

Surname	Centre Number	Candidate Number
First name(s)		0

**GCSE**

3300U60-1



S25-3300U60-1

WEDNESDAY, 11 JUNE 2025 – MORNING

MATHEMATICS
UNIT 2: CALCULATOR-ALLOWED
HIGHER TIER

1 hour 45 minutes

ADDITIONAL MATERIALS

A calculator will be required for this examination.

A ruler, a 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** the questions in the spaces provided.

If you run out of space, use the additional page at the back of the booklet. Question numbers must be given for all work written on the additional page.

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.

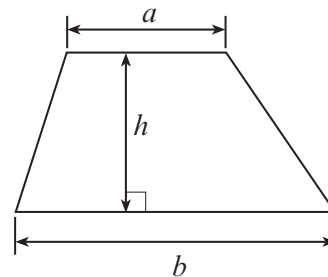
For Examiner's use only		
Question	Maximum Mark	Mark Awarded
1.	4	
2.	7	
3.	4	
4.	6	
5.	4	
6.	2	
7.	2	
8.	5	
9.	6	
10.	4	
11.	3	
12.	6	
13.	3	
14.	5	
15.	8	
16.	3	
17.	6	
18.	2	
Total	80	



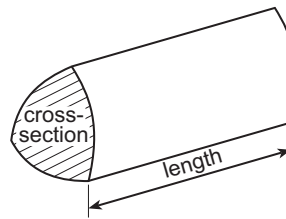
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Formula List – Higher Tier

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

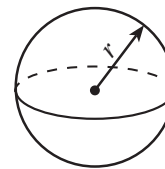


Volume of prism = area of cross-section $\times$ length



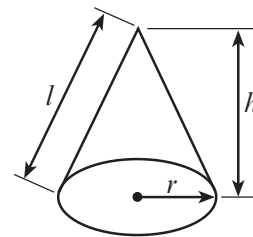
Volume of sphere $= \frac{4}{3} \pi r^3$

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



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

Curved surface area of cone $= \pi r l$

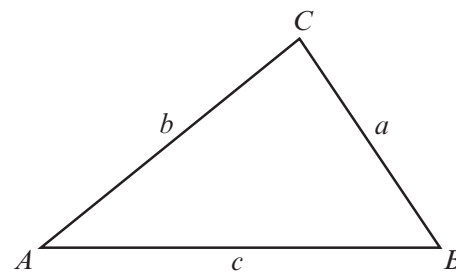


In any triangle ABC

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

Cosine rule $a^2 = b^2 + c^2 - 2bc \cos A$

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



The Quadratic Equation

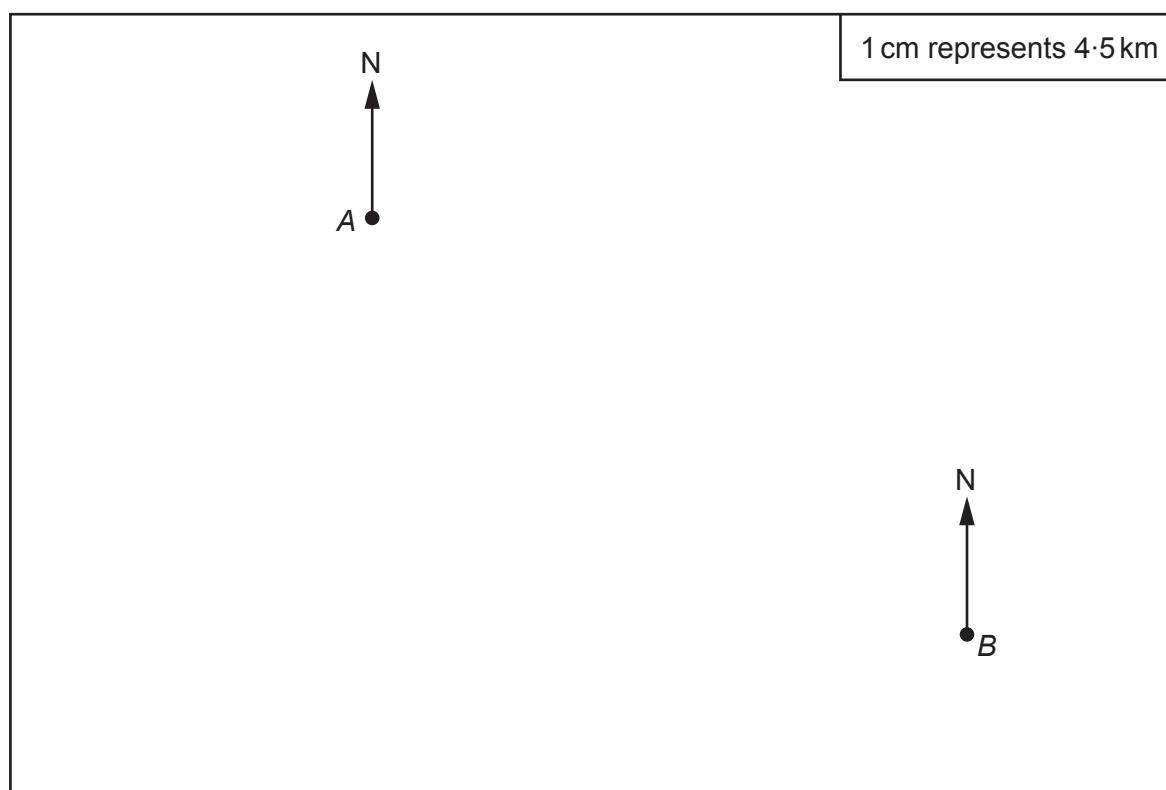
The solutions of $ax^2 + bx + c = 0$ where $a \neq 0$ are given by $x = \frac{-b \pm \sqrt{b^2 - 4ac}}{2a}$

