

Centre Number						Candidate Number				
Surname										
Other Names										
Candidate Signature										

For Examiner's Use	
Pages	Mark
3	
4 – 5	
6 – 7	
8 – 9	
10 – 11	
12 – 13	
14 – 15	
16	
TOTAL	



General Certificate of Secondary Education
Higher Tier

Mathematics (Linear) B

4365/1H

Paper 1 Non-calculator

Practice Paper 2012 Specification (Set 2)

H

<p>For this paper you must have:</p> <ul style="list-style-type: none"> mathematical instruments. <p>You must not use a calculator.</p>	
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Time allowed

- 1 hour 30 minutes

Instructions

- Use black ink or black ball-point pen. Draw diagrams in pencil.
- Fill in the boxes at the top of this page.
- Answer **all** questions.
- You must answer the questions in the spaces provided. Do not write outside the box around each page or on blank pages.
- Do all rough work in this book. Cross through any work that you do not want to be marked.

Information

- The marks for questions are shown in brackets.
- The maximum mark for this paper is 70.
- The quality of your written communication is specifically assessed in questions 3 and 17.
These questions are indicated with an asterisk (*).
- You may ask for more answer paper, graph paper and tracing paper.
These must be tagged securely to this answer booklet.

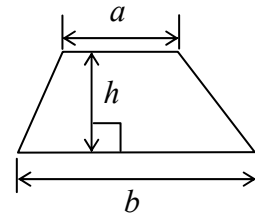
Advice

- In all calculations, show clearly how you work out your answer.

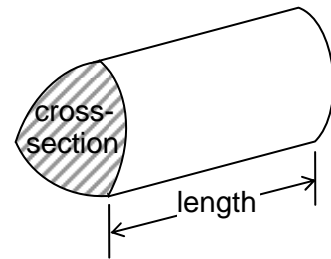
4365/1H

Formulae Sheet: Higher Tier

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

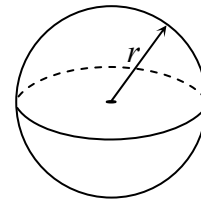


$$\text{Volume of prism} = \text{area of cross-section} \times \text{length}$$



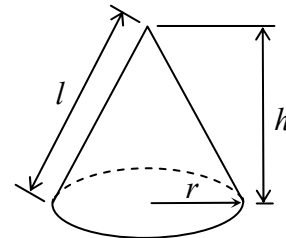
$$\text{Volume of sphere} = \frac{4}{3}\pi r^3$$

$$\text{Surface area of sphere} = 4\pi r^2$$



$$\text{Volume of cone} = \frac{1}{3}\pi r^2 h$$

$$\text{Curved surface area of cone} = \pi r l$$

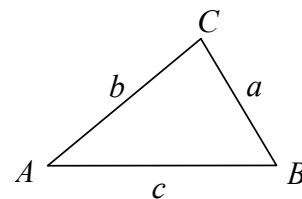


In any triangle ABC

$$\text{Area of triangle} = \frac{1}{2}ab \sin C$$

$$\text{Sine rule} \quad \frac{a}{\sin A} = \frac{b}{\sin B} = \frac{c}{\sin C}$$

