

# AQA

GCSE

# Mathematics

## SET B – Paper 1 Higher Tier

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# H

### Materials

Time allowed: 1 hour 30 minutes

**For this paper you must have:**

- mathematical instruments

**You may not use a calculator.**



### Instructions

- Use black ink or black ball-point pen. Draw diagrams in pencil.
- Answer **all** questions.
- You must answer the questions in the space provided.
- In all calculations, show clearly how you work out your answer.

### Information

- The marks for questions are shown in brackets.
- The maximum mark for this paper is 80.
- You may use additional paper, graph paper and tracing paper.

**Name:** .....

Answer **all** questions in the spaces provided.

1  $f(x) = x - 3$

Circle the expression for  $f^{-1}(x)$

[1 mark]

$$\frac{x}{3}$$

$$x + 3$$

$$3x$$

$$3 - x$$

2 Circle the equation with roots 2 and -3.

[1 mark]

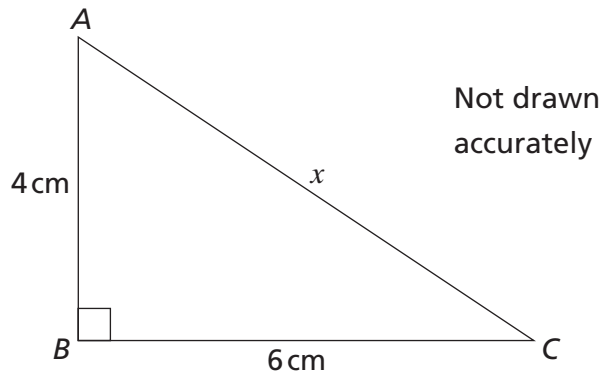
$$(x + 2)(x - 3) = 0$$

$$(x - 2)(x + 3) = 0$$

$$(x - 2)(x - 3) = 0$$

$$(x + 2)(x + 3) = 0$$

3 (a) Here is a right-angled triangle  $ABC$ .



Circle the **exact** value of the length  $x$ .

[1 mark]

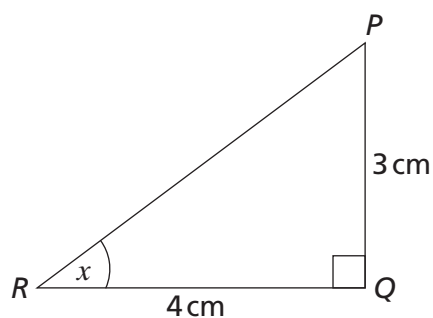
$$7.2111 \text{ cm}$$

$$8 \text{ cm}$$

$$\sqrt{52} \text{ cm}$$

$$10 \text{ cm}$$

- 3 (b) Here is a right-angled triangle  $PQR$ .



Not drawn  
accurately

Circle the value of the tangent of angle  $x$ .

[1 mark]

$$\frac{3}{5}$$

$$\frac{3}{4}$$

$$\frac{4}{5}$$

$$\frac{4}{3}$$

4 Solve  $3(x - 2) + 4 = \frac{x}{2}$

[3 marks]

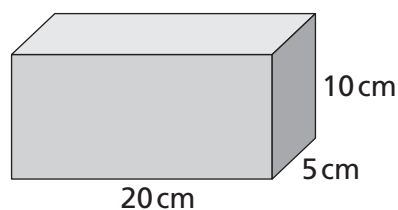
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$x =$  .....

- 5 Work out the surface area of the cuboid shown.



[3 marks]

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Answer .....  $\text{cm}^2$

6 Expand and simplify  $4(x + 1) - 2(3x - 4)$

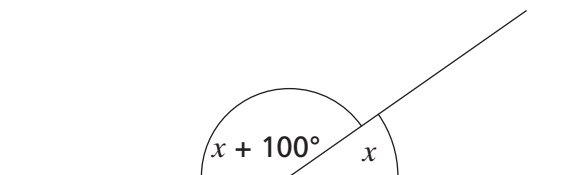
[3 marks]

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Answer .....

7 Part of a regular polygon is shown.



How many sides does the polygon have?