Annual Equivalent Rate (AER)

AER, as a decimal, is calculated using the formula $\left(1 + \frac{i}{n}\right)^n - 1$, where i is the nominal interest rate per annum as a decimal and n is the number of compounding periods per annum.



1. The diagram below shows two towns, *A* and *B*, on a map.
The scale of the map is 1 cm represents 4.5 km.



On the map, shade the region containing all the points that are:

- closer to town *A* than to town *B*, **and**
- less than 27 km from town *B*.

[4]

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$$x^3 + 5x = 25$$

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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4. (a) Calculate the length of PQ .

[3]

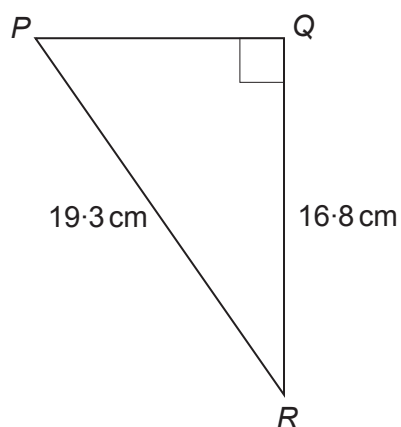
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Diagram not drawn to scale

- (b) Calculate the size of angle x .

[3]

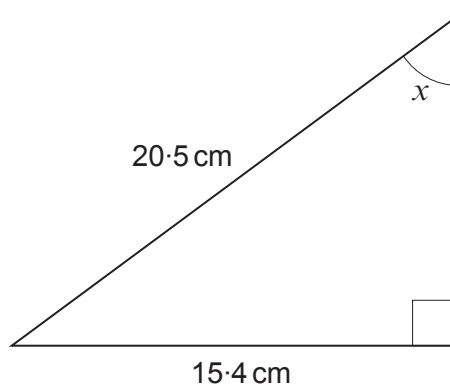


Diagram not drawn to scale



5. $\frac{3}{7}$ of £180.60 is shared in the ratio 4 : 5.

Calculate the value of the smaller share.
You must show all your working.

[4]

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Smaller share =



6. In the diagram below, the triangles ABC and DBE are **mathematically similar**.
 $CB = 8\text{ cm}$, $DB = 7.5\text{ cm}$, $BE = 5\text{ cm}$ and $\hat{ACB} = \hat{DEB}$.

