Surname	Centre Number	Candidate Number
First name(s)		0

GCSE

3300U40-1

A24-3300U40-1

WEDNESDAY, 13 NOVEMBER 2024 – MORNING

MATHEMATICS
UNIT 2: CALCULATOR-ALLOWED
INTERMEDIATE TIER

1 hour 45 minutes

ADDITIONAL MATERIALS

A calculator will be required for this examination.

A ruler, protractor and a pair of compasses may be required.

INSTRUCTIONS TO CANDIDATES

Use black ink or black ball-point pen. Do not use gel pen or correction fluid.

You may use a pencil for graphs and diagrams only.

Write your name, centre number and candidate number in the spaces at the top of this page.

Answer **all** questions.

Write your answers in the spaces provided in this booklet. If you run out of space, use the additional page(s) at the back of the booklet, taking care to number the question(s) correctly.

Take π as 3·14 or use the π 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.

In question **2**, the assessment will take into account the quality of your linguistic and mathematical organisation, communication and accuracy in writing.

For Examiner's use only		
Question	**Maximum Mark**	**Mark Awarded**
1.	**5**	
2.	**6**	
3.	**4**	
4.	**3**	
5.	**4**	
6.	**9**	
7.	**2**	
8.	**4**	
9.	**4**	
10.	**5**	
11.	**4**	
12.	**3**	
13.	**3**	
14.	**6**	
15.	**4**	
16.	**5**	
17.	**5**	
18.	**4**	
Total	**80**	

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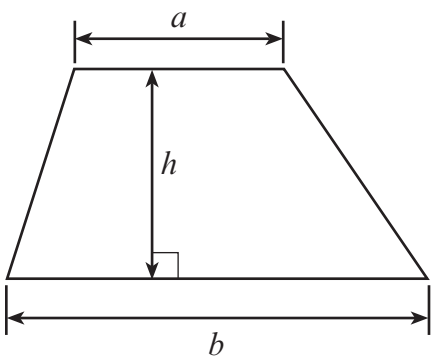
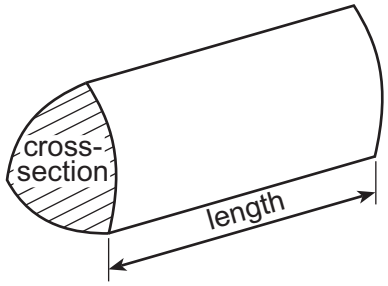
Formula List – Intermediate Tier

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



Volume of prism = area of cross-section × length



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1. (a) Calculate the size of angle x. [2]

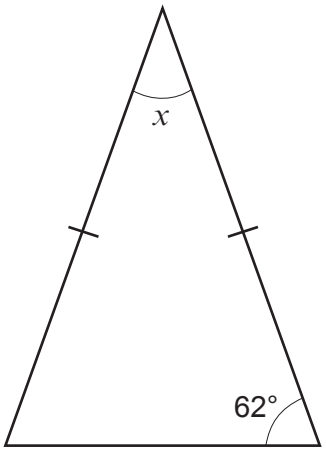

Diagram not drawn to scale

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x = ... °

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(b) *PQRS* is a quadrilateral.
QRT is a straight line.
Calculate the size of angle *y*. [3]

