Please write clearly in block capitals.

Centre number | | | | | | Candidate number | | | | |

Surname _____

Forename(s) _____

Candidate signature _____

GCSE MATHEMATICS

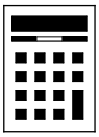
H

Higher Tier Paper 2 Calculator

Thursday 8 June 2017 Morning Time allowed: 1 hour 30 minutes

Materials

For this paper you must have:
- a calculator
- mathematical instruments.



Instructions
- Use black ink or black ball-point pen. Draw diagrams in pencil.
- Answer **all** questions.
- You must answer the questions in the spaces provided. Do not write outside the box around each page or on blank pages.
- Do all rough work in this book. Cross through any work you do not want to be marked.

Information
- The marks for questions are shown in brackets.
- The maximum mark for this paper is 80.
- You may ask for more answer paper, graph paper and tracing paper. These must be tagged securely to this answer book.

Advice
- In all calculations, show clearly how you work out your answer.

For Examiner's Use	
Pages	Mark
2–3	
4–5	
6–7	
8–9	
10–11	
12–13	
14–15	
16–17	
18–19	
20–21	
22–23	
24–25	
26–27	
TOTAL	

Do not write outside the box

Answer **all** questions in the spaces provided

1 Circle the decimal that is closest in value to $\frac{39}{800}$

[1 mark]

0.04 0.048 0.049 0.05

2 Circle the area that is equal to 36 mm^2

[1 mark]

360 cm^2 3600 cm^2 3.6 cm^2 0.36 cm^2

Do not write outside the box

3 *A* is (2, 12) and *B* is (8, 2)

Circle the midpoint of *AB*.

[1 mark]

(3, 5) (4, 6) (5, 7) (6, 10)

4 Here is a sequence.

90 82 74 66 58

Circle the expression for the nth term of the sequence.

[1 mark]

$n - 8$ $98 - 8n$ $8n + 82$ $8n - 98$

Turn over for the next question

4

Do not write outside the box

5 A code has 4 digits.

Each digit is a number from 0 to 9

Digits may be repeated.

The code starts 5 4 1

5	4	1	

5 (a) Amy knows the last digit is odd but **not** 7

She chooses a different odd number at random.

What is the probability that she chooses the correct number?

[1 mark]

Answer _____

5 (b) The 4-digit code is changed to an even number.

The first digit is 3

How many possible codes are there?

[2 marks]

_____

_____

_____

Answer _____

Do not write outside the box

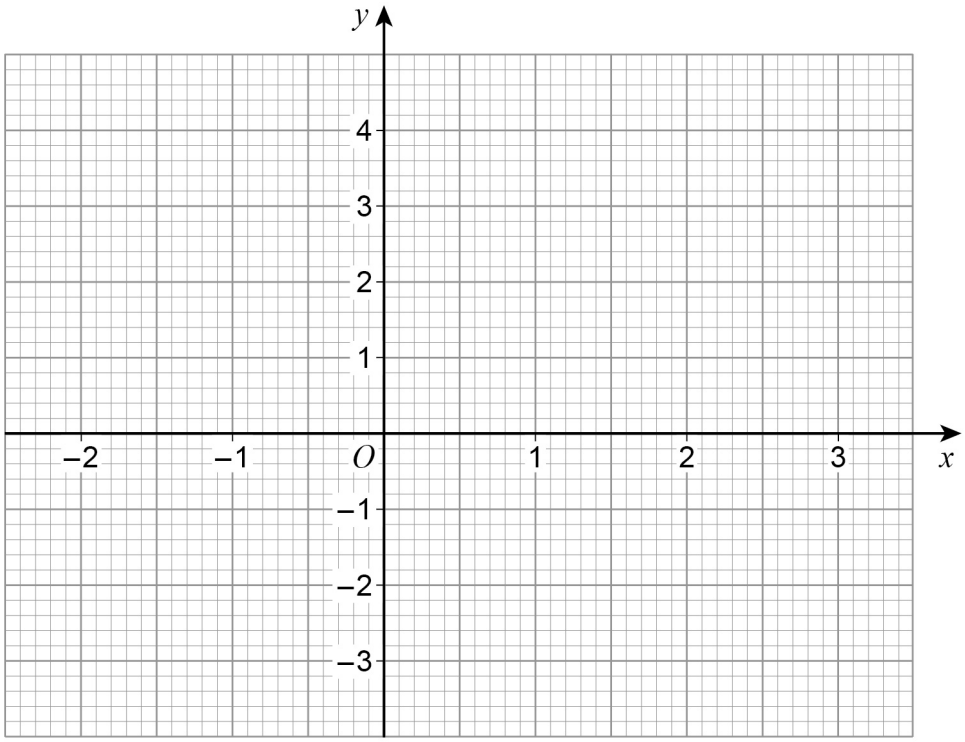
6 (a) Complete the table of values for $y = x^2 - x - 2$

[2 marks]

x	–2	–1	0	1	2	3
y			–2	–2		4

6 (b) Draw the graph of $y = x^2 - x - 2$ for values of x from –2 to 3

[2 marks]



6 (c) Write down the x-coordinate of the turning point of the graph.

