUESTION 3

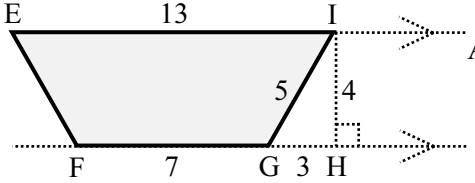
3.1



Area ΔABC = $\frac{1}{2} \times 8 \times 4$

= **16 sq. units** (2)

3.2



Area EFGI = $\frac{1}{2}(13 + 7) \times 4$

= **40 sq. units** (3)