[3 marks]

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Answer .....

8 (a) Write  $2.3 \times 10^5$  as an ordinary number.

[1 mark]

Answer .....

8 (b) Write 0.0005 in standard form.

[1 mark]

Answer .....

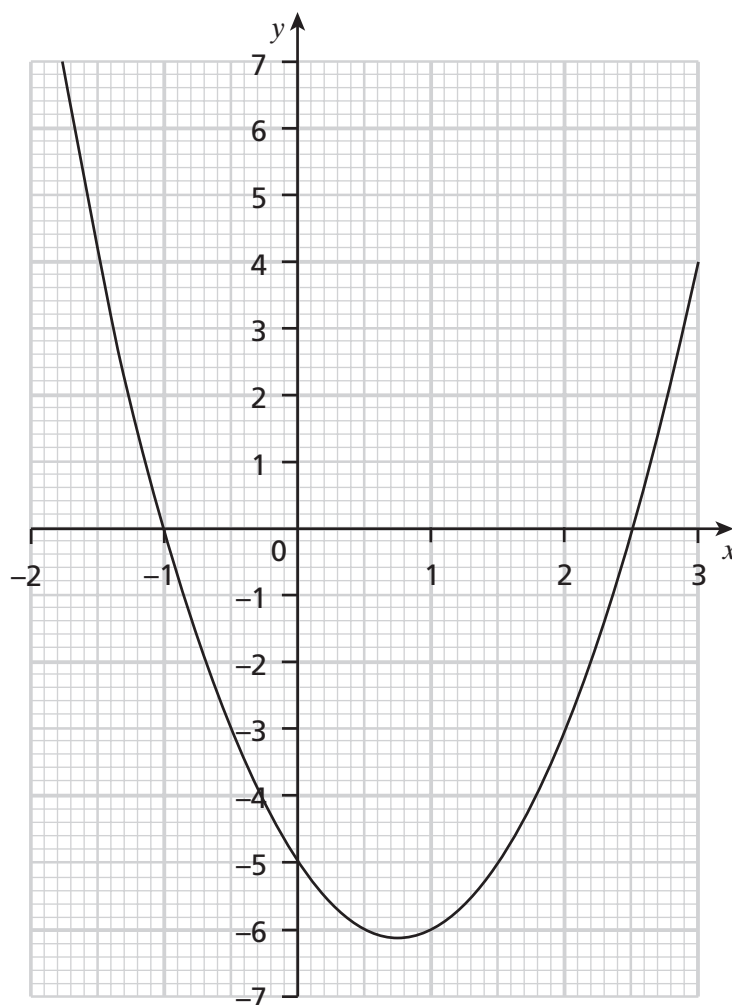
- 8 (c) Work out  $2 \times 10^4 \times 8 \times 10^3$

Give your answer in standard form.

[2 marks]

Answer .....

- 9 The graph of  $y = 2x^2 - 3x - 5$  is shown.



9 (a) Write down the values of  $x$  when  $y = 4$ .

[2 marks]

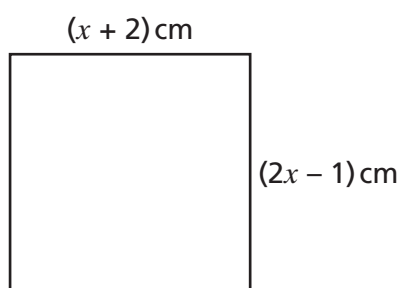
Answer ..... and .....

9 (b) Write down the coordinates of the minimum point.

[1 mark]

Answer ( ..... , ..... )

10 Here is a square.



Not drawn  
accurately

Work out the area.

You **must** show your working.

[5 marks]

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Answer .....  $\text{cm}^2$

11 Expand  $(x + 1)^2(x - 3)$

[3 marks]

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Answer .....

12 A cylinder has a base diameter that is  $\frac{1}{3}$  of the height.

The volume of the cylinder is  $48\pi$

Work out the **radius** of the base.

