

Surname	Centre Number	Candidate Number
Other Names		0



**GCSE**

4370/06



A14-4370-06

**MATHEMATICS – LINEAR  
PAPER 2  
HIGHER TIER**

A.M. MONDAY, 10 November 2014

2 hours

**ADDITIONAL MATERIALS**

A calculator will be required for this paper.  
A ruler, a protractor and a pair of compasses may be required.

**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  $\pi$  as 3.14 or use the  $\pi$  button on your calculator.

**INFORMATION FOR CANDIDATES**

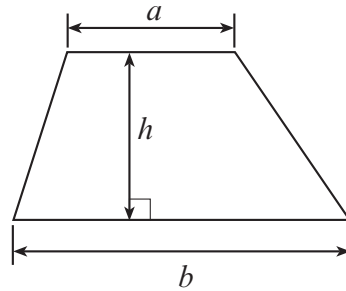
You should give details of your method of solution when appropriate.  
Unless stated, diagrams are not drawn to scale.  
Scale drawing solutions will not be acceptable where you are asked to calculate.  
The number of marks is given in brackets at the end of each question or part-question.  
You are reminded that assessment will take into account the quality of written communication (including mathematical communication) used in your answer to question 3.

For Examiner's use only		
Question	Maximum Mark	Mark Awarded
1.	3	
2.	8	
3.	10	
4.	4	
5.	4	
6.	6	
7.	4	
8.	9	
9.	11	
10.	6	
11.	9	
12.	4	
13.	8	
14.	5	
15.	4	
16.	5	
<b>Total</b>	<b>100</b>	

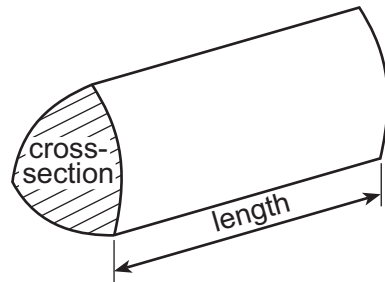
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## Formula List

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

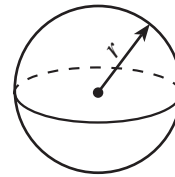


$$\text{Volume of prism} = \text{area of cross-section} \times \text{length}$$



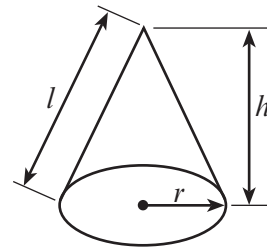
$$\text{Volume of sphere} = \frac{4}{3}\pi r^3$$

