



General Certificate of Secondary Education
November 2024

Centre Number

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Candidate Number

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Mathematics

Unit M8 Paper 1
(Non-Calculator)

Higher Tier

[GMC81]



GMC81

THURSDAY 21 NOVEMBER, 9.15am–10.30am

TIME

1 hour 15 minutes.

INSTRUCTIONS TO CANDIDATES

Write your Centre Number and Candidate Number in the spaces provided at the top of this page.

You must answer the questions in the spaces provided.

Do not write outside the boxed area on each page, on blank pages or tracing paper.

Complete in black ink only. **Do not write with a gel pen.**

Questions which require drawing or sketching should be completed using an HB pencil.

All working **must** be clearly shown in the spaces provided. Marks may be awarded for partially correct solutions.

You **must not** use a calculator for this paper.

Answer **all fourteen** questions.

INFORMATION FOR CANDIDATES

The total mark for this paper is 50.

Figures in brackets printed down the right-hand side of pages indicate the marks awarded to each question or part question.

You should have a ruler, compasses and a protractor.

The Formula Sheet is on page 2.

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Formula Sheet

Volume of prism = area of cross section \times length



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



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

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

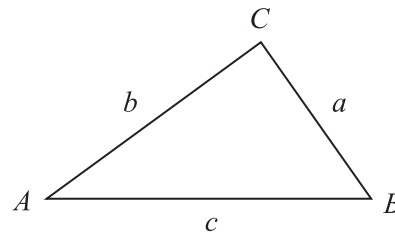


Volume of cone = $\frac{1}{3}\pi r^2 h$

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



In any triangle ABC



Quadratic Equation

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

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

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 = $\frac{1}{2} ab \sin C$



1

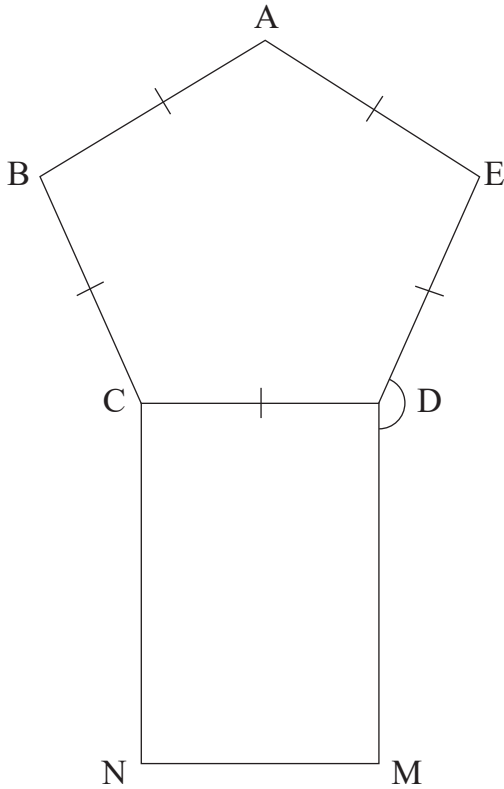


diagram not
drawn accurately

ABCDE is a regular pentagon.

CDMN is a rectangle.

Work out the size of the obtuse angle EDM.

Answer _____° [4]

[Turn over



2 Kevin tosses a coin.

He knows it is biased.

It lands 60 times on Heads.

Kevin uses his experiment to work out that the relative frequency of his coin landing on Heads is $\frac{2}{3}$

How many times did Kevin toss the coin?

Answer _____ [2]



3 Katie used flour to make muffins.

She used an equal amount of flour for each muffin.

To begin, she made three muffins and had $\frac{3}{4}$ of her flour left.

(a) What fraction of her flour did Katie **use** for **each** muffin?

Answer _____ [1]

Katie then made **another** seven muffins, giving a total of 10 muffins, and had 50 g of flour left.

(b) How many grams of flour did Katie use for **each** muffin?

Answer _____ g [2]

[Turn over



- 4 A rectangle is divided into four triangles.