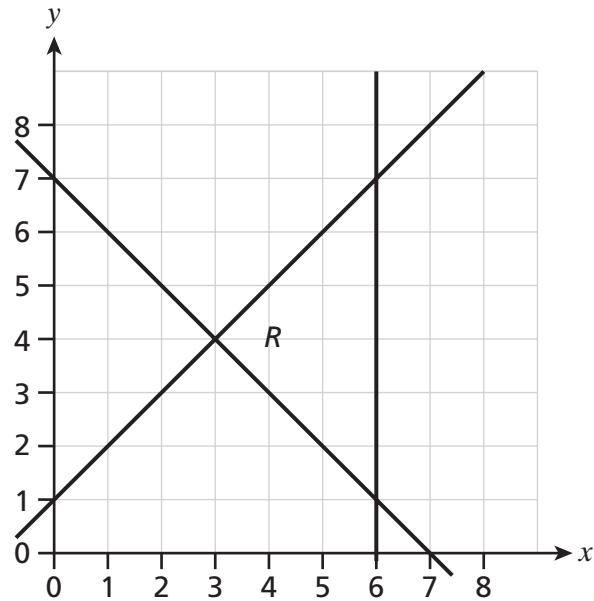
[3 marks]

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Answer ..... cm

13 Write down the three inequalities that define the region  $R$ .



[3 marks]

Answer .....  
.....  
.....

14 Expand and simplify  $(3 + \sqrt{2})(9 - \sqrt{8})$   
Give your answer in the form  $a + b\sqrt{2}$ , where  $a$  and  $b$  are integers.

[3 marks]

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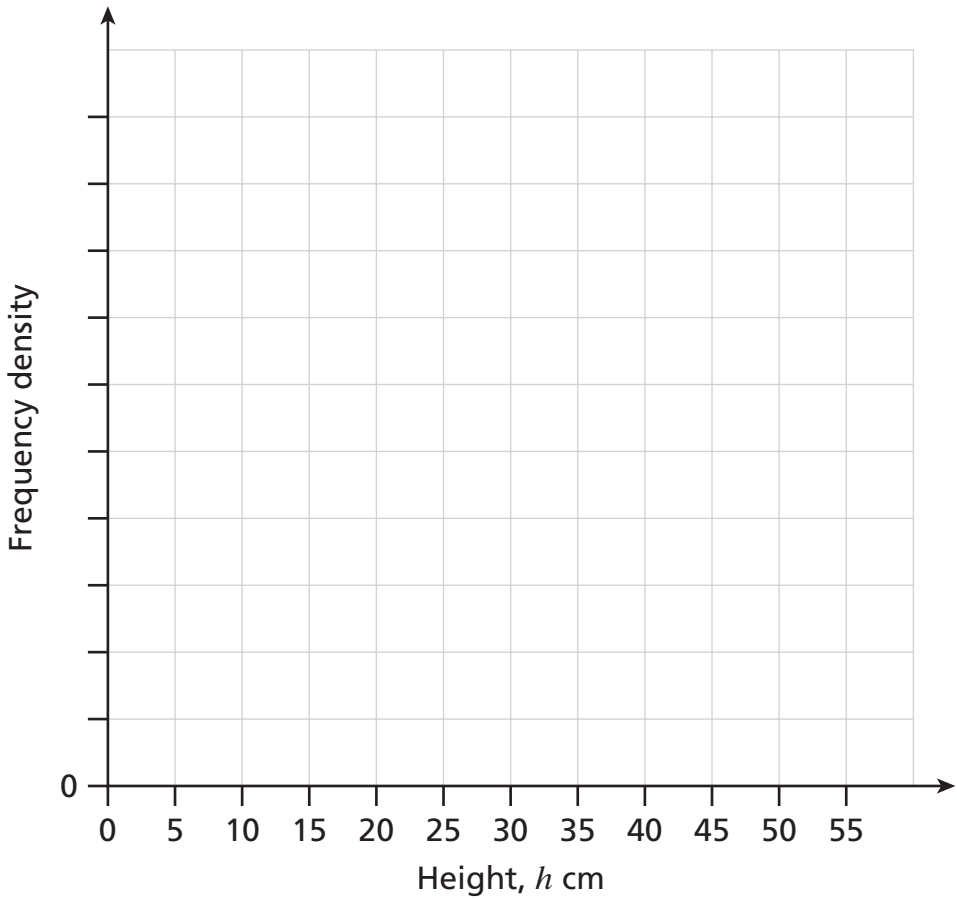
Answer .....