[1 mark]

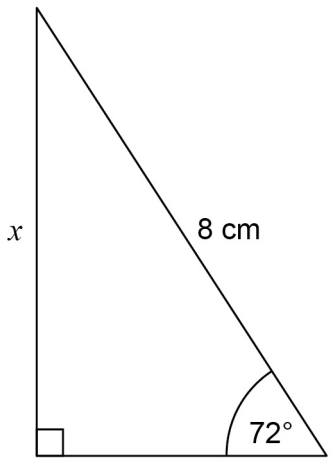
Answer _____

8

Turn over ►

Do not write outside the box

7 Use trigonometry to work out the length x.



Not drawn accurately

[2 marks]

Answer _____ cm

Do not write outside the box

8 Lily goes on a car journey.

For the first 30 minutes her average speed is 40 miles per hour.

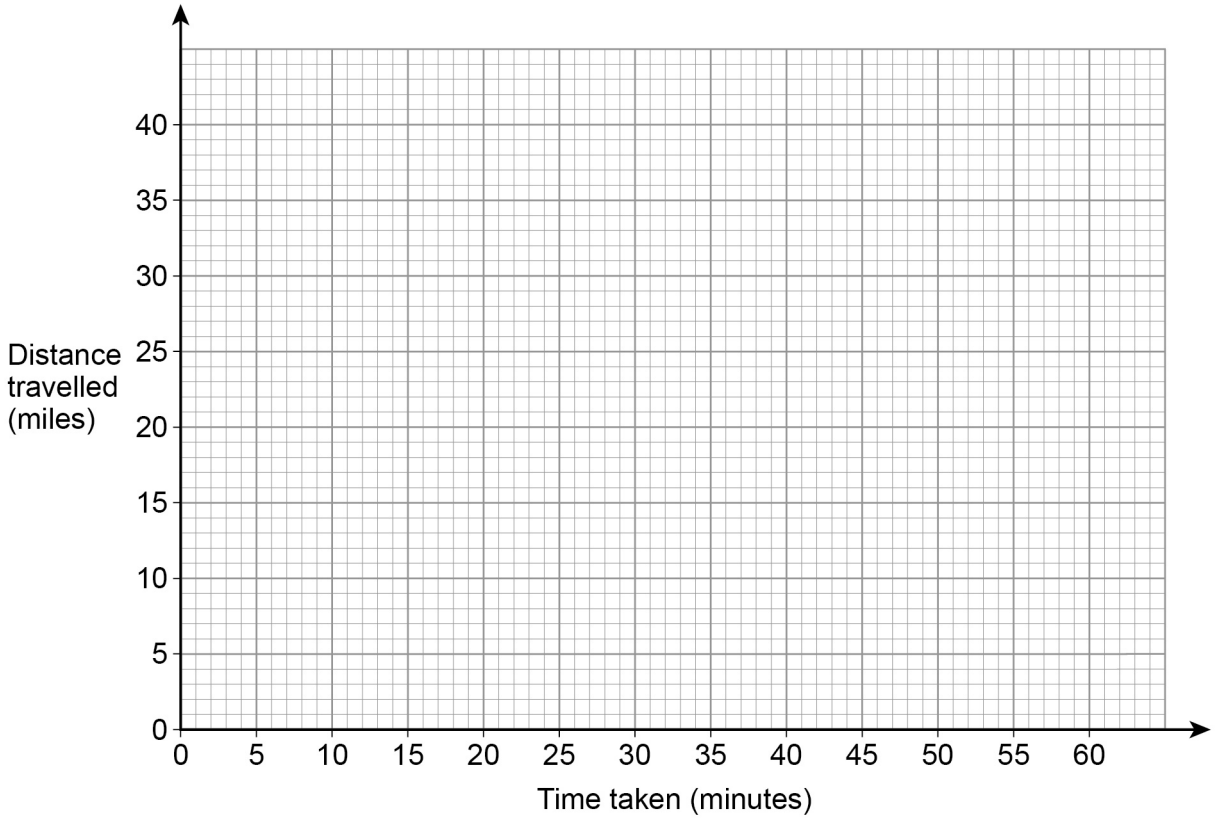
She then stops for 15 minutes.