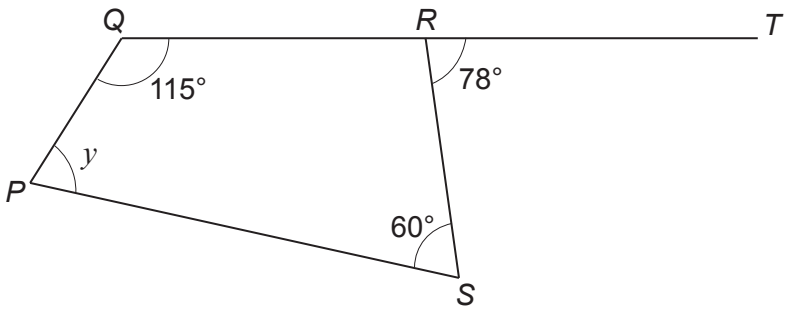

Diagram not drawn to scale

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y = ... °

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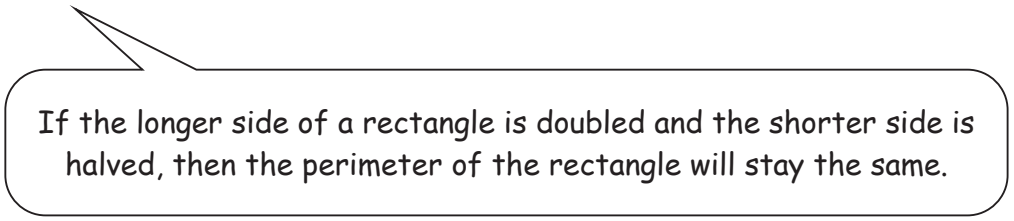
2. *In this question, you will be assessed on the quality of your organisation, communication and accuracy in writing.*

Owen says,



Is Owen correct?
Show clearly, using an example, how you decided. [4 + 2 OCW]

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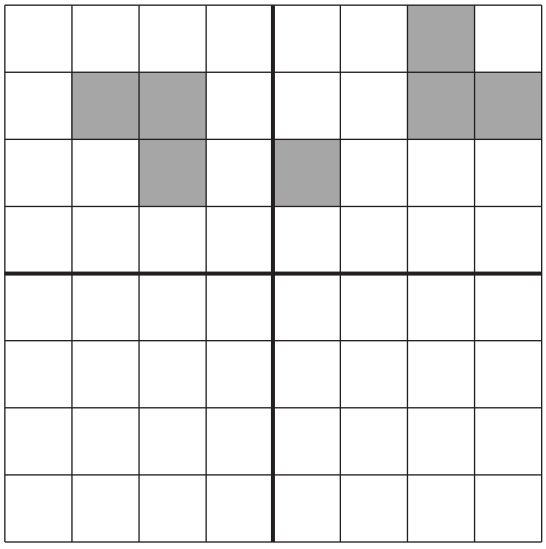
3. (a) Calculate the following.

$$\frac{17}{50} \text{ of } 24{\cdot}5 + 78\% \text{ of } 103{\cdot}5$$

You must show all your working. [2]

(b) Express £19.44 as a percentage of £36. [2]

4. Shade the least number of squares so that the grid has rotational symmetry of order 2. [3]



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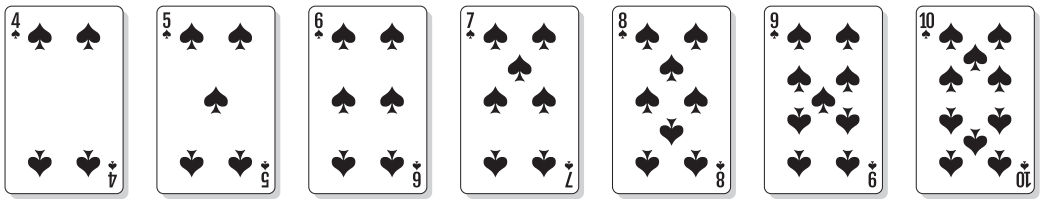
5. Megan has the following 7 playing cards.



She turned these cards face down.
Megan then chose a card at random and recorded the number.

(a) What is the probability that Megan recorded the number 5?
Circle your answer. [1]

$\frac{5}{7}$ $\frac{1}{7}$ 1 5 $\frac{7}{5}$

.....

(b) (i) What is the probability that Megan recorded a square number?
Circle your answer. [1]

$\frac{2}{5}$ $\frac{1}{7}$ $\frac{2}{7}$ $\frac{4}{7}$ $\frac{4}{5}$

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(ii) Megan chooses a card at random 91 times.
How many times would you expect Megan to record a square number?
You must show all your working. [2]

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6. (a) Solve each of the following equations.

(i) $3y - 5 = 19$ [2]

(ii) $7(2t + 3) = 56$ [3]

(iii) $8p + 5 = 3p - 25$ [3]

(b) Factorise $w^2 - 6w$. [1]

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7. A bag contains 1 yellow counter and 2 pink counters.
Olga puts more yellow counters into the bag.

She takes one counter out of the bag at random.
The probability of taking a yellow counter out of the bag is $\frac{3}{4}$.