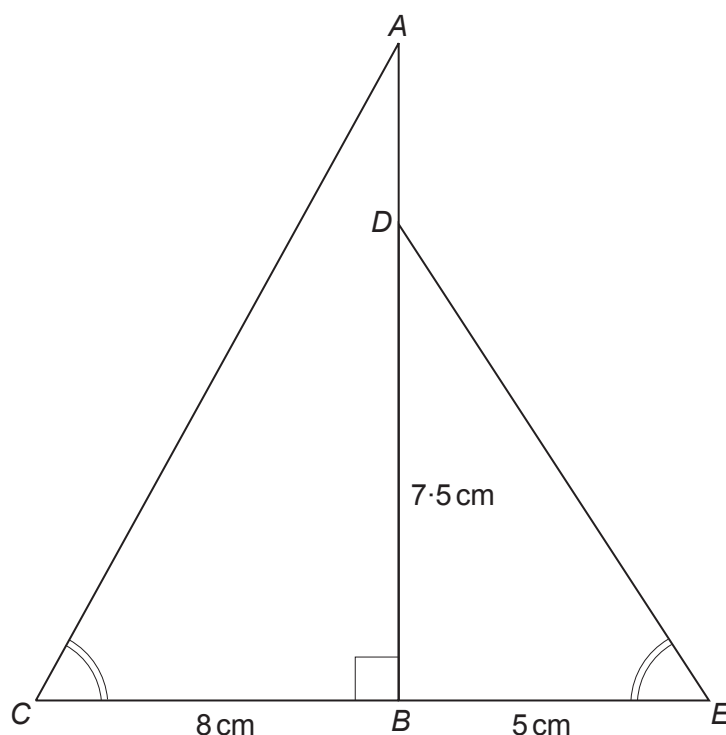


Diagram not drawn to scale

Calculate the length of AB .

[2]

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7. A number has been decreased by 20% to give an answer of 84.
 What was the original number?

[2]

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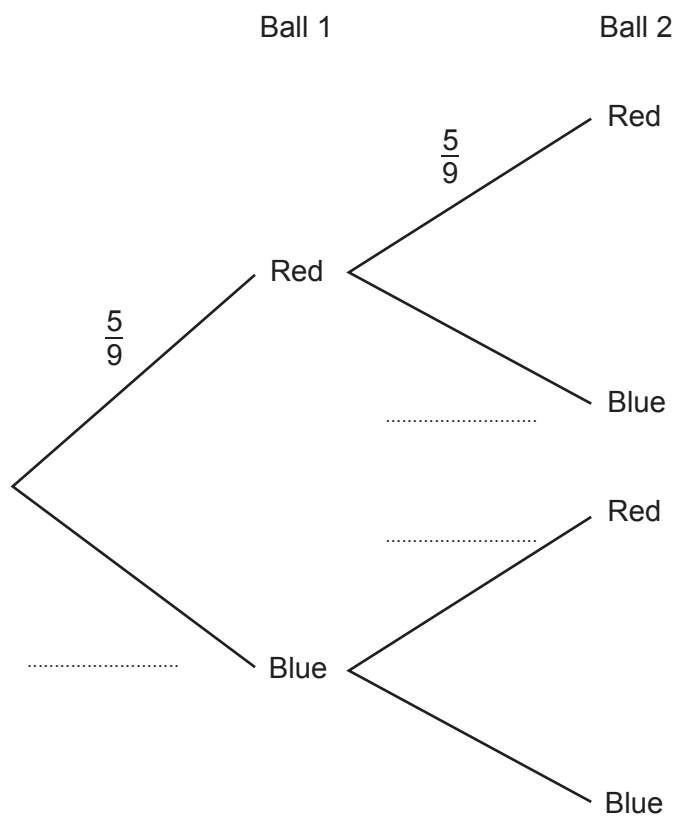
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8. A bag contains 5 red balls and 4 blue balls.
Megan chooses a ball from the bag at random.
She replaces the ball in the bag.
Then she chooses a second ball from the bag at random.

(a) Complete the tree diagram below.

[2]



(b) Find the probability that Megan chooses two balls of the same colour.

[3]

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- $\hat{ACB} = x$, where x is measured in degrees.