She then completes the journey at an average speed of 60 miles per hour.

The total journey time is 1 hour.

8 (a) Draw a distance-time graph for her journey.

[3 marks]



8 (b) Write down the average speed for the total journey.

[1 mark]

Answer _____ mph

Turn over for the next question

6

Do not write outside the box

9 The table shows information about some CDs.

Type	Rock	Pop	Jazz
Number of CDs	2	x	$2x + 5$

A CD is chosen at random.

The probability it is **rock** is $\frac{1}{20}$

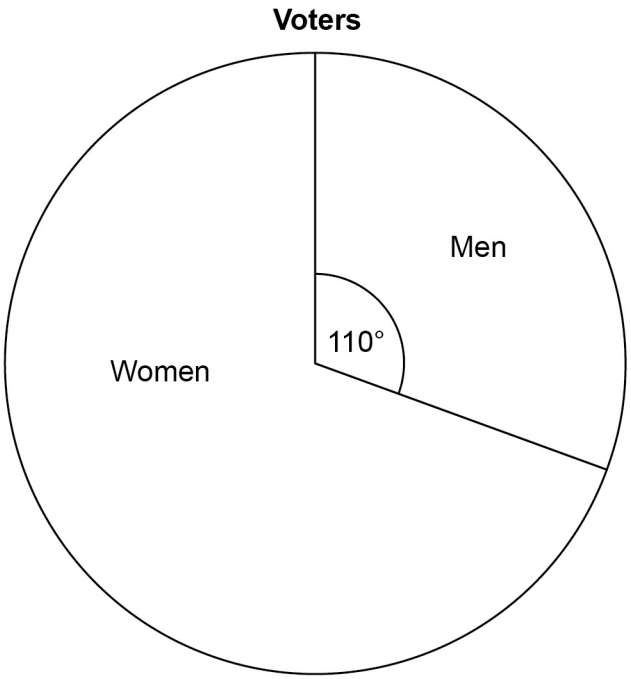
Work out the probability it is jazz.

[4 marks]

Answer _____

Do not write outside the box

10 The pie chart shows information about voters in an election.



3360 **more** women voted than men.

Work out the total number of voters.

[3 marks]

Answer _____

7

Turn over ►

Do not write outside the box

11 Write these numbers in **descending** order.

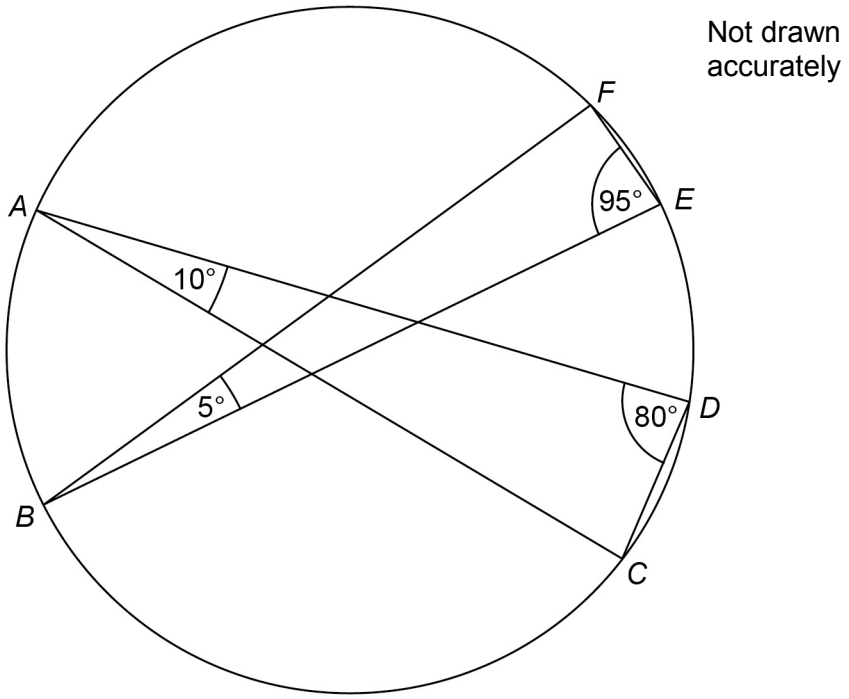
$9563 \qquad 9.56 \times 10^3 \qquad 9.56 \times 3^{10}$

[2 marks]

Answer _____ , _____ , _____

Do not write outside the box

12 *A*, *B*, *C*, *D*, *E* and *F* are points on a circle.



