

Surname		Centre Number	Candidate Number
Other Names			0



GCSE
4370/03

Actual C D E F G
59 48 37 26 15

MATHEMATICS – LINEAR

PAPER 1

FOUNDATION TIER

A.M. TUESDAY, 6 November 2012

1 $\frac{3}{4}$ hours

**CALCULATORS ARE
NOT TO BE USED
FOR THIS PAPER**

INSTRUCTIONS TO CANDIDATES

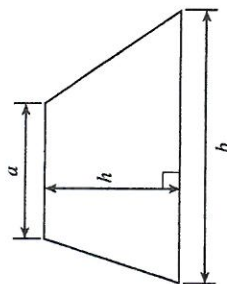
Use black ink or black ball-point pen.
Write your name, centre number and candidate number in the spaces at the top of this page.
Answer all the questions in the spaces provided.
Take π as 3.14.

INFORMATION FOR CANDIDATES

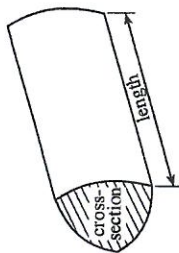
You should give details of your method of solution when appropriate.
Unless stated, diagrams are not drawn to scale.
Scale drawing solutions will not be acceptable where you are asked to calculate.
The number of marks is given in brackets at the end of each question or part-question.
You are reminded that assessment will take into account the quality of written communication (including mathematical communication) used in your answer to question 6.

For Examiner's use only		
Question	Maximum Mark	Mark Awarded
1	9	9
2	9	18
3	4	22
4	9	31
5	6	32
6	7	44
7	4	48
8	4	52
9	8	60
10	6	66
11	6	72
12	5	77
13	9	86
14	7	93
15	3	96
16	4	100
TOTAL MARK		

Handwritten marks: 1370, 610000, and arrows pointing to questions 1-16.



$$\text{Area of trapezium} = \frac{1}{2}(a + b)h$$



$$\text{Volume of prism} = \text{area of cross-section} \times \text{length}$$

1. (a) (i) A car manufacturer sells six thousand, five hundred and eighty three cars. Write down this number in figures.

6583

[1]

- (ii) The weekly sales for a local newspaper is 13 406. Write down this number in words.

Thirteen thousand four hundred and six

[1]

- (b) Add together 85 and 97.

$$\begin{array}{r} 85 \\ + 97 \\ \hline 182 \end{array}$$

[1]

- (c) Find $428 - 119$.

$$\begin{array}{r} 428 \\ - 119 \\ \hline 309 \end{array}$$

[1]

- (d) Write down a multiple of 8 that is between 70 and 79.

72

[1]

- (e) Write 8736

- (i) correct to the nearest 10,

8740

- (ii) correct to the nearest 100.

8700

[1]

- (f) Write down all the factors of 16.

1, 16
2, 8
4

[2]

2. (a) Write down the value of the 8 in the number 18 623.

8000

[1]

- (b) Write down a square number that is less than 100 and has a tens digit of 8.

81

[1]

- (c) Tom has a £10 note and a £5 note. He buys 10 packs of cards and has £1 left over. What is the cost of 1 pack of cards?

cost = £14 for 10 packs

$$14 \div 10 = £1.40$$

[3]

- (d) What percentage of the discs are black?



$\frac{4}{10}$ black = 25%

[1]

- (e) Showing all your working, find an estimate for the value of 74.6×99.7 .

$$75 \times 100 = 7500$$

[1]

- (f) Write down the smallest prime number that is greater than 20.

23

[1]

3. The formula for the profit (in £) made by selling printers is

$$\text{profit} = \text{number sold} \times 24 - \text{outlay}$$

(a) Find the profit when the number sold is 20 and the outlay is £150.

$$\begin{aligned} \text{profit} &= 20 \times 24 - 150 \\ &= 480 - 150 \\ &= £330 \end{aligned}$$

[2]

(b) On another occasion, a profit of £180 is made when the number sold is 10. Find the outlay.

$$\begin{aligned} 180 &= 10 \times 24 - \text{out} \\ 180 &= 240 - \text{out} \end{aligned}$$

$$\text{outlay} = £60$$

[2]

Examiner only

M1

A1

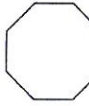
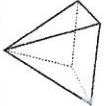
M1

A1

4370-03

4. (a) Write down the special name of each of the following figures.

