



THIRD SPACE  
LEARNING

# Mathematics

## Paper 1

### (Non-Calculator)

## Higher Tier

AQA GCSE

SET 3

# Mathematics Paper 1 (Non-Calculator) Higher Tier AQA

## GCSE SET 3

Name

Total marks



Paper length: 1hr 30mins

### Instructions

- Use black ink or ball-point pen.
- Fill in the boxes at the top of this page with your name, centre number and candidate number.
- Answer all questions.
- Answer the questions in the spaces provided – there may be more space than you need.
- You must show all your working.
- Diagrams are NOT accurately drawn, unless otherwise indicated.
- Calculators may not be used.

### Information

- The total mark for this paper is 80
- The marks for each question are shown in brackets – use this as a guide as to how much time to spend on each question.

Question	Mark
1	
2	
3	
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13	
14	
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### Advice

- Read each question carefully before you start to answer it.
- Keep an eye on the time.
- Try to answer every question.
- Check your answers if you have time at the end.

**You must have:** Ruler graduated in centimetres and millimetres, protractor, pair of compasses, pen, HB pencil, eraser. Tracing paper may be used.

This practice paper is based on the topics from the **advanced information for the November 2024 exam series**.

*Please note, this practice paper is an example to help revision, these topics can be tested in other ways and other topics may be included in the actual papers*

- 1 Write  $36.5 \times 10^{-2}$  in standard form.

[1 mark]

Answer \_\_\_\_\_

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- 2 Write the equation of a line that is parallel to  $y = 3x - 2$

[1 mark]

Answer \_\_\_\_\_

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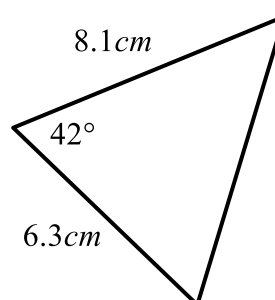
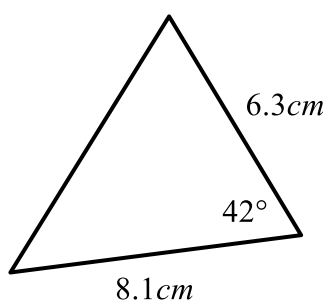
- 3 Work out the value of  $1.5^2$ . Write your answer as a decimal.

[1 mark]

Answer \_\_\_\_\_

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Explain why the triangles are congruent.

[1 mark]

Answer \_\_\_\_\_

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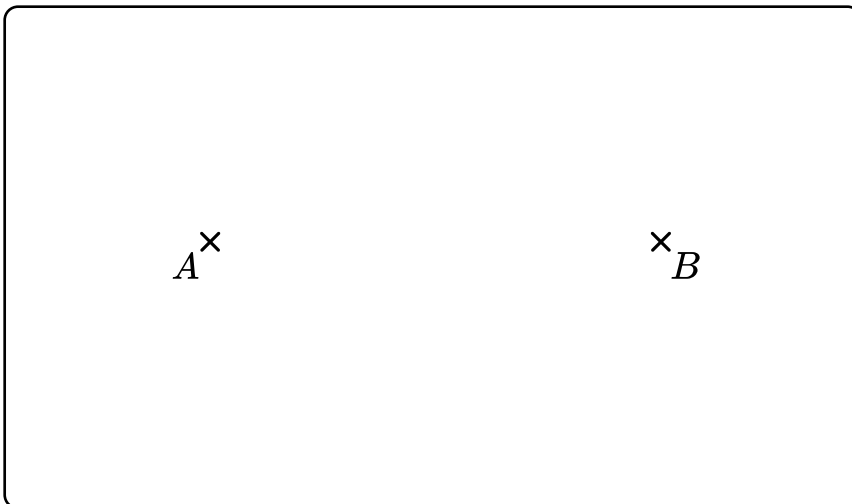
- 5 Write 208 as a product of its prime factors.  
Give your answer in index form.