Circle the line that is a diameter of the circle.

[1 mark]

BE *AD* *AC* *BF*

Turn over for the next question

3

Do not write outside the box

13 To make one cheese sandwich, Gina uses one bread roll and two cheese slices.

Pack of 15 bread rolls	**Pack of 20 cheese slices**
£1.88	£2.15

She is going to buy enough packs to

have exactly twice as many cheese slices as bread rolls

make **more than** 100 cheese sandwiches.

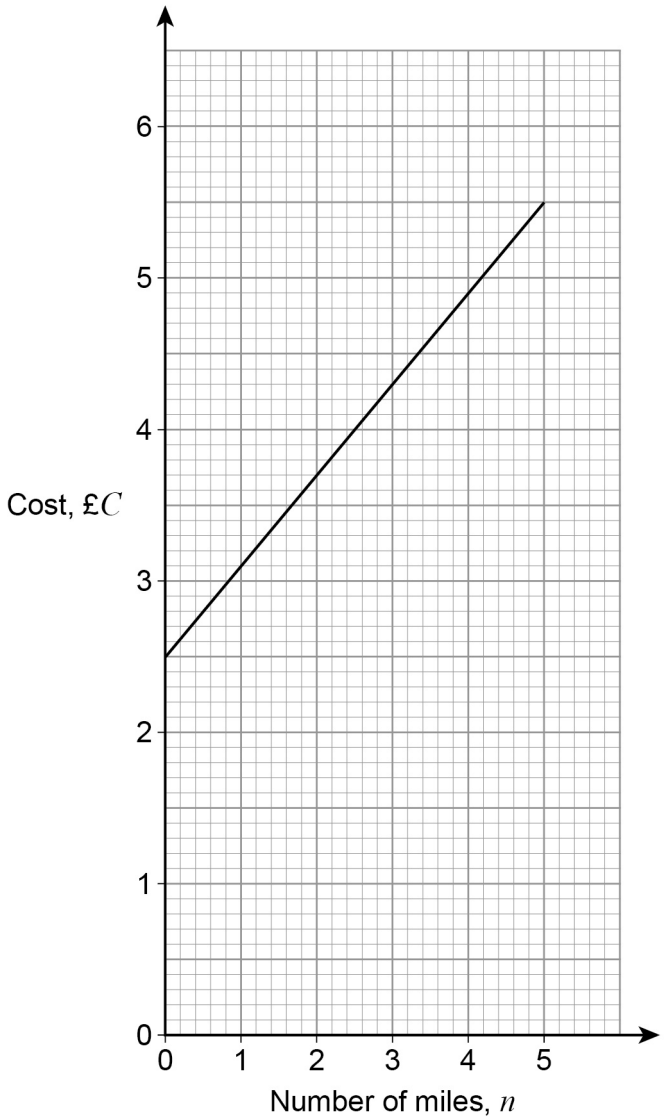
Work out the least amount she can spend.

[4 marks]

Answer £ _____

Do not write outside the box

14 The graph shows the cost of some taxi journeys.



Work out a formula for C in terms of n.

[3 marks]

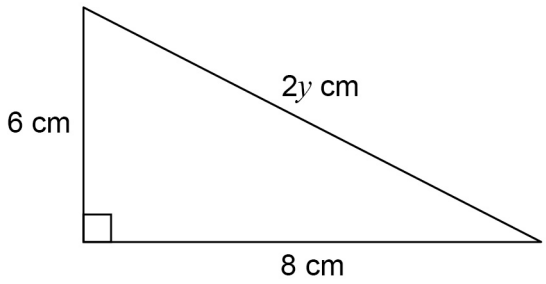
Answer _____

7

Turn over ►

Do not write outside the box

15 Sami is trying to work out the exact value of y using Pythagoras' theorem.



Not drawn accurately

Here is her working.

$$(2y)^2 = 6^2 + 8^2$$

$$2y^2 = 36 + 64$$

$$2y^2 = 100$$

$$y^2 = 100 \div 2$$

$$y^2 = 50$$

$$y = \sqrt{50}$$

15 (a) What error has she made in her working?

[1 mark]

Do not write outside the box

15 (b) Kai works out that $y = 5$

Mel says,

"y cannot be 5 because the hypotenuse should be the longest side and the other sides are longer than 5 cm"

Is Mel correct?