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



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

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

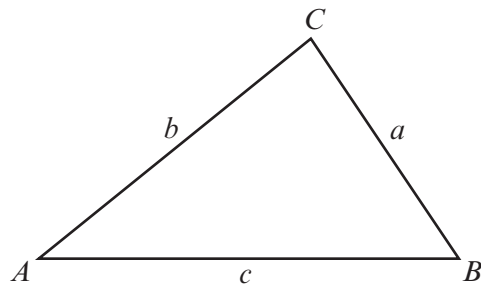


In any triangle  $ABC$

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

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

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



### The Quadratic Equation

The solutions of  $ax^2 + bx + c = 0$

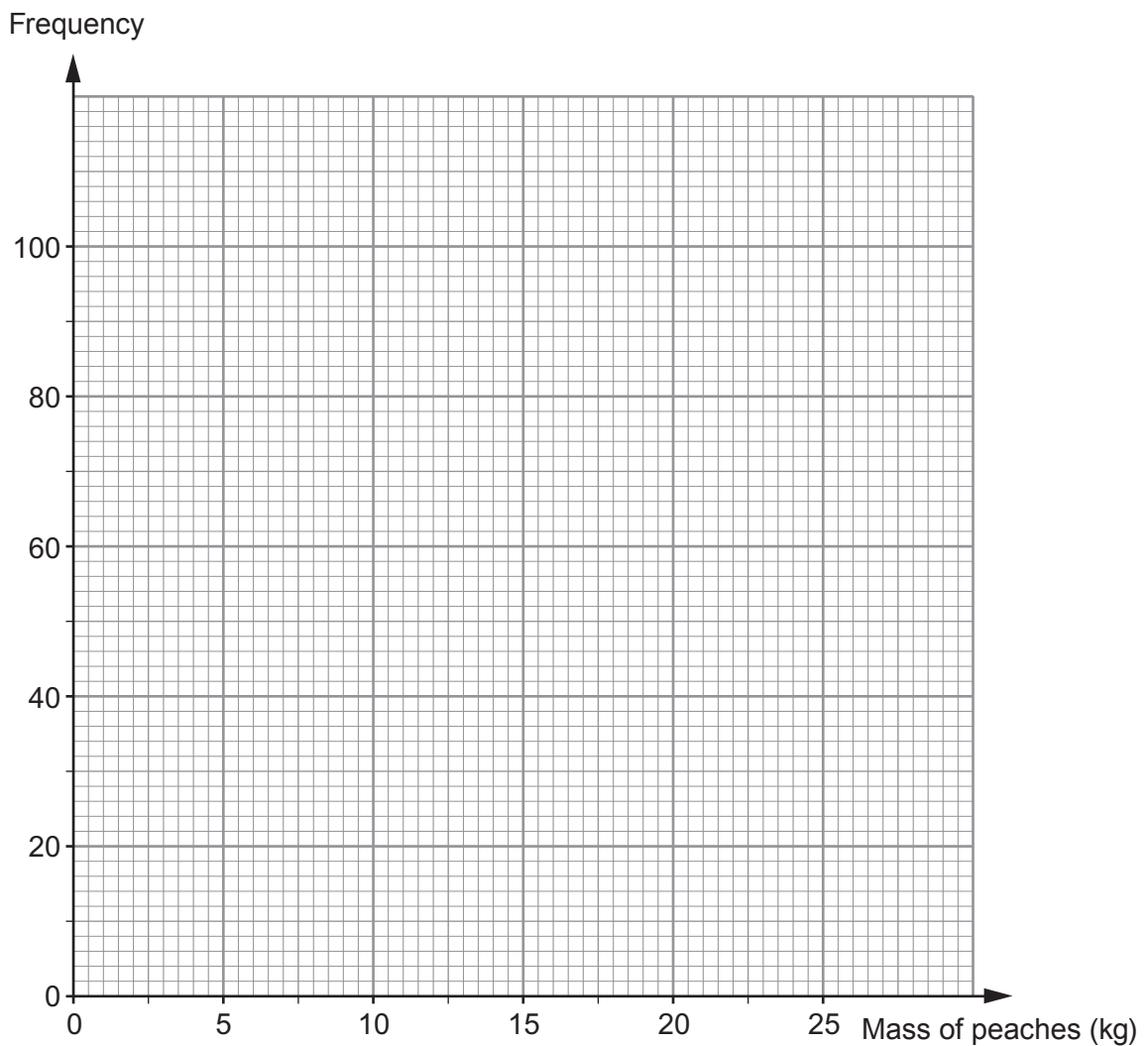
where  $a \neq 0$  are given by

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

1. The total mass of peaches, in kg, produced by each of 200 trees was measured. The table shows the grouped frequency distribution for the masses of peaches from these 200 trees.

Mass of peaches, $x$ kg	$0 < x \leq 5$	$5 < x \leq 10$	$10 < x \leq 15$	$15 < x \leq 20$	$20 < x \leq 25$
Number of trees	4	6	82	76	32

- (a) On the graph paper below, draw a grouped frequency diagram to show this data. [2]



- (b) State which class interval contains the median. [1]