How many **more** yellow counters did Olga put into the bag? [2]

Olga put ..... more yellow counters into the bag

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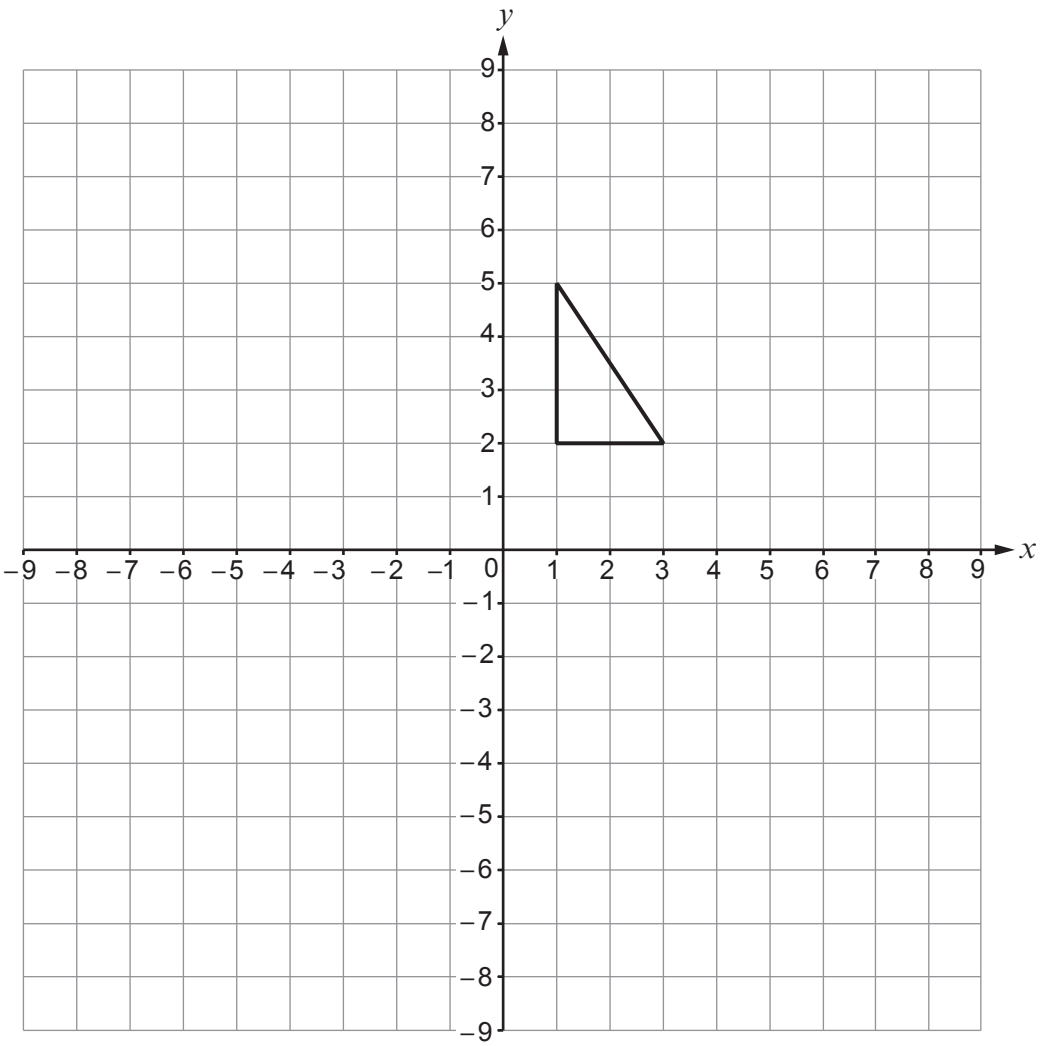
8. (a) Rotate the triangle through 90° clockwise, about the origin. [2]