$$\text{Cosine rule} \quad a^2 = b^2 + c^2 - 2bc \cos A$$



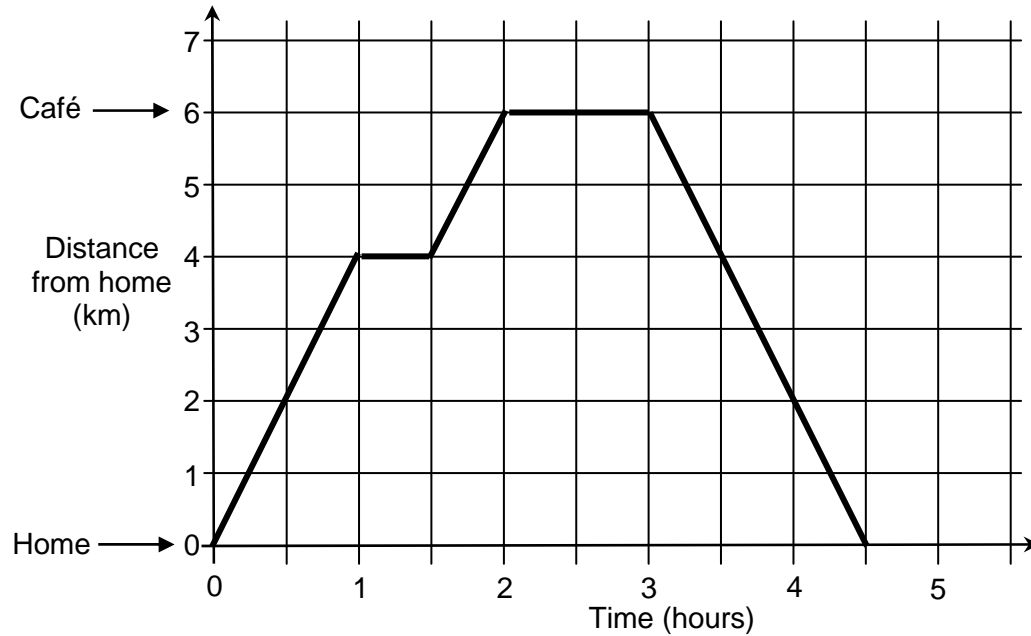
The Quadratic Equation

The solutions of $ax^2 + bx + c = 0$, where $a \neq 0$, are given by

$$x = \frac{-b \pm \sqrt{b^2 - 4ac}}{2a}$$

Answer **all** questions in the spaces provided.

- 1** Mary walks from her home to a café and back.
The distance-time graph shows her walk.



- 1 (a)** How far does Mary walk altogether?

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Answer km (1 mark)

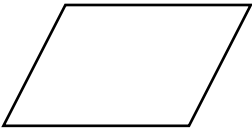
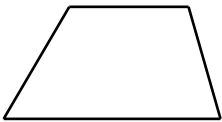
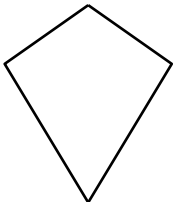
- 1 (b)** Mary sets off at 9 am.
What time does she arrive at the café?

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Answer (1 mark)

- 1 (c)** Work out her average speed on the way back from the café.

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Answer km/h (2 marks)

- 2 (a)** Complete the table showing the properties of some quadrilaterals.
Tick or cross the columns.
The first one has been done for you.

Quadrilateral	Both pairs of opposite angles equal	All sides equal	Diagonals cross at right angles
 Parallelogram	✓	✗	✗
 Trapezium			
 Kite			

(3 marks)

- 2 (b)** Draw or name this quadrilateral.

Quadrilateral	Both pairs of opposite angles equal	All sides equal	Diagonals cross at right angles
	✓	✓	✓

(1 mark)

*3 A raffle has three prizes.

First prize is £40.

Second prize is $\frac{3}{4}$ of the first prize.

Third prize is $\frac{1}{2}$ of the second prize.

Raffle tickets are 50p each.

How many tickets need to be sold to make a profit of £70?

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Answer (5 marks)

4 The average speed of a car is 50 miles per hour (mph).
A journey is 400 kilometres (km).

How long will the journey last?
State any conversions you use.

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Answer hours (3 marks)

- 5** The mode of five numbers is 3.
The median is 7.
The mean is 6.

Work out the five numbers.

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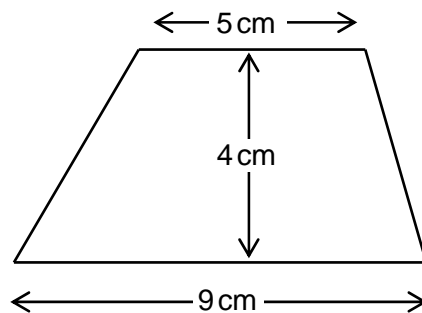
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Answer,,,, (3 marks)

- 6** Work out the area of the trapezium.