[3]

	<u>cone</u>
	<u>octagon</u>
	<u>pyramid</u>

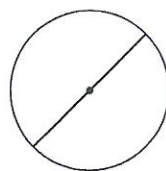
B1

B1

B1

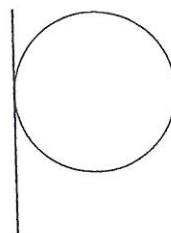
(b) Write down the special name of the straight line shown in each of the following diagrams.

[3]



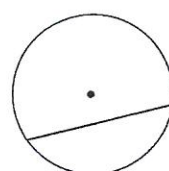
diameter

B1



tangent

B1

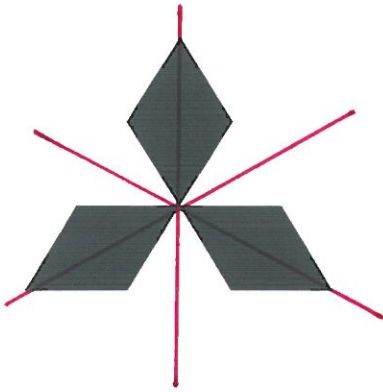


chord

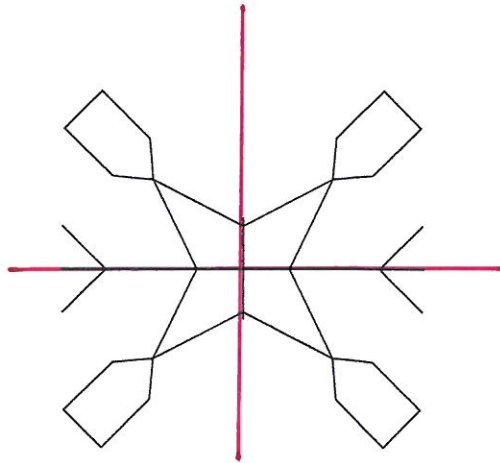
B1

(c) Draw all the lines of symmetry on each of the following patterns.

(i)



(ii)



Examiner only

[3]

B3

4170 010007

Examiner only

5. Three identical rectangles, each 10 cm by 2 cm, are placed to make the shape shown in the diagram.

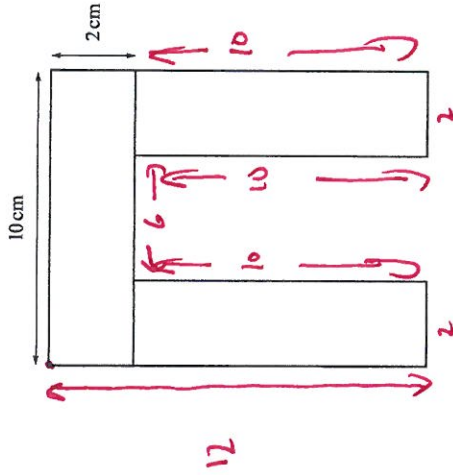


Diagram not drawn to scale

(a) Calculate the perimeter of the shape.

$$12 + 2 + 10 + 6 + 10 + 2 + 12 + 10 = 64 \text{ cm}$$

B1 M1 A1

[3]

(b) Calculate the area of the shape.

Write down the units of your answer.

$$\text{Area of each rectangle: } 10 \times 2 = 20$$

$$\text{So total area: } 3 \times 20 = 60 \text{ cm}^2$$

M1 A1 M1

[3]

6. You will be assessed on the quality of your written communication in this question.

Year 11 pupils have been asked to estimate the cost for each pupil to go to a concert.

There are 98 pupils in Year 11.
A packed lunch for each pupil costs £3.95.
The total cost of tickets to the concert is £915.
The buses cost £290.

ESTIMATE the cost per pupil of the trip, to the nearest pound.
You must show all your working.

For my estimate I'll use
100 pupils, £4 for lunch, £900 for tickets, £300 bus-

Cost per pupil for ticket $900 \div 100 = £9$

Cost per pupil for bus $300 \div 100 = £3$

So cost per pupil = $9 + 3 + £4 = £16$

[7]

7. The following table shows, for five different places,
• the temperatures at midday on 2 different days,
• the change of temperature between the 2 days.
Complete the table.