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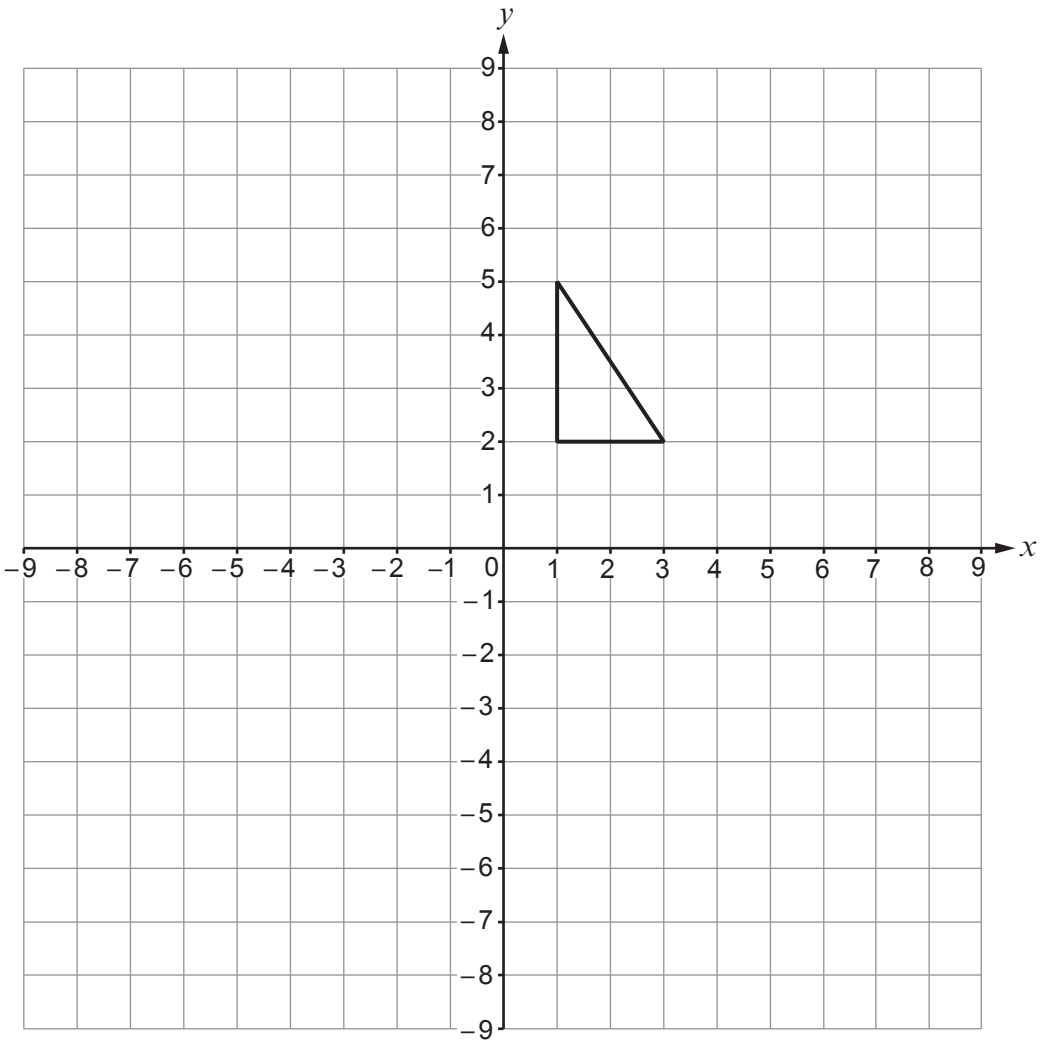
(b) Reflect the triangle in the line $x = -2$. [2]



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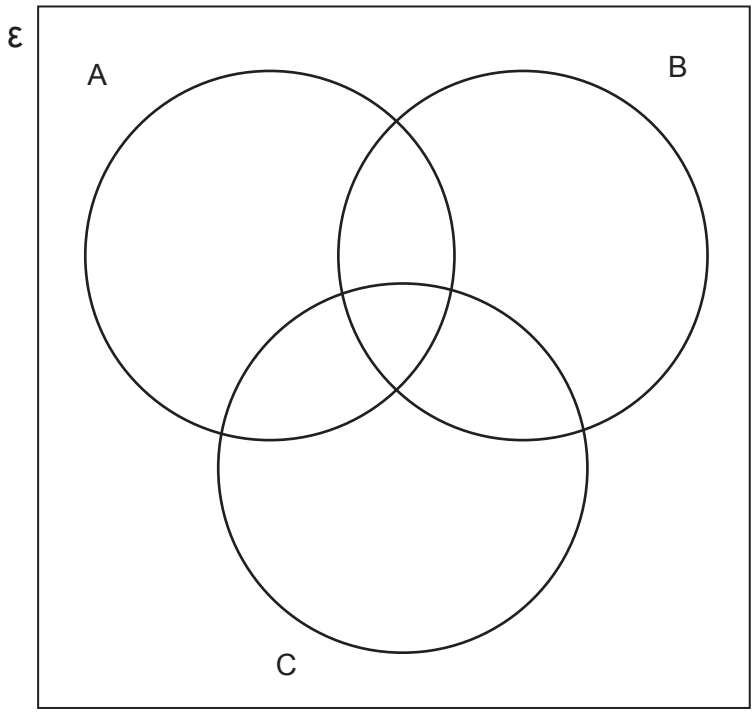
9. Display the following information in the Venn diagram below. [4]