Not drawn
accurately

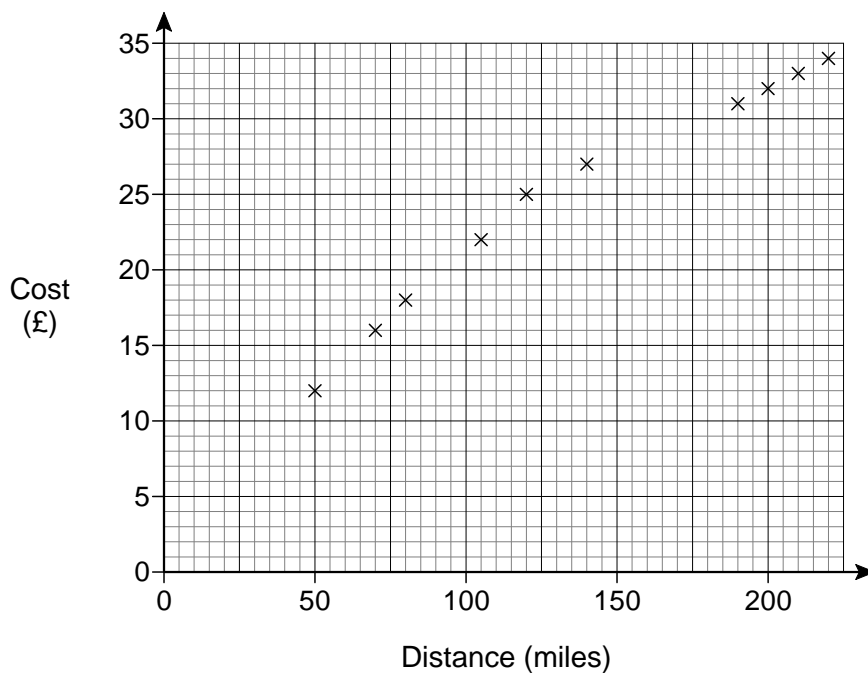
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Answer cm^2 (2 marks)

- 7 The costs and distances for 10 coach journeys are shown on the scatter diagram.



- 7 (a) Draw a line of best fit on the diagram. (1 mark)

- 7 (b) Estimate the cost of a journey of 175 miles.

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Answer £ (1 mark)

- 7 (c) The scatter diagram shows positive correlation.

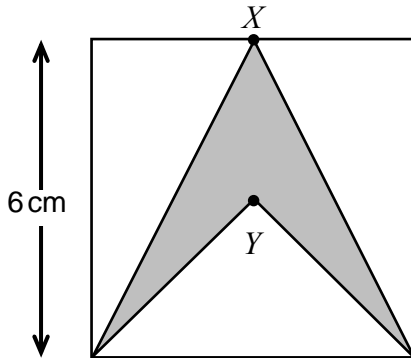
Explain what this means for the relationship between the cost and the distance of a journey.

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(1 mark)

- 8** An arrowhead is drawn inside a square of side 6 cm.
 X is the midpoint of one side.
 Y is the centre of the square.



Not drawn
accurately

Work out the area of the arrowhead.

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Answer cm^2 (3 marks)

- 9 (a)** Work out the highest common factor (HCF) of 30 and 80

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Answer (1 mark)

- 9 (b)** Work out the least common multiple (LCM) of 30 and 80

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Answer (2 marks)

10 Ellie has 3000 songs on her MP3 player.

10 (a) On Monday she listened to 50 songs chosen at random.
15 were rock songs.

Estimate the total number of rock songs on her MP3 player.

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Answer (3 marks)

10 (b) On Tuesday she again listened to 50 songs chosen at random.
10 were rock songs.

Give a reason why the number of rock songs was different each day.

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(1 mark)

11 Make x the subject of $y = 2x + 3$

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Answer (2 marks)

12 (a) Write down the value of

12 (a) (i) 2^0

Answer (1 mark)

12 (a) (ii) 2^{-1}

Answer (1 mark)

12 (b) Work out the value of $2^{-1} + 2^{-2}$

Give your answer as a fraction.

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Answer (2 marks)

13 Draw the region defined by the inequalities

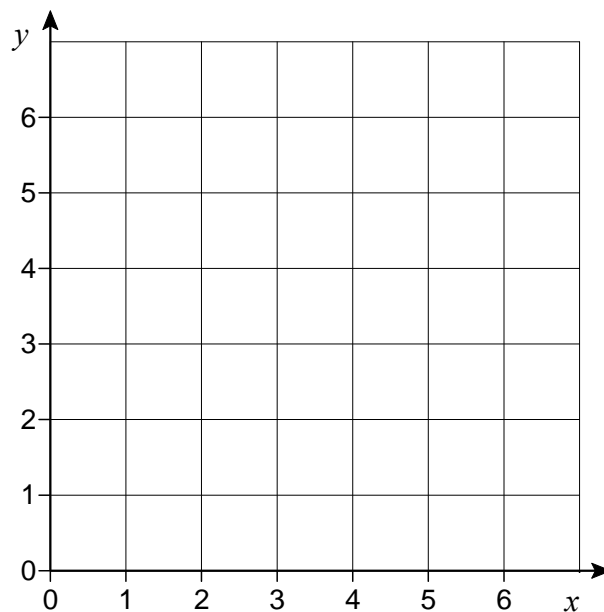
$$\begin{aligned} x &> 1 \\ y &> x \\ x + y &< 6 \end{aligned}$$

Mark the region clearly with an R.