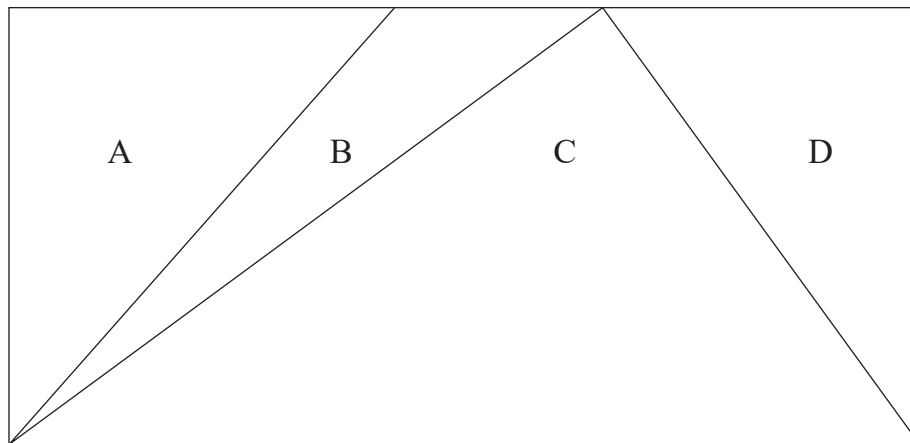


diagram not drawn accurately

The area of triangle C is 120 cm^2 and is **half** of the area of the rectangle.

The ratio of the area of triangle A to the area of the rectangle is $1 : 4$

The ratio of the area of triangle D to the area of the rectangle is $1 : 6$

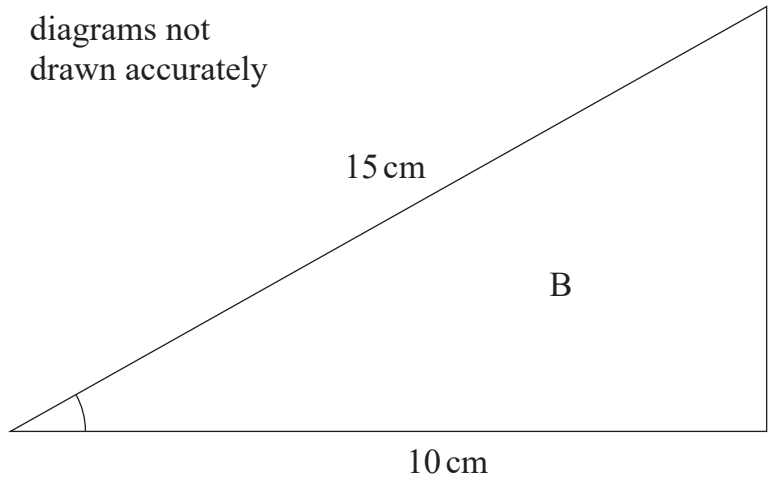
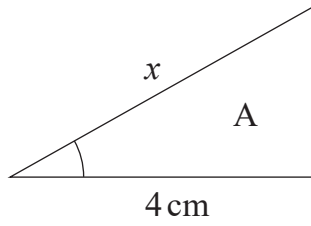
What is the area of triangle B?

Answer _____ cm^2 [4]



5

diagrams not
drawn accurately



A and B are similar triangles.

Work out the length of x .

Answer _____ cm [2]



6 (a) Write 463 in standard form.

Answer _____ [1]

(b) Calculate $(4 \times 10^3) \times (5 \times 10^{-4})$

Answer _____ [1]



8 Simplify $(4x^2y^3) \times (x^3y^4)$

Answer _____ [2]