- Universal Set ε = {Integers between 1 and 7 inclusive}
- Set A = {even numbers}
- Set B = {factors of 6}
- Set C = {prime numbers}



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10. A money box contains some 20p coins and some 50p coins.
The value of the 20p coins is £19.20.

The ratio of the number of 20p coins to the number of 50p coins is 8 : 5.

Find the total value of the coins in the money box.
You must show all your working. [5]

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11. A solution of the equation

$$x^3 + 5x - 4 = 0$$

lies between 0 and 1.

Use the method of trial and improvement to find this solution correct to 1 decimal place. You must show all your working. [4]

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12. Find five numbers so that:

- their mean is 4·5
- their mode is 3·5.

Write your five numbers in the boxes below. [3]

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The five numbers are | | | | | |

13. The interior angle of a regular polygon is 171°.

How many sides does the polygon have? [3]

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14. (a) Calculate the length of *AC*. [3]

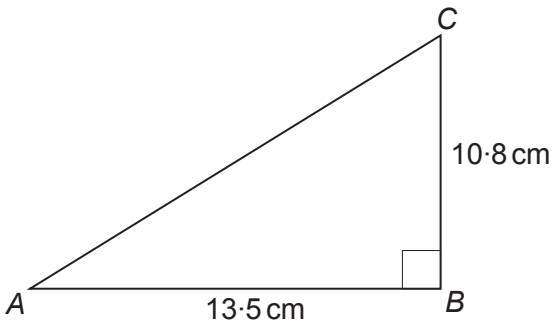

Diagram not drawn to scale

(b) Calculate the value of x. [3]

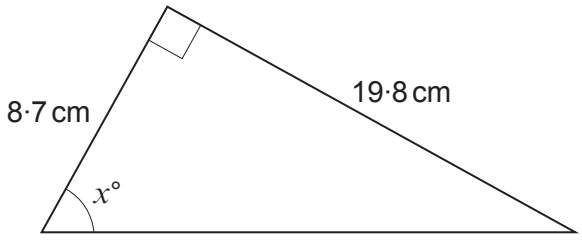

Diagram not drawn to scale

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15. Line AB is drawn below.
Point C lies **below** the line AB.
The region in which point C is located is such that:

- $A\hat{B}C \leqslant 30°$
- line $BC \leqslant 5\,\text{cm}$.

Use a ruler and a pair of compasses to **construct** suitable arcs and lines to show this region.
You must show your construction arcs.
Shade the region in which point C is located. [4]