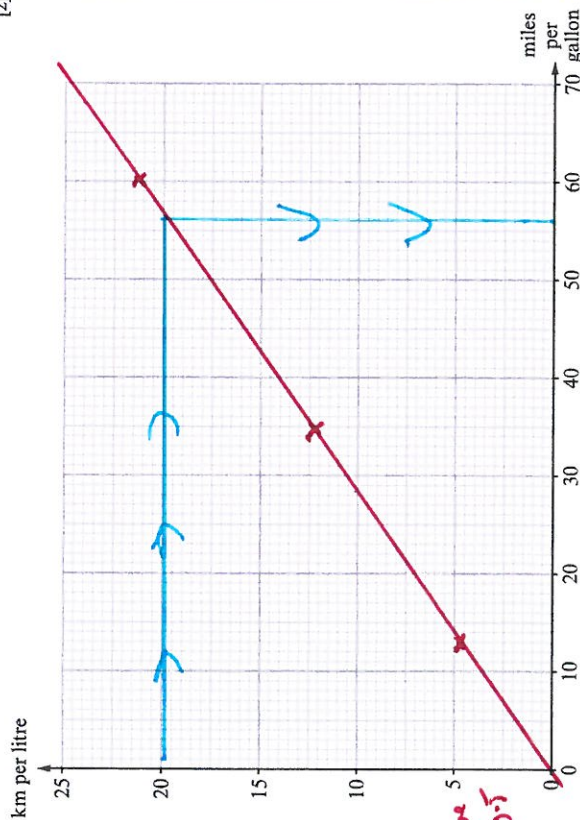
Place	Temperature on day 1	Temperature on day 2	Change in temperature
Bangor	-4	2	up 6
Toronto	3	-2	down 5
Glasgow	-1	-4	down 3
Moscow	-2	-6	down 4
Reykjavik	-7	-5	up 2

[4]

8. (a) The fuel consumption of vehicles can be measured in miles per gallon or in kilometres per litre. The table shows 3 different values for the consumption in miles per gallon and the corresponding 3 values in kilometres per litre.

Miles per gallon	13	35	60
Kilometres per litre	4.6	12.4	21.2

Use the data in the table to draw a conversion graph between miles per gallon and kilometres per litre.



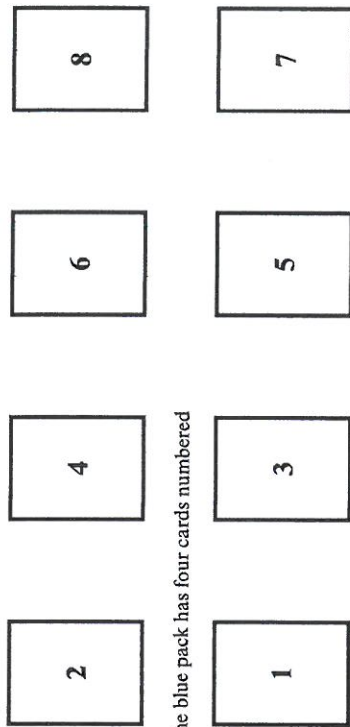
each square $\rightarrow 10 \div 10 = 1$

- (b) Find an estimate, in miles per gallon, for 40 kilometres per litre.

$$20 \text{ km per litre} = 56 \text{ mpg}$$

$$40 \text{ km per litre} = 2 \times 56 =$$

9. There are two packs of cards. One pack is coloured red and the other pack is coloured blue. The red pack has four cards numbered

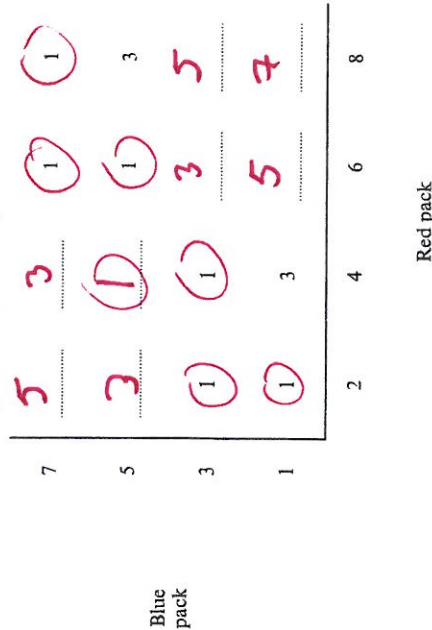


In a game, a player chooses one card at random from the red pack and one card at random from the blue pack. The player's score is the difference between the two numbers.