[2 marks]

Answer \_\_\_\_\_

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- 6 The diagram shows the position of two phone masts.  
The scale of the diagram is  $1\text{ cm}$  represents  $20\text{ m}$ .



Lydia lives near two phone masts,  $A$  and  $B$ .  
Lydia lives closer to mast  $A$  than mast  $B$ , but still within  $80\text{ m}$  of mast  $B$ .

On the diagram, shade the area where Lydia could live.

[3 marks]

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- 7 Stacey buys 300 glow sticks for £40.  
Stacey sells all of the glow sticks. She charges 50p for 3 glow sticks.  
Calculate Stacey's percentage profit.

**[4 marks]**

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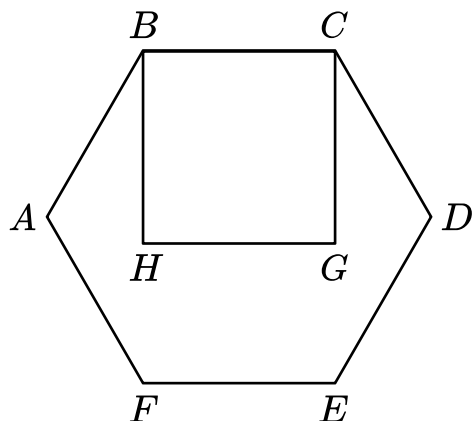
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Answer \_\_\_\_\_

- 8  $ABCDEF$  is a regular hexagon.  
 $BCGH$  is a square.



Show that angle  $BHG = 3 \times$  angle  $ABH$ .

[4 marks]

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9 In a football team there are 6 boys and 4 girls.  
The mean height of the boys is  $130\text{cm}$  and the mean height of the girls is  $120\text{cm}$ .

Tiami says the mean height of all of the players is  $126\text{cm}$ .  
Is Tiami correct?  
You must show how you decide.

[4 marks]

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Answer \_\_\_\_\_

10 Complete the table for these sequences.

[4 marks]

Sequence	1st term	2nd term	3rd term	4th term	5th term	$n$ th term
A	3	7	11	15		
B	1	4	9	16		
C	$\frac{1}{3}$	1	3	9	27	
D	$\frac{2}{3}$	3	6	7	-2	

- 11 In a football season, Player *J* scored 28 goals from 36 shots, player *K* scored 22 goals from 40 shots and Player *L* scored 16 goals from 30 shots.

Player *J*'s success rate is  $\frac{28}{36}$ .

Write the success rate of each player in the ratio *J*:*K*:*L*, where each value is an integer.  
Give your answer in its simplest form.

[4 marks]

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Answer                    :                    :



12 (a) Simplify  $3p^2q \times 4p^3q^2$

[2 marks]

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Answer \_\_\_\_\_

(b) Given  $a = 4b^3$  and  $b = 2m^2$ , write an expression for  $a$  in terms of  $m$ .

Give your answer in its simplest form.

[2 marks]

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Answer \_\_\_\_\_

(c) Write  $\sqrt{32} \times \frac{1}{2^2}$  as a single power of 2

[3 marks]

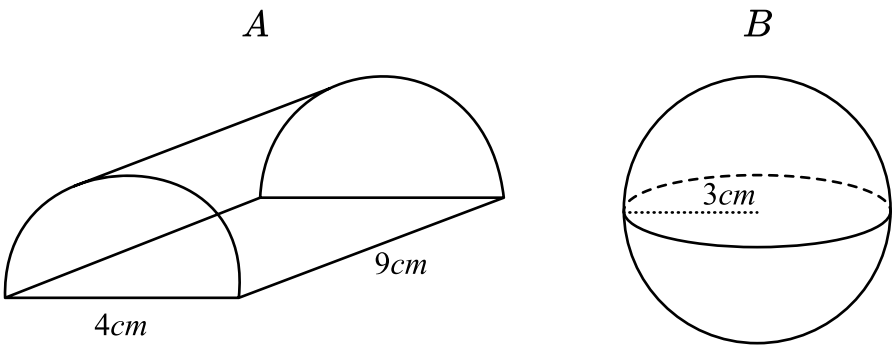
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Answer \_\_\_\_\_