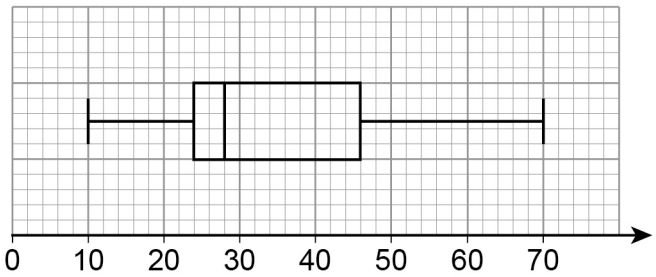
Tick a box.

Yes ☐ No ☐

Give a reason for your answer.

[1 mark]

16 Here is a box plot.



Circle the median value.

[1 mark]

28 35 24 22

3

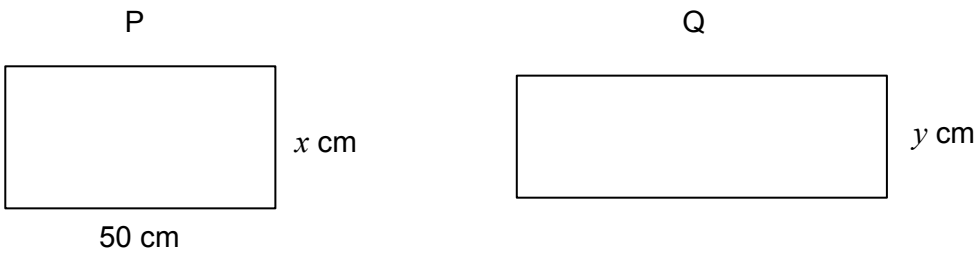
Turn over ►

Do not write outside the box

17 P is a rectangle with length 50 cm and width x cm

Q is a rectangle with width y cm

Not drawn accurately



The length of Q is 20% **more** than the length of P.

The area of Q is 10% **less** than the area of P.

Work out the ratio $x : y$

Give your answer in its simplest form.

[4 marks]

Answer _____ : _____

Do not write outside the box

18 A school has 86 teachers.

42 are male and 44 are female.

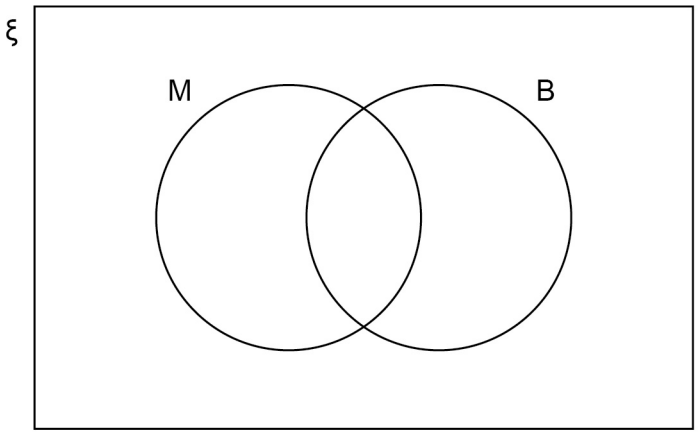
$\frac{1}{3}$ of the male teachers have blue eyes.

$\frac{1}{4}$ of the female teachers have blue eyes.

18 (a) ξ = teachers in the school

M = male teachers

B = teachers who have blue eyes



Complete the Venn diagram.

[3 marks]

18 (b) One teacher who has blue eyes is chosen at random.

Work out the probability that the teacher is male.

[1 mark]

Answer _____

8

Do not write outside the box

19 Rana sells 192 cakes in the ratio small : medium : large = 7 : 6 : 11

The profit for one medium cake is twice the profit for one small cake.

The profit for one large cake is three times the profit for one small cake.

Her total profit is £532.48

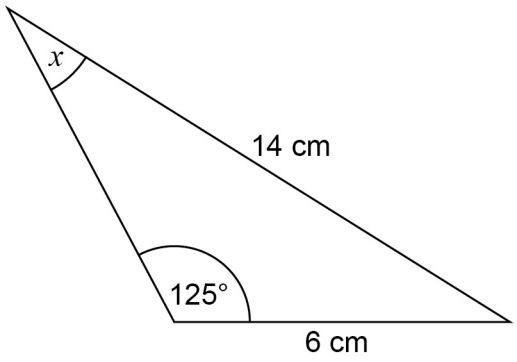
Work out the profit for one small cake.