For example, if the number on the red card is 8 and the number on the blue card is 5, the player works out $8 - 5 = 3$ and the player scores 3.

Similarly, if the number on the red card is 2 and the number on the blue card is 3, the player works out $3 - 2 = 1$ and the player scores 1.

- (a) Complete the following table to show all the possible scores.



[2]

- (b) A player wins a prize by getting a score of 1. It costs 50p to play the game once. The prize for winning the game is 80p. When 320 people play the game once, find the expected profit.

$$\text{probability of winning} = \frac{7}{16}$$

$$\text{No of winners when 320 play} = \frac{7}{16} \times 320$$

$$= 7 \times 20 = 140$$

$$\text{Money in} = 320 \times 0.80 = \pounds 160$$

$$\text{Money out} = 140 \times 0.80 = \pounds 112$$

$$\text{profit } \pounds 48$$

$$\begin{array}{r} 14 \\ \times 8 \\ \hline 112 \\ 3 \end{array}$$

[6]

10. (a) Find the size of the angle marked x .

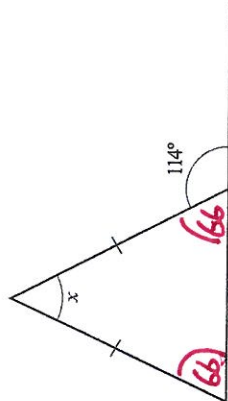


Diagram not drawn to scale

$$\begin{array}{r} 66 \\ + 66 \\ \hline 132 \end{array}$$

$$\begin{array}{r} 180 \\ - 132 \\ \hline 48 \end{array}$$

$$x = 48^\circ$$

[3]

- (b) Find the size of the angle marked y .

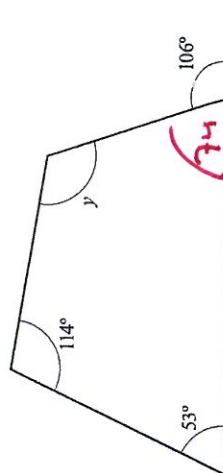


Diagram not drawn to scale

$$\begin{array}{r} 114 \\ + 53 \\ + 74 \\ \hline 241 \end{array}$$

$$\begin{array}{r} 360 \\ - 241 \\ \hline 119 \end{array}$$

$$y = 119^\circ$$

[3]

11. The diagram shows 2 identical rectangles and 2 identical parallelograms. The coordinates of four vertices are shown on the diagram.

Find the coordinates of the vertices marked A, B and C.