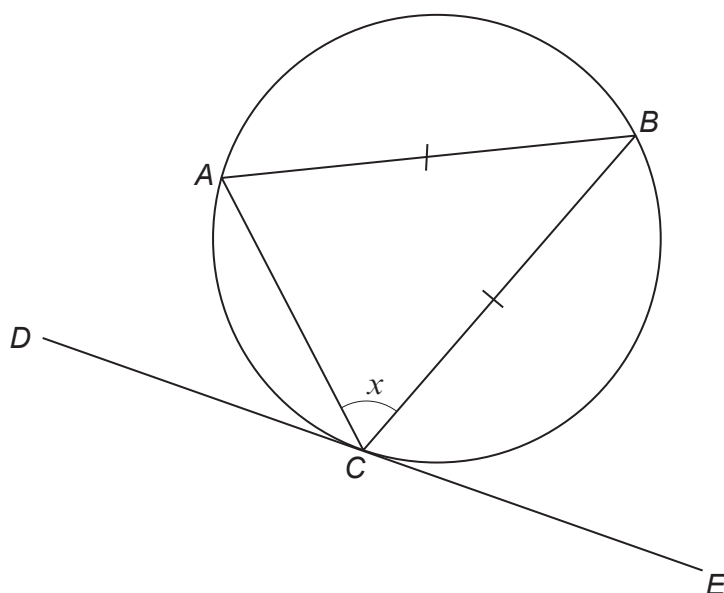


Diagram not drawn to scale

You must give a reason for each step of your solution.

[4]



12. (a) (i) y is **inversely** proportional to x^3 .
 $y = 0.15$ when $x = 6$.

Use this information to write an expression for y in terms of x .

[3]

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- (ii) Use the expression you found in part (i) to complete the following table.

[2]

x	0.2		6
y		1.2	0.15

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- (b) c is **directly** proportional to the square root of d .
 What happens to c if d is multiplied by 4?
 Circle the correct statement below.

[1]

c is
multiplied by 16

c is
divided by 16

c is
multiplied by 2

c is
divided by 2

c is
squared

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13. The diagram shows a sector of a circle with centre O and radius 29 cm .
The area of the sector is 756 cm^2 .

$$\hat{AOB} = x^\circ.$$

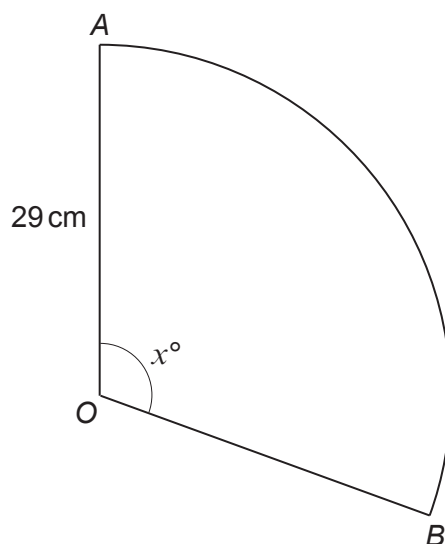


Diagram not drawn to scale

Calculate the value of x .
You must show all your working.

[3]

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14. Rearrange the following to make w the subject.

[5]

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$$\frac{xw^2 + 6}{5 - 3w^2} = y$$

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15. Triangle PQR is shown below.

The length of PQ is $(2x + 1)$ cm.

The length of QR is x cm.

The length of PR is 6 cm.

The size of $\hat{P}RQ$ is 60° .

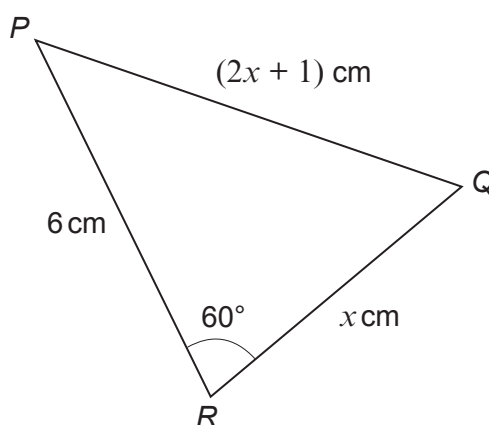


Diagram not drawn to scale

(a) Use the cosine rule to show that $3x^2 + 10x - 35 = 0$.

[3]

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- (b) Solve the equation

$$3x^2 + 10x - 35 = 0.$$

You must use the quadratic formula and show all your working.
Give your answers correct to 2 decimal places.

[3]

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- (c) Evaluate the length of PQ .
You must justify any decision that you make.