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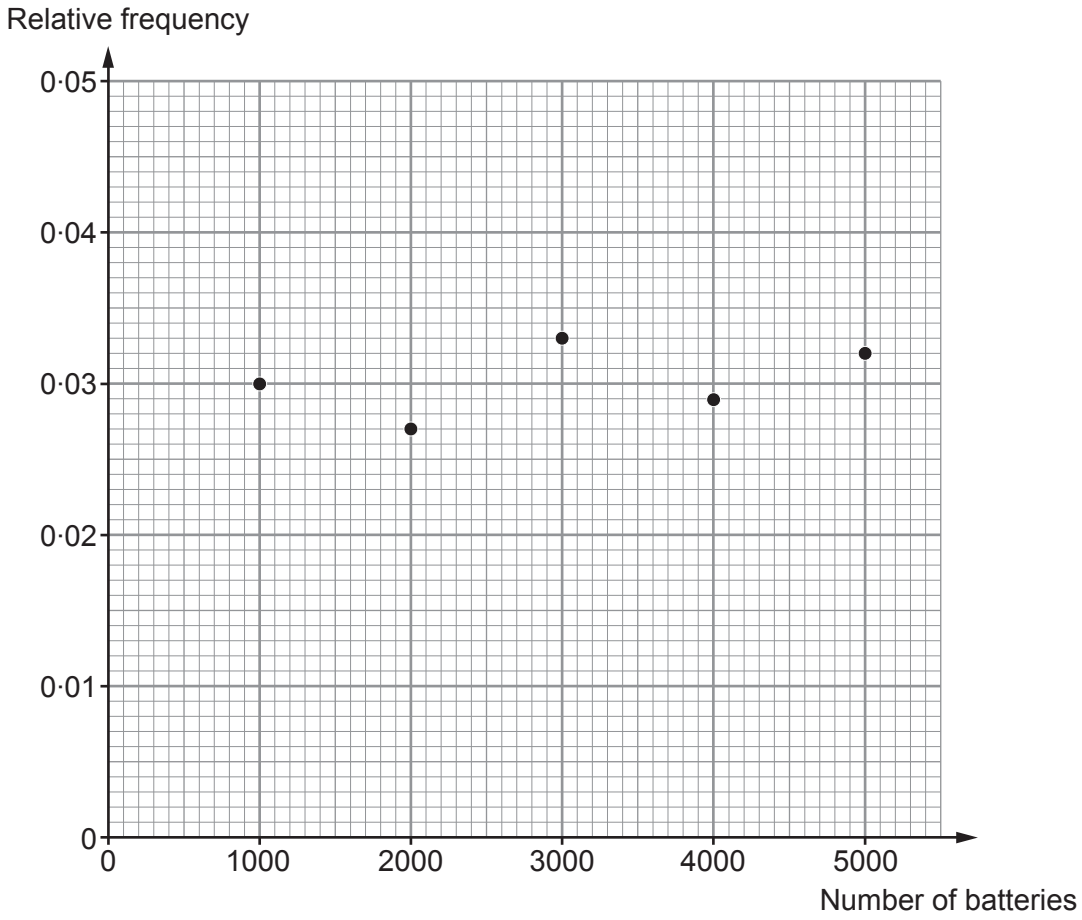
16. PowrUp is a company that makes batteries.
The quality of the batteries is tested regularly.
PowrUp calculates the relative frequency of faulty batteries after checking a total of 1000, 2000, 3000, 4000 and 5000 batteries.
The results are plotted on the graph below.



(a) One battery is selected at random.
Write down the best estimate for the probability that this battery will be faulty.
You must give a reason for your choice. [2]

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Probability = ...

Reason:

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Examiner only

(b) It costs the company 2·6p to dispose of each of the faulty batteries.
How much will it cost the company to dispose of all the faulty batteries after testing the first 3000 batteries?
You must show all your working. [3]

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17. The diagram shows a **solid** cylinder with radius 10 cm.
The total **surface area** of the solid cylinder is 1570·8 cm^2.

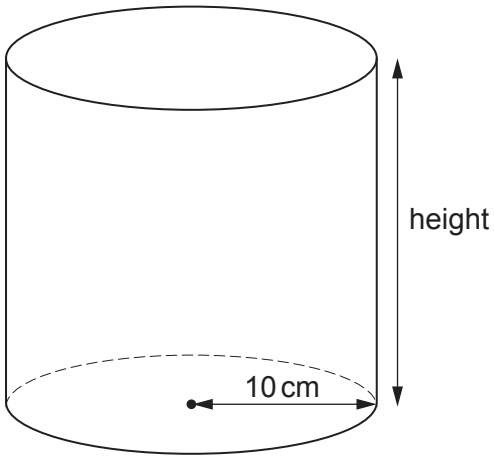

Diagram not drawn to scale

Find the height of the cylinder. [5]

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18. 2400 tickets were sold for a concert.
The table below shows the cost of the different types of ticket.

Ticket	Cost per ticket
SEATED	£45
STANDING	£23

The total cost of all the 2400 tickets sold was £89 520.

Let x represent the number of seated tickets sold.
Let y represent the number of standing tickets sold.

(a) Complete the following table. [1]

	Equation in terms of x and y
Total number of tickets sold	$x + y = 2400$
Total cost of tickets sold	

(b) Use an algebraic method to find the value of x and the value of y.
You must show all your working. [3]

The number of seated tickets sold, x = ...

The number of standing tickets sold, y = ...

END OF PAPER

Question number	Additional page, if required. Write the question number(s) in the left-hand margin.

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