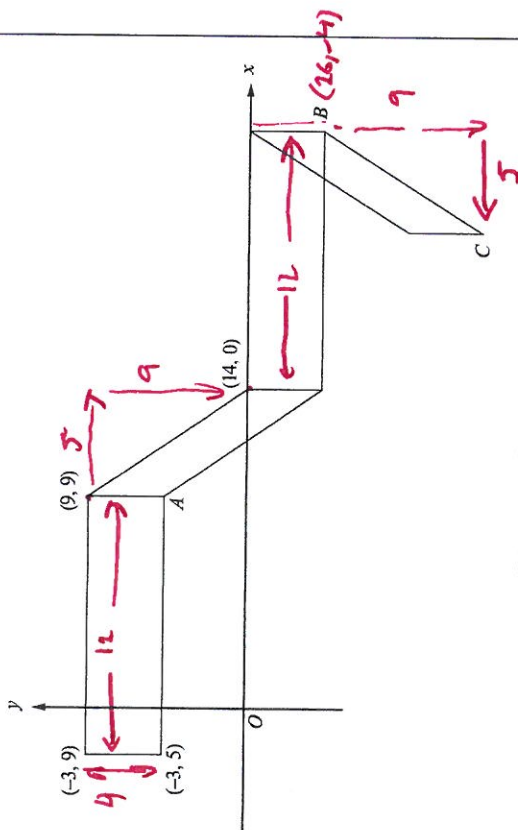
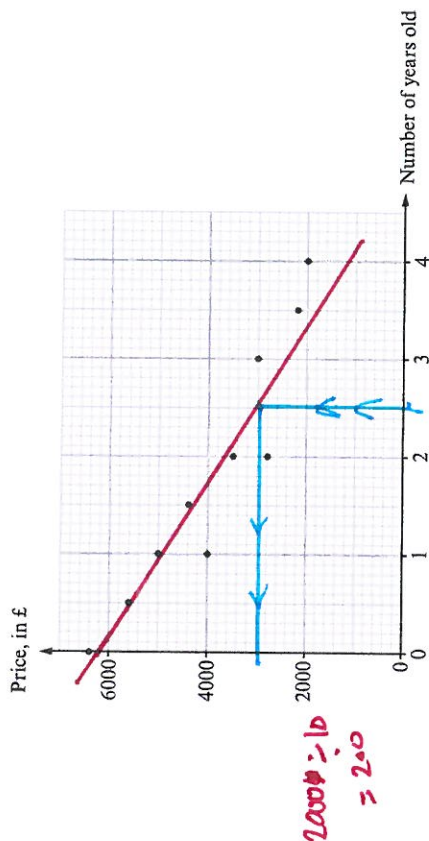


Diagram not drawn to scale

A (9 , 5) B (26 , -4) C (21 , -13) [6]

12. The scatter diagram shows the price and age for each of 10 cars of the same make and model.



- (a) Write down the price of the new car.

£6400

- (b) Write down the price of the oldest car.

£1000

- (c) Draw, by eye, a line of best fit on the scatter diagram.

- (d) Write down the type of correlation shown by the scatter diagram.

negative

- (e) Estimate the price of a $2\frac{1}{2}$ year old car of the same make and model.

£3000

13. (a) Factorise
- $24x + 3$
- .

$$3 \times 8x + 3 \times 1 = 3(8x + 1)$$

[1]

- (b) Factorise
- $x^2 - 6x$
- .

$$x \times x - 6 \times x = x(x - 6)$$

[1]

- (c) Expand
- $2x(x^3 + 6)$
- .

$$2x^4 + 12x$$

[2]

- (d) Solve
- $\frac{x}{3} + 15 = 25$
- .

$$\frac{x}{3} = 25 - 15$$

$$\frac{x}{3} = 10$$

$$x = 10 \times 3 = 30$$

[2]

- (e) Solve
- $5x - 7 = 3(x + 2)$
- .

$$5x - 7 = 3x + 6$$

$$5x - 7 - 3x = 6$$

$$2x - 7 = 6$$

$$2x = 6 + 7$$

$$2x = 13$$

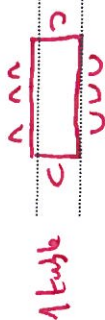
$$x = \frac{13}{2} = 6.5$$

[3]

14. A community hall has a large number of rectangular tables and a large number of chairs. The tables can seat up to 3 people along each of the longer sides and 1 person at each end.

A street party is being organised using the community hall's tables and chairs. Tables are joined and placed in a long straight line. Tables meet edge to edge to form the line.

- (a) What is the least number of tables needed to seat 164 people?



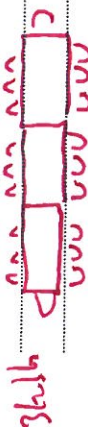
8

1 8



2 14

3 20



164 people, two-end 162 on sides

$$\frac{27}{6} \text{ } 50 \text{ } 27 \text{ tables}$$

[4]

- (b) There are
- n
- people sitting around a straight line of tables.

There are no empty seats.