15 Draw a histogram for the data below.

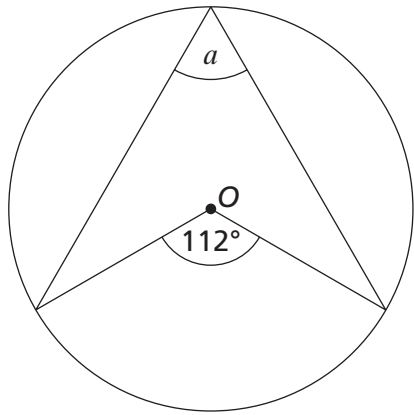
Height, $h$ cm	Frequency
$5 \leq h < 10$	15
$10 \leq h < 20$	35
$20 \leq h < 35$	30
$35 \leq h < 45$	15
$45 \leq h < 50$	5

[3 marks]



16 (a)  $O$  is the centre of the circle.

Work out the size of angle  $a$  in degrees.



Not drawn accurately

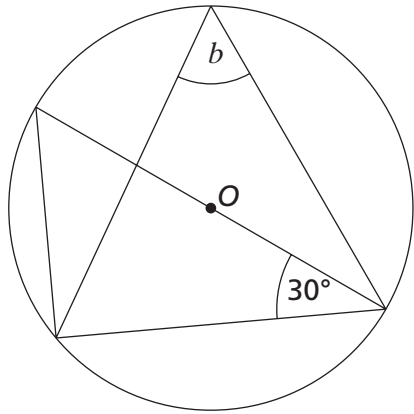
Circle your answer.

[1 mark]

- 56
- 68
- 112
- 248

16 (b)  $O$  is the centre of the circle.

Work out the size of angle  $b$  in degrees.



Not drawn accurately

Circle your answer.

[1 mark]

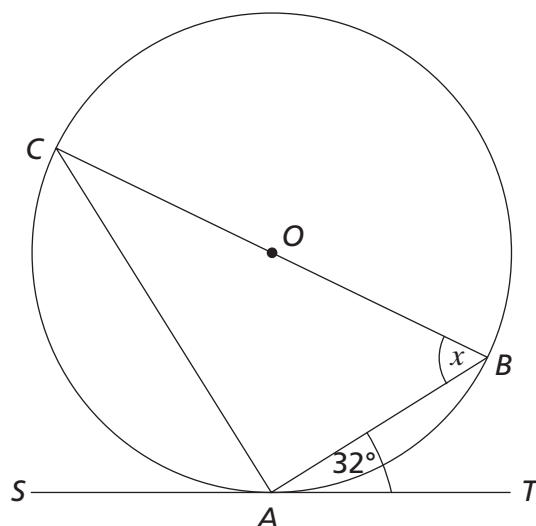
- 30
- 60
- 90
- 150

- 16 (c)  $ABC$  are points on the circumference of a circle, centre  $O$ .

$SAT$  is a tangent.

$BC$  is a diameter.

Angle  $BAT = 32^\circ$



Not drawn  
accurately

Work out the size of angle  $CBA$ , marked  $x$  on the diagram.

You **must** show your working, which may be on the diagram.

[3 marks]