[5 marks]

Answer £ _____

Do not write outside the box

20 Work out the size of angle x.



Not drawn accurately

[3 marks]

Answer _____ degrees

Turn over for the next question

8

Do not write outside the box

21 Solve $5x^2 = 10x + 4$

Give your answers to 2 decimal places.

[4 marks]

Answer _____

Do not write outside the box

22 A ball, dropped vertically, falls d metres in t seconds.

d is directly proportional to the square of t.

The ball drops 45 metres in the first 3 seconds.

How far does the ball drop in the **next** 7 seconds?

[4 marks]

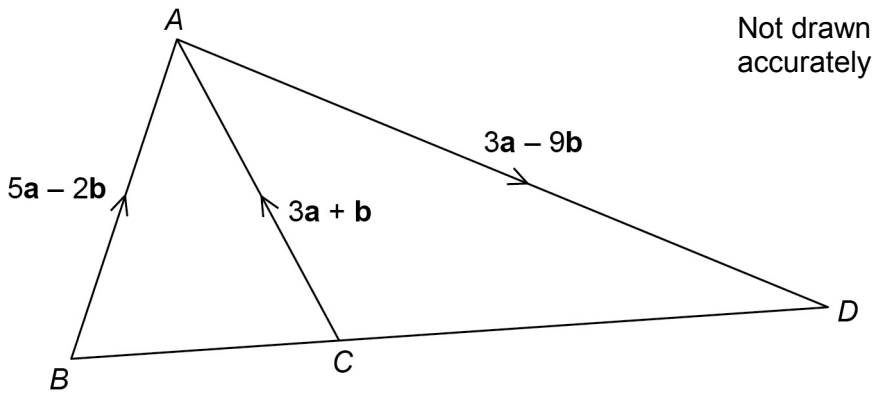
Answer _____ metres

Turn over for the next question

8

Do not write outside the box

23



Is *BCD* a straight line?

Show working to support your answer.

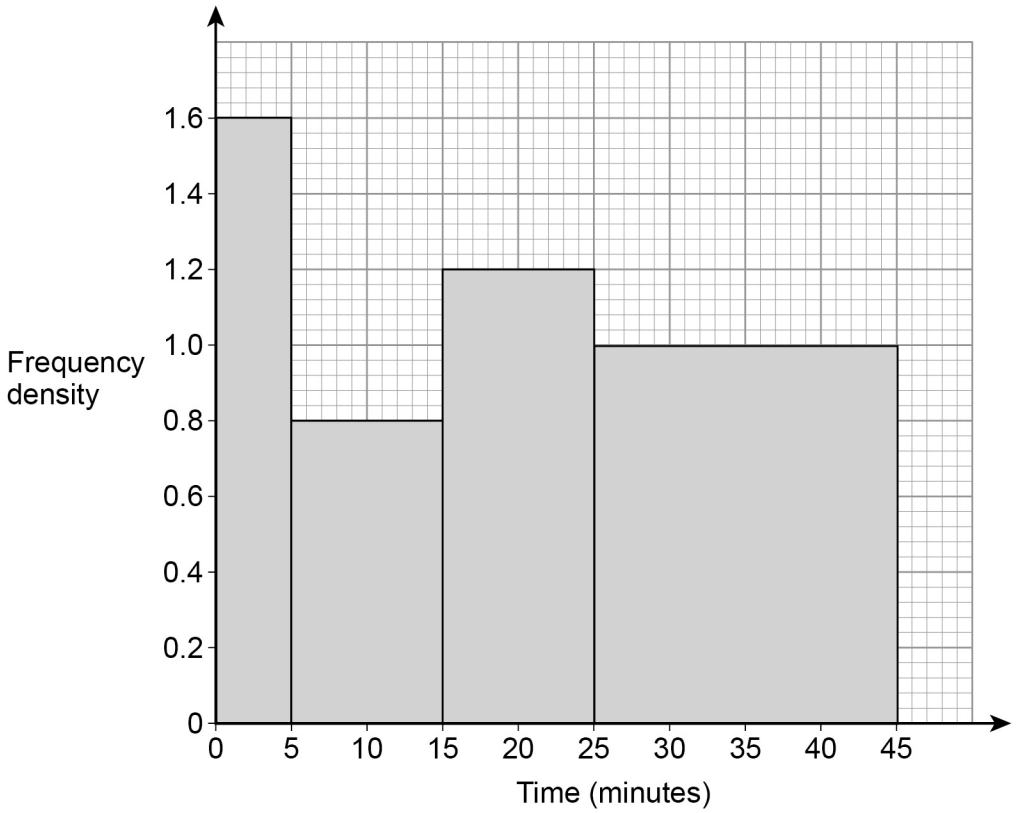
[3 marks]

Answer _____

Do not write outside the box

24 48 students completed some homework.