13 Here are two shapes, *A* and *B*.



Not drawn  
accurately

Volume of a Cylinder:  $V = \pi r^2 h$

Volume of a Sphere:  $V = \frac{4}{3} \pi r^3$

How many times bigger is the volume of shape *A* than the volume of shape *B*?  
You must show your working.

[4 marks]

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Answer \_\_\_\_\_

- 14 The table shows information about the ages of 80 trees in a national park.

Age, $A$	Frequency
$0 < A \leq 40$	13
$40 < A \leq 80$	28
$80 < A \leq 120$	23
$120 < A \leq 160$	9
$160 < A \leq 200$	5
$200 < A \leq 240$	2

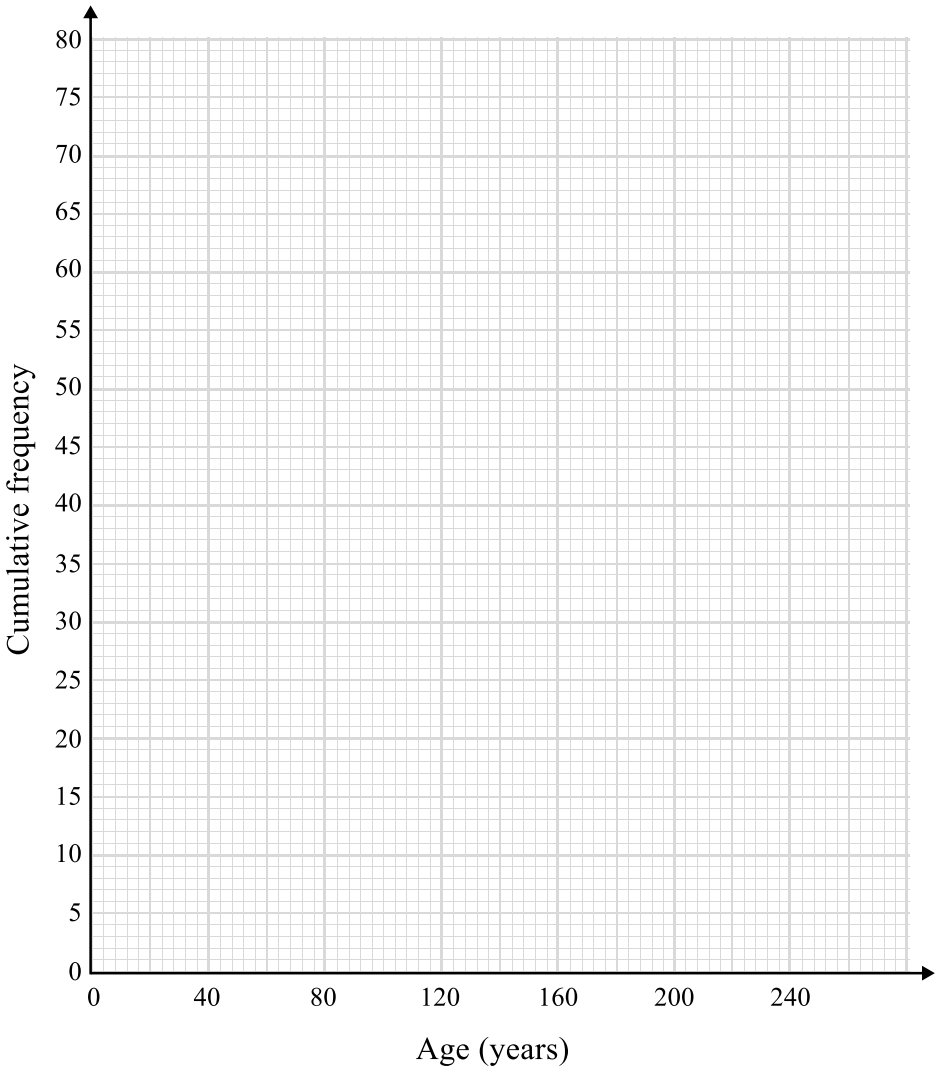
- (a) Complete the cumulative frequency table.