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(3 marks)

14 Solve the equation $\frac{x - 1}{2} + \frac{x + 3}{3} = 1$

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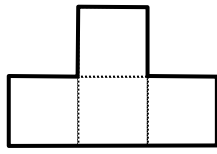
Answer $x = \dots\dots\dots$ (4 marks)

Turn over for the next question

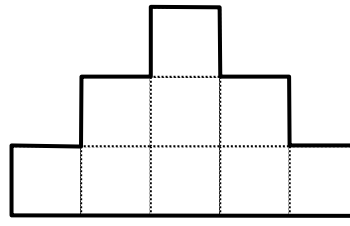
- 15** A sequence of shapes is made from centimetre squares.



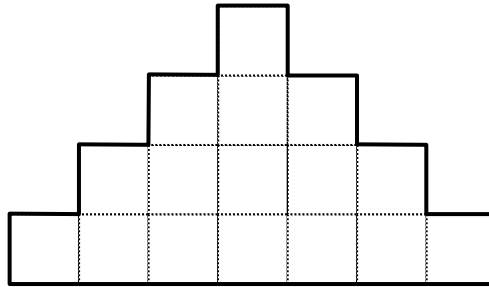
Shape 1



Shape 2



Shape 3



Shape 4

Work out an expression for the perimeter of shape n .

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Answer (3 marks)

- 16** Simplify fully

$$\frac{x^2 - 36}{3x + 18}$$

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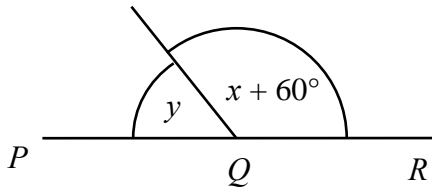
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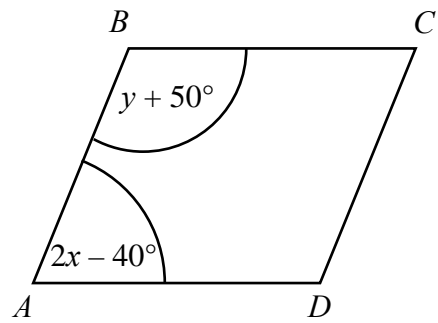
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Answer (3 marks)

- *17 PQR is a straight line.
 $ABCD$ is a parallelogram.



Not drawn
accurately



Use the information in the diagrams to find the values of x and y .

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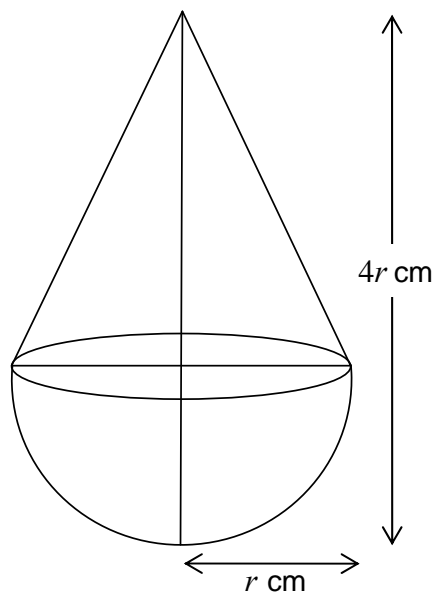
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Answer $x = \dots\dots\dots$ degrees

$y = \dots\dots\dots$ degrees (5 marks)

- 18** A cone and a hemisphere are joined to make a toy as shown.
They both have a radius r cm.
The total height is $4r$ cm.



Not drawn
accurately

The manufacturer works out a formula for the volume of the toy.
Work out this formula.
Give your answer as simply as possible in terms of π .

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Answer cm^3
(4 marks)

- 19** Choose two numbers: for example, 8 and 5
- Subtract the smaller from the larger and square the result: $(8 - 5)^2 = 3^2 = 9$
- Square the numbers and add: $8^2 + 5^2 = 64 + 25 = 89$
- Work out the difference of the two results: $89 - 9 = 80$
- The result is two times the product of the original numbers: $2 \times 5 \times 8 = 80$

Prove this result algebraically.

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(4 marks)

Turn over for the next question

20 A bag contains x apples, $2x$ oranges and 1 banana.

Two items of fruit are selected at random from the bag without replacement.

The probability of selecting an apple followed by an orange is $\frac{5}{23}$

How many apples are in the bag?

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Answer (4 marks)

4

END OF QUESTIONS