Write an expression in terms of n for the least number of tables needed to seat these people.

$$(n-2) \div 6$$

[3]

15. Roz and Simon each throw a fair dice. Calculate the probability that the sum of the two numbers obtained is 4.

$\begin{array}{r} 6 \\ 5 \\ 4 \\ 3 \\ 2 \\ 1 \end{array}$

$\textcircled{36}$

$\begin{array}{r} 3+1 \\ 1+3 \\ 2+2 \end{array}$

$\frac{3}{36}$

16. Seven single digit numbers have a median of 6 and a range of 8. The mode of the seven numbers is 3. Find the seven numbers. Write your single digit numbers in order in the boxes.

1	3	3	6	7	8	9
---	---	---	---	---	---	---

PAPER 1 - FOUNDATION TIER

PAPER 1 (Non calculator) Foundation Tier	Marks	FINAL MARK SCHEME Comments
1. (a) (i) 6 583 (ii) thirteen thousand four hundred and six 1. (b) 182 1. (c) 309 1. (d) 72 1. (e) (i) 8740 (ii) 8700 1. (f) 1, 2, 4, 8, 16	B1 B1 B1 B1 B1 B1 B2 9	B1 for any 3 correct factors with at most 1 incorrect number. <u>Allow 1×16, 2×8, 4×4 or repeats in a list.</u>
2. (a) 8 thousand(s) OR 8000 OR thousand(s) 2. (b) 81 2. (c) Tom spends £14 on cards Each pack costs (£)14/10 = (£)1.4(0) OR 140 (p) 2. (d) 25 (%) 2. (e) (74 OR 75 OR 74.6 OR 70 <u>OR 80</u>) × 100 = 7400 OR 7500 OR 7460 OR 7000 <u>OR 8000</u> 2. (f) 23	B1 B1 M1 M1 A1 B1 M1 A1 B1 9	<u>B0 for 1000</u> <u>Accept 9×9 OR 9², but 9 gets B0</u> Allow this M1 only for (£)15/10. <u>Unsupported (£)1.50 gets 0</u> C.A.O. <u>¼ OR .25 get B0.</u> Good estimates F.T their estimates for simple calculations Answers only get M0, A0.
3. (a) Profit = 20 × 24 – 150 = (£) 330 3. (b) Outlay = 10× 24 – 180 = (£) 60	M1 A1 M1 A1 4	Correctly substituted shown by correct attempt to evaluate. <u>Must show that the substitution is 20 × 24 then – 150</u> For correct substitution with subtraction Allow embedded references to the correct answer.
4. (a) cone octagon (square based) pyramid OR <u>rectangular based pyramid</u> 4. (b) diameter tangent chord 4. (c) (i) All 3 lines of symmetry (ii) BOTH lines of symmetry	B1 B1 B1 B1 B1 B1 B2 B1 9	<u>Circular based pyramid gets B0</u> Triangular pyramid gets B0, but pyramid gets B1 B1 any one of them and no incorrect lines OR 2 correct lines and up to 1 incorrect line. B0 if any incorrect lines are drawn
5. (a) Missing side segment = 6 Perimeter = 10+2+10+2+10+6+10+2+10+2 = 64 (cm) 5. (b) Area = 3 × 10 × 2 = 60 cm ²	S1 M1 A1 M1 A1 U1 6	<u>This may be implied by some correct methods</u> Attempt to add all sides of the shape C.A.O. OR equivalent C.A.O. Independent of all other marks. <u>Watch out as the area of the 'gap' is also 60.</u>