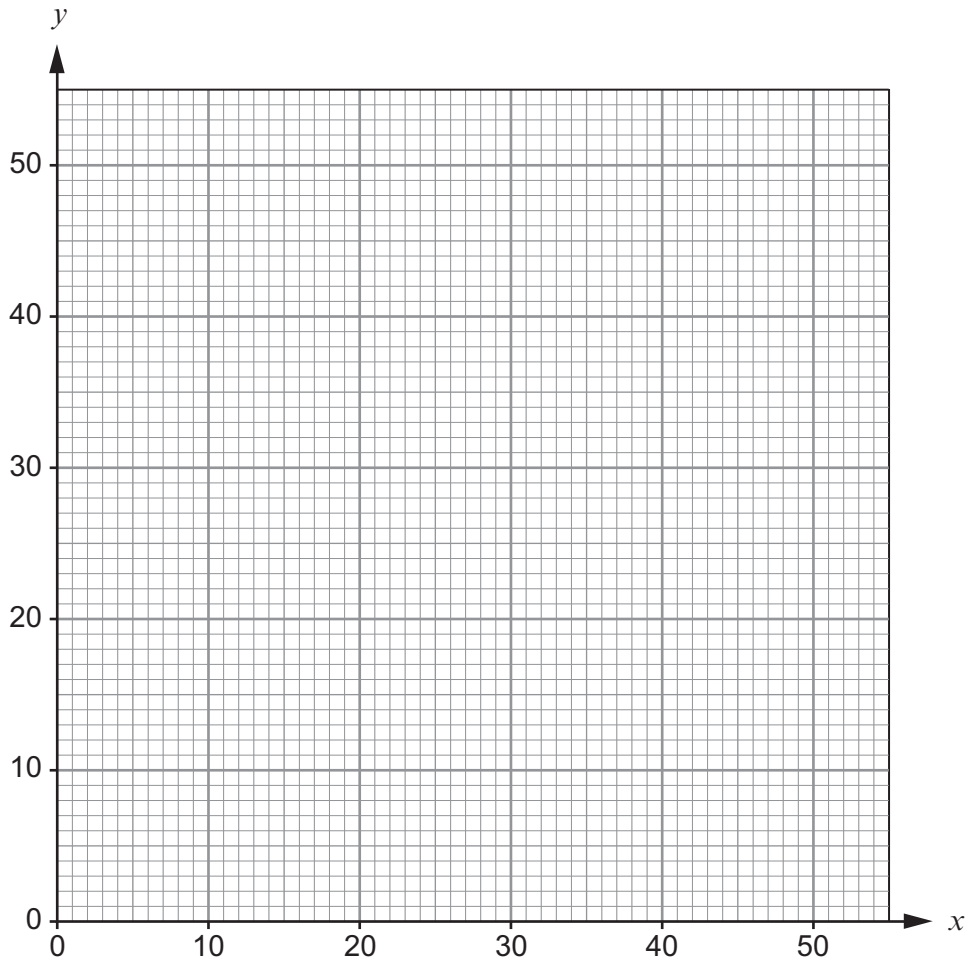
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2. In an experiment, values of  $x$  and  $y$  are recorded to look for a possible relationship. The table below shows the results.

$x$	20	36	44	22	38	40	48	8
$y$	16	32	40	20	34	32	44	6

- (a) On the grid below, draw a scatter diagram to show the results.

[2]



- (b) The mean of the  $x$  values is 32.  
Calculate the mean of the  $y$  values and then draw a line of best fit on your scatter diagram. [4]

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- (c) What type of correlation does your scatter diagram show? [1]

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- (d) Using your line of best fit, find an approximate value of  $y$  when  $x$  is 25. [1]

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

Radiators are used to heat rooms.



Guidance from the internet for calculating the size of radiator needed to heat a room is as follows.

- Calculate the volume of the room in  $m^3$ .
- Allow 50 watts per  $1 m^3$ .
- Check if the window area is greater than  $3 m^2$ ; if so, increase the total number of watts by 11%.
- One watt multiplied by 3.412 gives a measure in British thermal units (Btu). (A Btu is a measure of the amount of heat produced.)

The company Dragon Radiators sells 4 sizes of radiator, as listed below.

Radiator	British thermal units (Btu)
Mini	35 000 Btu
Small	40 000 Btu
Standard	45 000 Btu
Super	50 000 Btu

Griff's sitting room has height 2.4 m, length 12 m and width 8 m. The sitting room has one window that measures 1.7 m by 1.8 m. He wants to buy one radiator sufficient to heat his sitting room.

Which radiator would you suggest that Griff buys from Dragon Radiators? You must show all your working and give a reason for your answer.

[10]

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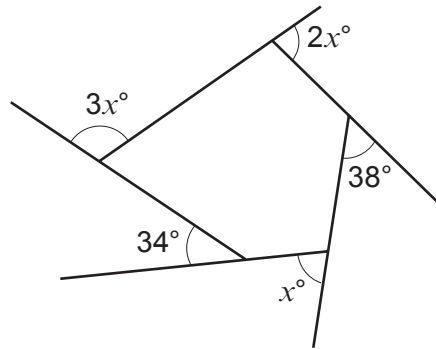
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4.



*Diagram not drawn to scale*

Calculate the value of  $x$ .

[4]

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5. (a) Decrease 7800 metres by 23%.

[2]

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(b) Tomos and Rita share £27 in the ratio 1 : 8.  
Calculate Rita's share of the money.

[2]

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6. (a) The  $n$ th term of a sequence is  $3n^2 - 25$ .  
Evaluate the 40th term of the sequence.

[2]

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- (b) Write down the  $n$ th term of the following sequences.

[2]

- (i) 7, 19, 31, 43, 55, 67, ....

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- (ii) 48, 46, 44, 42, 40, ...

[2]

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9. An 'e-reader' is an electronic book.