[1 mark]

Age, $A$	Cumulative Frequency
$A \leq 40$	
$A \leq 80$	
$A \leq 120$	
$A \leq 160$	
$A \leq 200$	
$A \leq 240$	

(b) On the grid below, draw a cumulative frequency graph for your completed table.

**[2 marks]**



(c) One tree is picked at random. Use your graph to find an estimate for the probability that the tree is over 100 years old.

**[3 marks]**

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Answer \_\_\_\_\_

**15** Express  $0.4\dot{3}\dot{5}$  as a fraction.

You must show all your working.

**[3 marks]**

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Answer \_\_\_\_\_

**16** Given that  $6\sin(30) \times 2\cos(30) = a\sqrt{3}$ , find the value of  $a$ .

**[3 marks]**

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Answer \_\_\_\_\_

**17** The probability that Olivia walks to school is 0.6.

When Olivia doesn't walk, she gets the bus.

When Olivia walks to school, the probability that she is late is 0.4.

When Olivia gets the bus, the probability that she is late is 0.1.

Find the probability that, on any one day, Olivia is late for school.

**[4 marks]**

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Answer \_\_\_\_\_

**18**  $P$  is inversely proportional to the square of  $Q$ .

$P = 1.5$  when  $Q = 10$ .

Find the value of  $P$  when  $Q = 5$

**[3 marks]**

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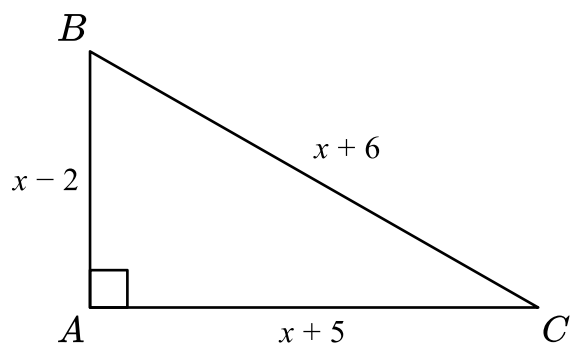
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Answer \_\_\_\_\_

19  $ABC$  is a right-angled triangle.



Form an equation in  $x$  and use it to work out the value of  $x$ .

**[4 marks]**

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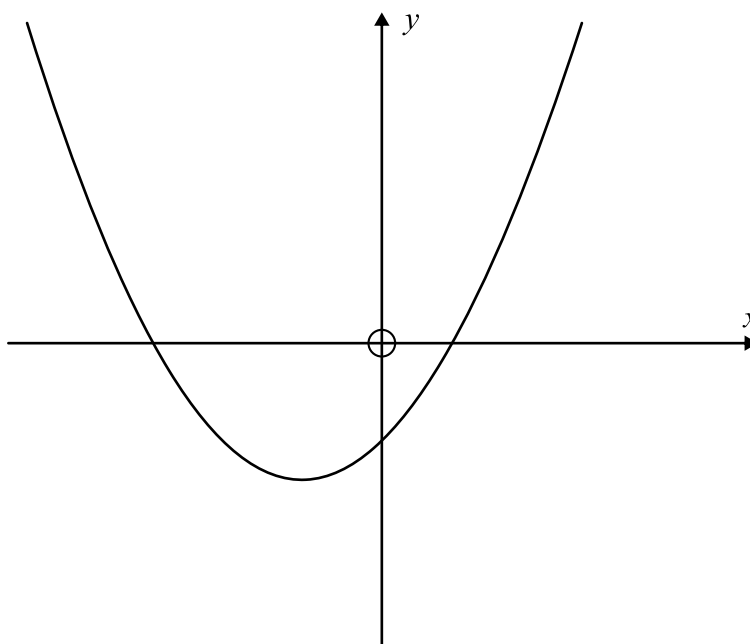
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Answer \_\_\_\_\_



**20** Here is a sketch of a curve.



The equation of the curve is  $y = x^2 + ax + b$  where  $a$  and  $b$  are integers.