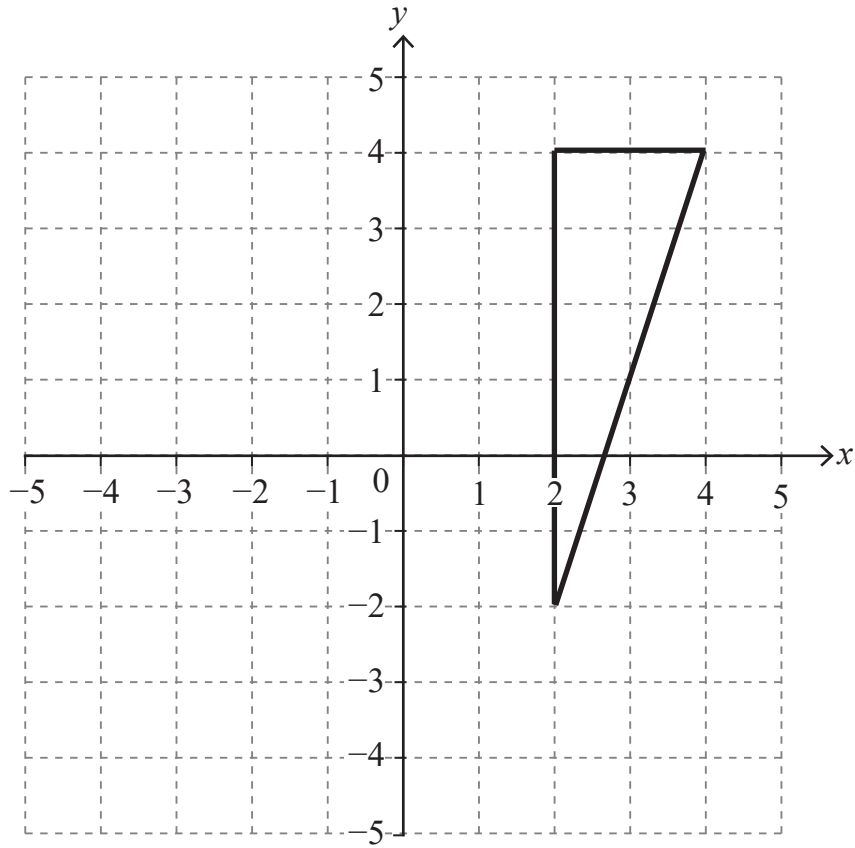
9 Rearrange to make x the subject of

$$Ax^2 = B$$

Answer $x =$ _____ [2]