[2]

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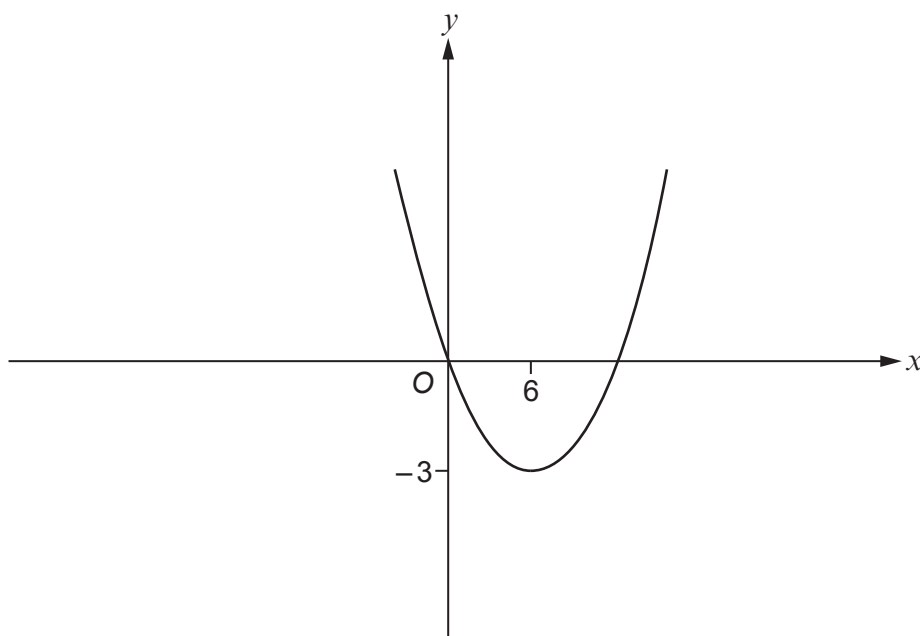
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- 16.** The lowest point of a curve is called a minimum point.

The diagram shows a sketch of the curve with equation $y = f(x)$.
The minimum point of the curve has coordinates $(6, -3)$.



- (a) For each of the following equations, write down the coordinates of the minimum point of the curve.

(i) $y = 4f(x)$ [1]

The coordinates of the minimum point are (.....,).

(ii) $y = f(x + 2)$ [1]

The coordinates of the minimum point are (.....,).

- (b) The curve with equation $y = f(x)$ is reflected in the x -axis.
Write down the equation of the transformed curve.
You should use function notation.

[1]

The equation of the transformed curve is $y =$



17. The diagram shows a quadrilateral $EFGH$.

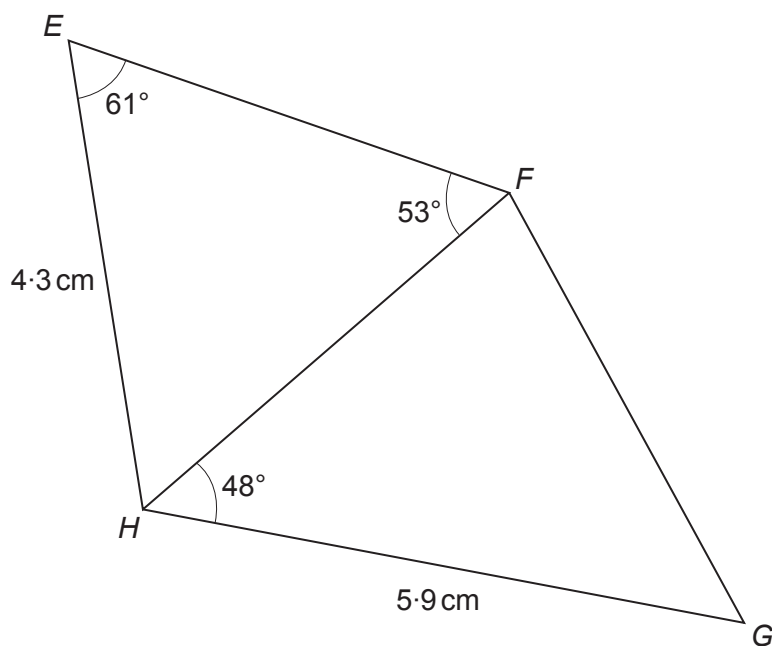


Diagram not drawn to scale

Calculate the area of triangle FGH .

[6]

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18. Carys says,
“It will never be possible for the volume of a cube of side length r to be equal to the volume of a hemisphere of radius r .”
Use algebraic expressions to show that Carys is correct. [2]

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