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Answer ..... $^\circ$

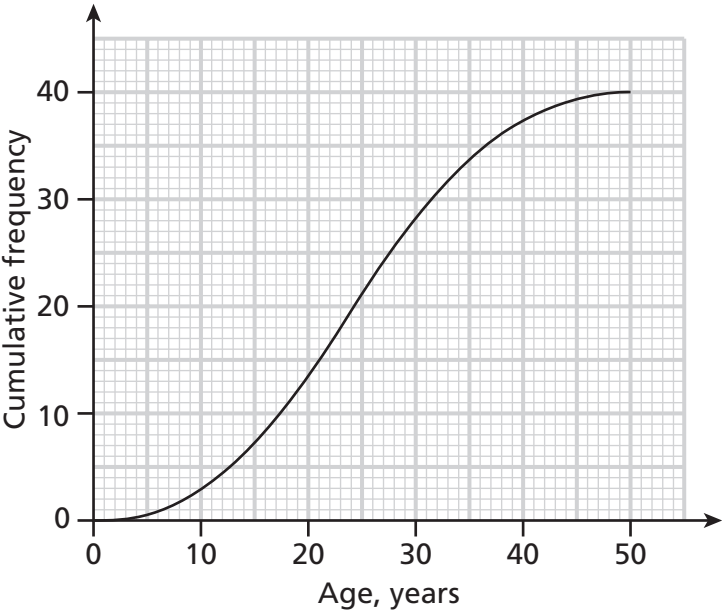
- 17 Work out  $64^{\frac{2}{3}}$

[2 marks]

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Answer .....

18 The cumulative frequency diagram shows the ages of people at a wedding.



18 (a) Write down an estimate of the median age.

[1 mark]

Answer ..... years

18 (b) Work out an estimate of the interquartile range.

[2 marks]

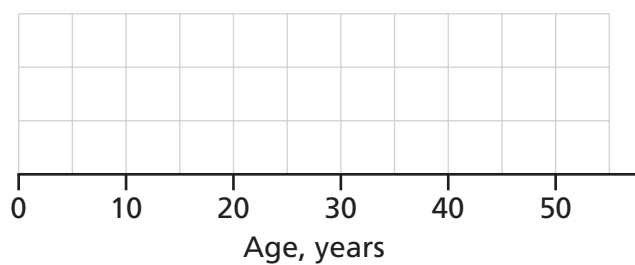
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Answer ..... years

- 18 (c) The youngest person at the wedding was 5 years old.

Draw a box plot for the data.

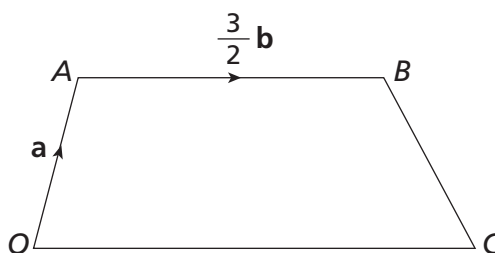
[2 marks]



- 19  $OABC$  is a trapezium.

$$\overrightarrow{OA} = \mathbf{a}$$

$$\overrightarrow{AB} = \frac{3}{2} \mathbf{b}$$



Not drawn  
accurately

- 19 (a) Write down the vector  $\overrightarrow{OB}$  in terms of  $\mathbf{a}$  and  $\mathbf{b}$ .

[1 mark]

Answer .....

19 (b)  $\overrightarrow{BC} = -\mathbf{a} + \frac{1}{2}\mathbf{b}$

Work out the vector  $\overrightarrow{OC}$ .

[2 marks]

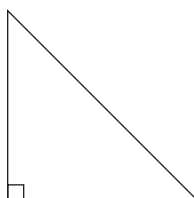
Answer .....

20 Write the recurring decimal 3.733333.... as a mixed number.

[3 marks]

Answer .....

21 The area of a right-angled isosceles triangle is  $9 \text{ cm}^2$ .



Not drawn  
accurately

Work out the perimeter of the triangle.

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

[5 marks]

Answer ..... cm

**22** A bag contains 10 counters.

7 of them are red, 3 of them are blue.

Two counters are taken from the bag.

Work out the probability that they are different colours.

**[5 marks]**

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Answer .....

**23** Simplify fully  $\frac{4x^2 - 4x - 15}{2x + 8} \times \frac{2x^2 + 5x - 12}{4x^2 - 9}$

**[4 marks]**

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Answer .....

24  $A(3, 10)$  and  $B(7, 8)$  are two points.

Work out the equation of the line that is  
perpendicular to  $AB$   
passes through the midpoint of  $AB$ .

[5 marks]

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Answer .....

END OF QUESTIONS