10



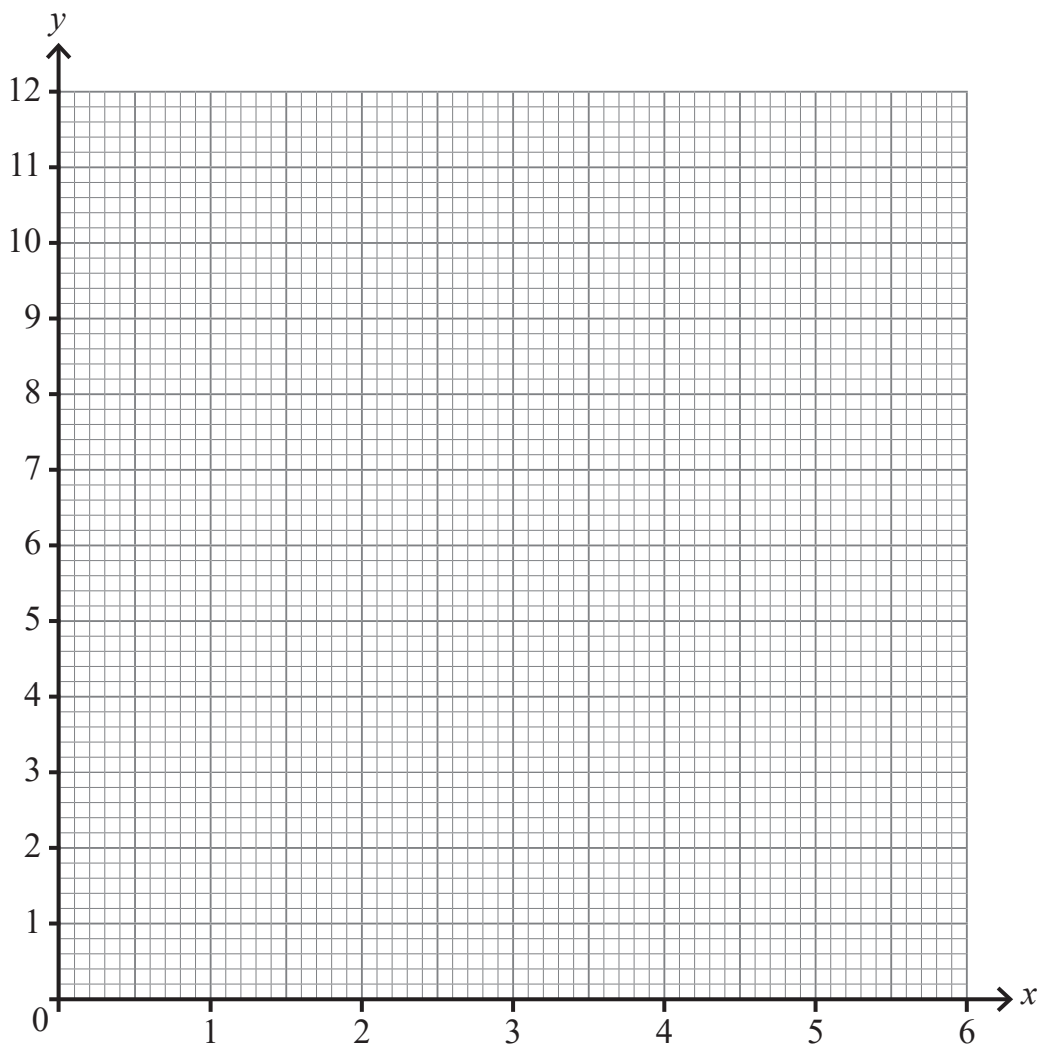
Draw the image of the triangle after an enlargement of scale factor $-\frac{1}{2}$ with centre (0, 2).

[2]

[Turn over



11 (a) Sketch the graph of $y = \frac{6}{x}$ on the grid below.



[3]



(b) Use your graph to estimate the value of $\frac{6}{3.7}$

Answer _____ [1]

(c) The curved surface area of a cone is 6π .

If x is the radius of the base of the cone, what does y represent?

Answer _____ [2]



12 PQ is a diameter of the circle whose equation is $x^2 + y^2 = 90$

(2, 6) is a point on the diameter PQ.

(a) Write down the equation of the diameter PQ.

Answer _____ [2]

(b) Find the coordinates of P and Q.

Answer (_____ , _____) and (_____ , _____) [3]



(c) Find the equations of the tangents at P and Q.

Answer _____ and _____ [4]

[Turn over

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13

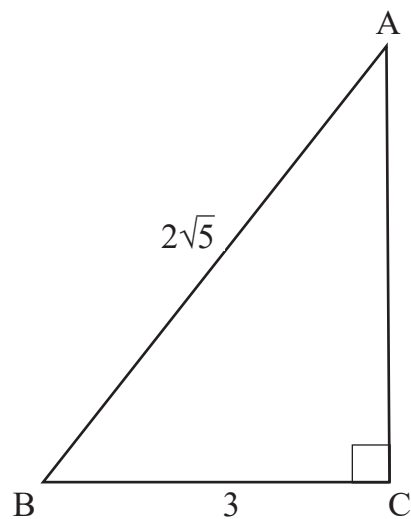


diagram not
drawn accurately

In triangle ABC, angle C is a right angle, $AB = 2\sqrt{5}$ cm and $BC = 3$ cm.

Find $\tan B$, giving your answer in surd form.

Answer _____ [3]



14 $2^x \times 2^{2y} = 2^3$

$$2^{2x} \times (2^y)^{12} = 2^2$$

Find the values of x and y .

Show your working.

A solution by trial and improvement will not be accepted.

Answer $x =$ _____, $y =$ _____ [5]

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Question Number	Marks
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Total Marks	
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Examiner Number

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