- (a) The screen of the e-reader measures 152 mm by 102 mm, with measurements given correct to the nearest mm.  
Calculate the greatest possible area of the screen.  
Give the units of your answer. [4]

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- (b) Guinevere has carried out a survey by recording the number of pages in each of her 70 paperback books.  
Her results are shown below.

Number of pages, $p$	Number of books
$1 \leq p \leq 100$	2
$101 \leq p \leq 200$	6
$201 \leq p \leq 300$	16
$301 \leq p \leq 400$	34
$401 \leq p \leq 500$	12

- (i) Calculate an estimate for the mean number of pages per paperback book. [4]

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- (ii) Guinevere has bought an e-reader.



Her e-reader can store the equivalent of 1100 books.  
Calculate an estimate for the number of pages stored by Guinevere's e-reader.  
Give your answer in standard form. [3]

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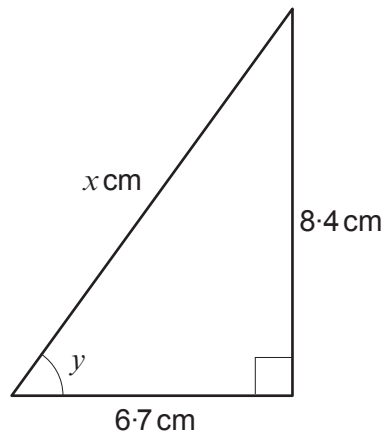
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10. The diagram shows a right-angled triangle.



*Diagram not drawn to scale*

- (a) Calculate the value of  $x$ .

[3]

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- (b) Calculate the size of angle  $y$ .

[3]

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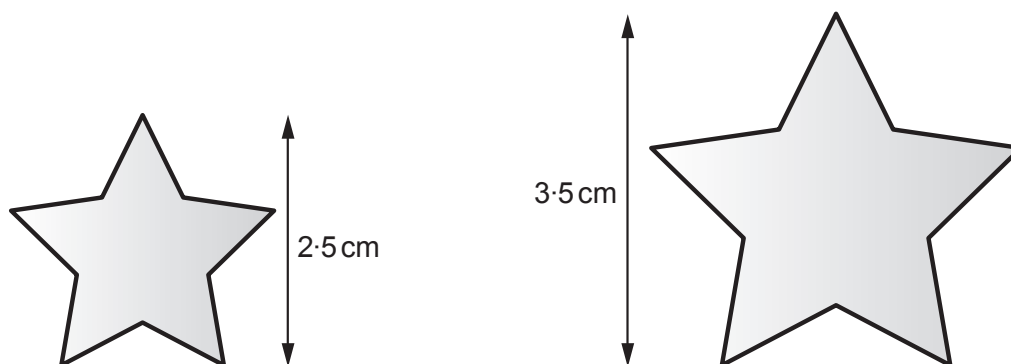
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12. Tara has two **similar** star badges, as shown below.  
The front of each badge is coated in gold paint.



*Diagram not drawn to scale*

The value of the gold paint on the larger star badge is £18.55.  
Calculate the value of the gold paint on the smaller star badge.  
You must show all your working.

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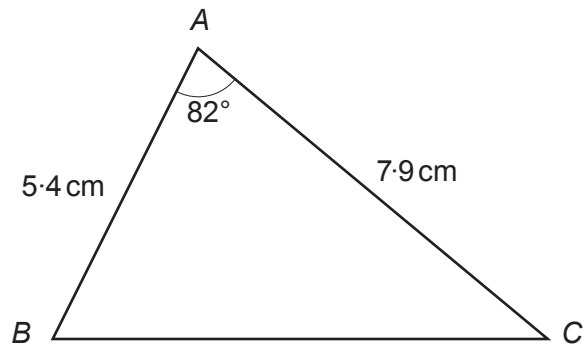
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14. The diagram below shows triangle  $ABC$ .



*Diagram not drawn to scale*

Calculate

(a) the length  $BC$ ,

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(b) the area of triangle  $ABC$ .

[2]

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15. Ceri plays in a hockey team.  
The hockey team's training sessions are run by one of two different coaches, Meg or Lotti.  
Meg is the coach for 70% of the training sessions.

Ceri likes to play as goal-keeper for the team.  
When Meg coaches the hockey team, the probability that Ceri is the goal-keeper is 0.4.  
When Lotti coaches the hockey team, the probability that Ceri is the goal-keeper is 0.9.

Calculate the probability that Ceri will **not** be the goal-keeper at the hockey team's next training session. [4]

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16. A semi-circle has a perimeter of 16 cm.  
Calculate the area of the semi-circle.

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