This histogram shows information about the times taken.



Work out an estimate of the interquartile range.

You **must** show your working.

[4 marks]

Answer _____ minutes

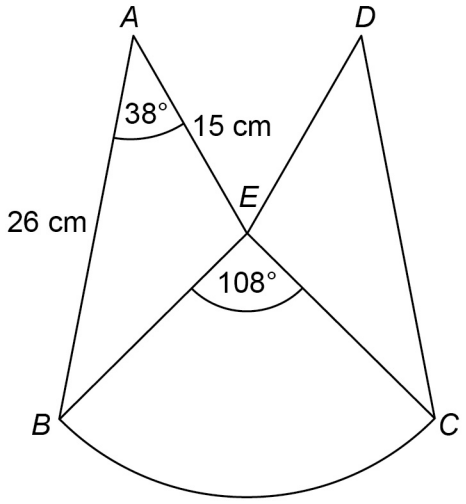
7

Do not write outside the box

25 The diagram shows a logo.

ABE and *DCE* are congruent triangles.

BCE is a sector of a circle, centre *E*.



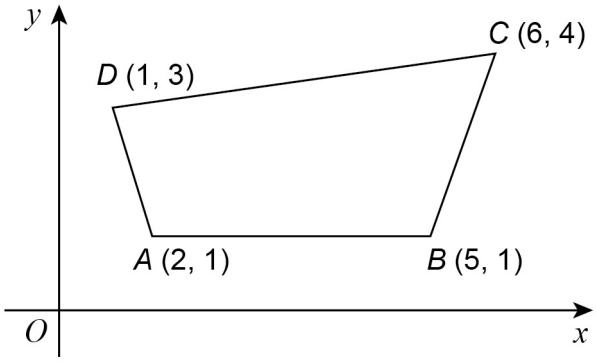
Not drawn accurately

Show that the area of the logo is 510 cm^2 to 2 significant figures.

[5 marks]

Do not write outside the box

26 (a) A sketch of a quadrilateral *ABCD* is shown.



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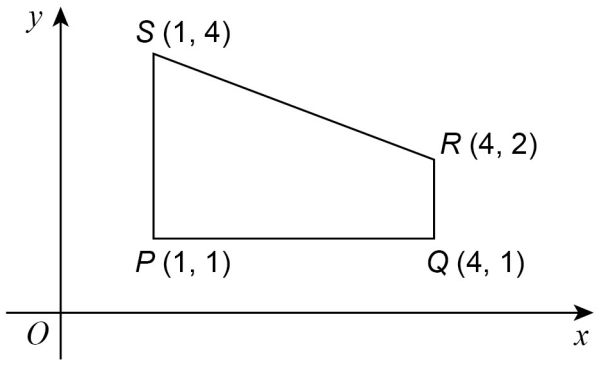
ABCD is enlarged, centre *B*, scale factor $\frac{1}{3}$

Circle the vertex that is invariant.

[1 mark]

A *B* *C* *D*

26 (b) A sketch of a quadrilateral *PQRS* is shown.



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PQRS is reflected in the line $y = x$

Circle the vertex that is invariant.

[1 mark]