The points  $(0, -6)$  and  $(1, 0)$  lie on the curve.

Find the coordinates of the turning point of the curve.

**[4 marks]**

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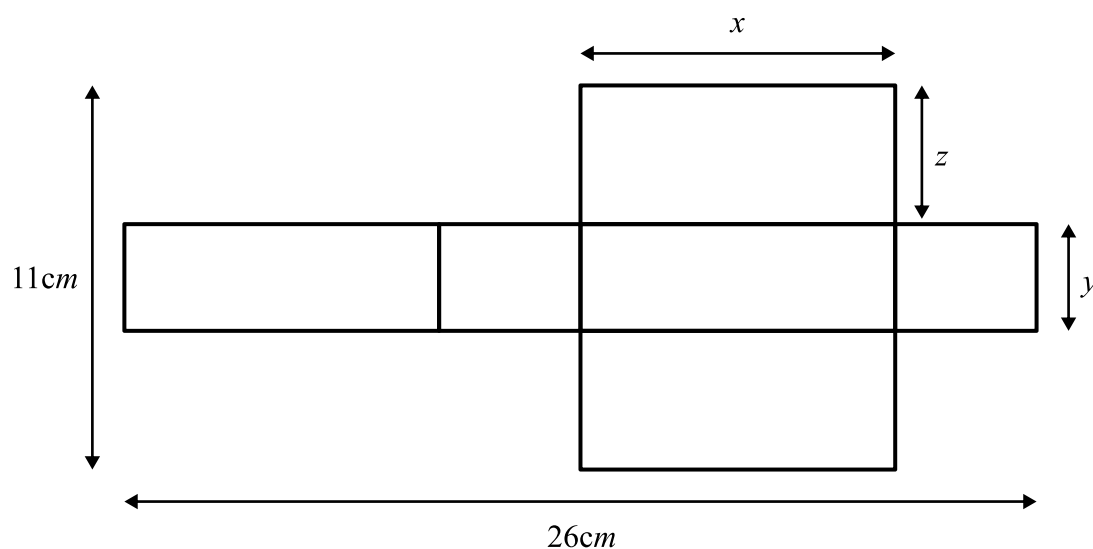
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Answer ( \_\_\_\_\_ , \_\_\_\_\_ )

- 21** A cuboid has length  $x$  cm, width  $y$  cm and height  $z$  cm.

Here is a net of the cuboid.



The ratio  $x:y = 3:1$ .

Find the value of  $x$ , the value of  $y$ , and the value of  $z$ .

**[5 marks]**

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$x =$  \_\_\_\_\_

$y =$  \_\_\_\_\_

$z =$  \_\_\_\_\_

**22**  $a = \sqrt{90}$

$b = 2 + \sqrt{10}$

$M = \frac{a}{b}$

Work out the value of  $M$ .

Give your answer in the form  $a - \sqrt{b}$  where  $a$  and  $b$  are integers.

**[4 marks]**

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Answer \_\_\_\_\_

- 23** A rectangle has height  $h$  and base  $b$ . The area of the rectangle is  $54\text{cm}^2$  and the perimeter of the rectangle is  $33\text{cm}$ .

(a) Show that  $h = \frac{54}{b}$

**[1 mark]**

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- (b) Work out the height and base of the rectangle.

**[3 marks]**

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Answer \_\_\_\_\_

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