PAPER 1 (Non calculator) Foundation Tier	Marks	FINAL MARK SCHEME Comments
6. Finding the costs per pupil of tickets, bus and lunch Cost of ticket per pupil = $915/98 = (\text{OR } 900/100)$ = (£)9 Cost of bus per pupil = $290/98 = (\text{OR } 300/100)$ = (£)3 Total cost per pupil = $£9 + £3 + £3.95 = £15.95$ = (£)16 (to nearest £)	M1 A1 M1 A1 A1	Allow any method that implies estimating <u>Allow unsupported answers in the range 7-11 incl.</u> <u>But if working shown then mark it.</u> Allow any method that implies estimating <u>Allow unsupported answers in the range 2-4 incl.</u> <u>But if working shown then mark it.</u> F.T. if both Ms awarded <u>Must be rounded to the nearest £</u>
<u>OR</u> <u>Finding the TOTAL cost of tickets, bus and lunches /98</u> Total cost of lunches = $(£)3.95 \times 98 = (\text{OR } £4 \times 100)$ = (£)400 Total for the trip = $400 + 915 + 290 = (\text{OR } 400+900+300)$ = (£) 1600 Cost per pupil = $(1605 \text{ OR } 1600)/100$ = (£)16 (to nearest £) <u>NOTE:</u> 98 ~ 100 (£)3.95 ~ (£)4 (£)915 ~ (£) 900 (£)290 ~ (£)300	M1 A1 A1 M1 A1	Allow any method that implies estimating <u>Allow estimated answers</u> F.T. if M awarded Allow any method that implies estimating <u>If no marks then SC1 for any 3 of these estimates</u>
<u>QWC</u> Look for • Spelling • Clarity of text explanations • The use of notation – watch for ‘=’, ‘£’, ‘p’ being used appropriately. QWC2: Candidates will be expected to • present work clearly, with words explaining their processes or steps AND • make few if any mistakes in mathematical form, spelling, punctuation and grammar and include units in their final answer QWC1: Candidates will be expected to • present work clearly, with words explaining their processes or steps OR • make few if any mistakes in mathematical form, spelling, punctuation and grammar and include units in their final answer	QWC 2 7	QWC2 Presents relevant material in a coherent and logical manner, using acceptable mathematical form, and with few if any errors in spelling, punctuation and grammar. QWC1 Presents relevant material in a coherent and logical manner but with some errors in use of mathematical form, spelling, punctuation or grammar. OR Evident weaknesses in organisation of material but using acceptable mathematical form, with few if any errors in spelling, punctuation and grammar. QWC0 Evident weaknesses in organisation of material, and errors in use of mathematical form, spelling, punctuation and grammar.

PAPER 1 (Non calculator) Foundation Tier		Marks	FINAL MARK SCHEME Comments
7. Toronto Glasgow Moscow Reykjavik	down 5 -4 down 4 -7	B1 B1 B1 B1 4	<u>If given as -5 then B0, but allow B1 if Moscow is given as -4</u>
8. (a) Overlay Plots Line		P1 L1	<u>A valid attempt at drawing a line/curve through the points</u>
8. (b) Any correct strategy, e.g. 2 times value at 20 kilometres per litre $56 \times 2 = 112$		M1 A1 4	Any correct method using graph or table. F.T. their graph. Unsupported answers in the range 108 – 116 <u>inclusive</u> get M1, A1.
9. (a) 5 3 (1 1) 3 1 (1 3) (1 1) 3 5 (1 3) 5 7 (b) $\frac{7}{16}$ (of 320) = 140 Cost = $320 \times 50(p)$ OR Prizes = $140 \times 80 (p)$ (£) 160 or 16000 (p) OR (£) 112 or 11200 (p) <u>$320 \times 50(p) - \text{their } 140 \times 80 (p)$</u> = £48 OR 4800p		B2 M1 A1 M1 A1 M1 A1 8	B1 for at least 4 correct entries <u>Negative numbers are errors in this table, but follow through, if needed in part (b)</u> F.T. their table. F.T. 'their 7/16' if a fraction less than 1 Sight of bone fide 140 in later working OR 140/320 gets M1, A1. Accept words '7 out of 16', or '70 out of 160' here. For either method and accuracy for cost OR prizes. F.T. 'their 140' provided it is clearly identifiable. <u>A0 for £16000 OR 160p OR 112p OR £11200</u> F.T. full method (ignore units for the M1). Rounded up or down figure if <u>their 140</u> is not a whole number
10. (a) Base angle = 66 $x = 180 - 66 - 66$ <u>OR 114 - 66</u> = 48 10. (b) $(180 - 106) = 74$ $360 - 114 - 53 - 74$ = 119 (°)		B1 M1 A1 B1 M1 A1 6	<u>$x = 66$ with no working gets B1M0A0</u> F.T. their 180 - 114 For finding 4 th angle. Also look in their diagram. 74 on its own gets this B1, even as $y = 74$ Angle sum of quadrilateral. Note that $180 - 167 + 106$ is equivalent (114 + 53) F.T. 'their 74'
11. A (9, 5) B (26, -4) C (21, -13)		B2 B2 B2 6	B1 for each ordinate B1 for each ordinate B1 for each ordinate. <u>F.T. 'their B + (-5, -9)'</u>