P *Q* *R* *S*

7

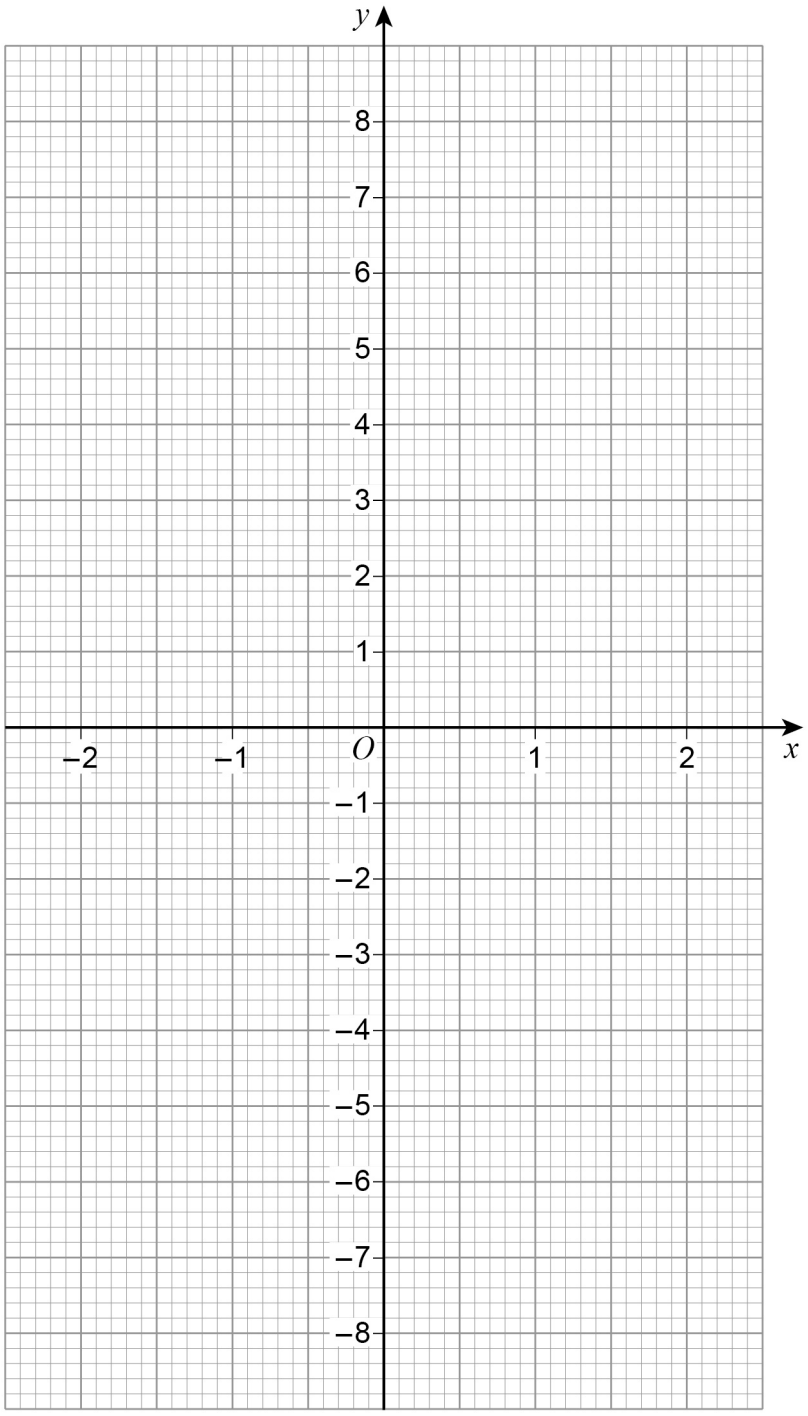
Turn over ►

Do not write outside the box

27 (a) $h(x) = \sqrt[3]{x}$ for all values of x

On the grid, draw the graph of the inverse function $y = h^{-1}(x)$ for $-2 \leqslant x \leqslant 2$

[2 marks]



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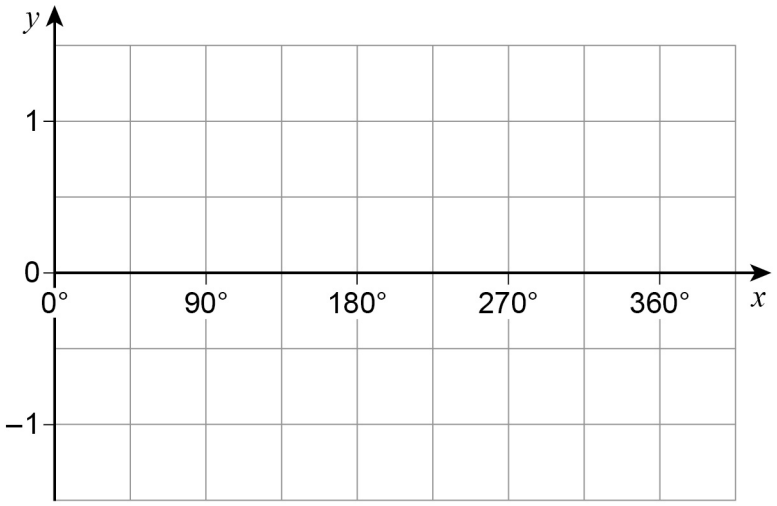
27 (b) For all values of x

$f(x) = \sin x$

$g(x) = x + 90$

On the grid, draw the graph of the composite function $y = fg(x)$ for $0° \leqslant x \leqslant 360°$

[2 marks]



END OF QUESTIONS

4

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