PAPER 1 (Non calculator) Foundation Tier	Marks	FINAL MARK SCHEME Comments
12.(a) (£)6400 (b) (£)2000 (c) Reasonable straight line of best fit (d) Negative (correlation) (e) FT from a line of best fit (reading accurate to small square) (curved line or straight line, not dot-to-dot) H1	B1 B1 B1 B1 B1 5	Some points above and some points below <u>Do not accept from 'corner' to 'corner' of the graph paper</u> OR an answer between (£)2600 and (£)3600 inclusive if no line of best fit.
13. (a) $3(8x + 1)$ (b) $x(x - 6)$ (c) $2x^4 + 12x$ (d) $x/3 = 25 - 15$ $x = 30$ F13 parts (a) to (d) are H4 parts (b) to (e) (e) $5x - 7 = 3x + 6$ $2x = 13$ $x = 6.5$ OR $6\frac{1}{2}$	B1 B1 B2 M1 A1 B1 B1 B1 9	CAO CAO B1 for each term. If B2 penalise further wrong work -1. Or alternate correct first step CAO. Accept embedded answers. <u>Mark final answer.</u> SC1 for $x=120$ from $x/3 = 40$, OR SC1 for 'ladder method' showing $-15, \times 3$ FT until 2 nd error OR $x = 13/2$ Must be simplified <u>SC1 for 'ladder method'</u>
14.(a) Strategy, shorter edges meeting (accept a diagram) (Showing) 6 on longer sides (2 lots of 3) and 1 on each end OR idea end tables seat 7 people and middle table seat 6 people (Number of tables is) $(164 - 2) \div 6$ OR 2 correct trials with equivalent " $\times 6 + 2$ " 27 (tables) (b) $(n - 2) \div 6$ OR $(n - 2)/6$ H5	S1 M1 M1 A1 B3 7	May be implied in later working that this is the arrangement Accept intention, not about notation <u>SC2 for 79 or SC1 for $(164 - 6)/2$</u> <i>Alternative:</i> <i>Any 3 multiples of 6 shown or 3 terms of a sequence going up in 6s, or $164/6$ or $164 \div 6$</i> S1 <i>$27 \times 6 = 162$ OR 27 remainder 2 OR $27.3(3..)$</i> M1 <i>(this implies S1 also)</i> <i>$162 + 2 = 164$ (seen or implied)</i> M1 <i>27 (tables)</i> A1 <i>An answer of 27 from working '27 remainder 2' or '27.3(3..)' must be confirmed in order to award the final M1, A1 (i.e. remainder justified), otherwise SC1 instead</i> <i>An answer of 27 (tables) without working is awarded SC3</i> <i>FT misunderstanding longer edges joined leading to $(n-6) \div 2$</i> <i>B2 for $n-2 \div 6$ or $n - 2/6$ or $-2 \div 6$</i> <i>B1 for -2 or $\div 6$ in an expression</i> <i>or $n = 6 \times \text{tables} + 2$, or $n = 6 \times 2 + 2$</i> <i>B0 for $\times 6 + 2$ or $n \times 6 + 2$</i>
15. Realising could be 2+2, 1+3, 3+1 Realising 36 different outcomes OR sight of $1/6 \times 1/6$ <u>OR product of 2 terms both with denominators of 6 seen</u> OR sight of a denominator of 36 $3/36$ or equivalent H6	B1 B1 B1 3	May be within a sample space diagram, e.g. sight of two-way table with three 4s shown, or the appropriate additions <u>Maybe shown in a sample space diagram with indication of 36, must be stated not implied</u> Ignore incorrect cancelling
16. Middle card 6 Two cards (or three cards) 3 <u>as the mode for their cards</u> First card 1 and last card 9 (or in reverse) <u>Correct answer 1 3 3 6 7 8 9 or in reverse</u> H7	B1 B1 B1 B1 4	<u>If boxes are blank, mark the working</u> <u>Smaller numbers to one side and larger to the other</u> <u>3 is the distinct mode for their cards</u> <u>OR any pair of single digit numbers (including negatives) with a difference of 8</u> <u>CAO</u>