Please write clearly in block capitals.

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

Surname _____

Forename(s) _____

Candidate signature _____

GCSE MATHEMATICS

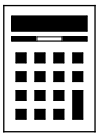
H

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.

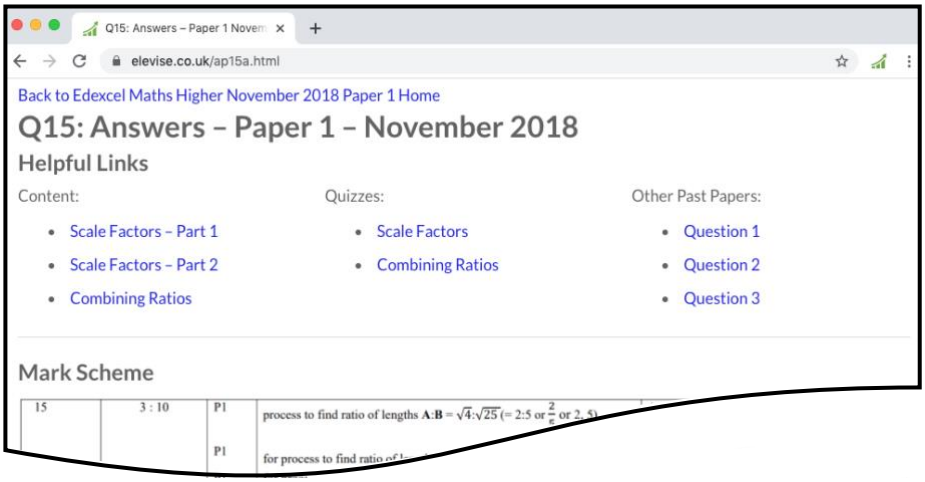
Information
- The marks for questions are shown in brackets.
- The maximum mark for this paper is 80.
- You may ask for more answer paper, graph paper and tracing paper. These must be tagged securely to this answer book.

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	

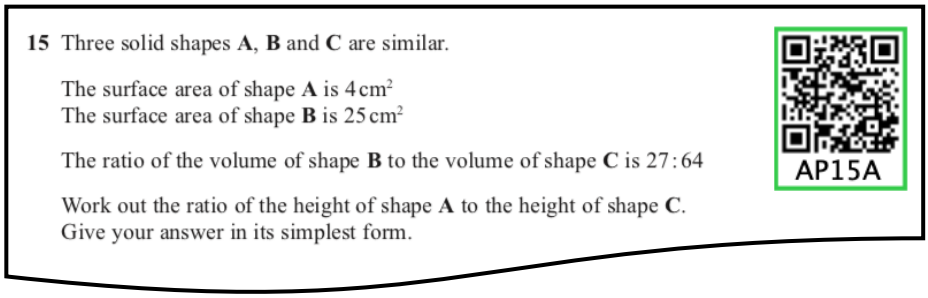
How the Past Papers work

Every past paper question has a corresponding webpage that has the mark scheme and worked solutions for that particular question. There are also helpful links to content for the concepts used to answer the question, quizzes that you can use to try some of the concepts and similar past paper questions. An example of a webpage for a question is given below:



How to get to the webpage

Every past paper question has a QR code next to it, such as:



You can get to the corresponding webpage in 3 different ways:

1) Scanning the QR code with the camera on a smart phone or tablet.
2) Typing the code that is underneath the QR code at the end of www.elevise.co.uk/. For this question, the code is AP15A, so you would type www.elevise.co.uk/AP15A into the address bar to obtain the webpage. If you would like to see the question rather than the answers, you change the A at the end of the code to a Q; you would type www.elevise.co.uk/AP15Q
3) Clicking on the QR code if you are viewing the past paper as a PDF or on a web browser.

www.elevise.co.uk

ELEVISE

Answer **all** questions in the spaces provided

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

[1 mark]

AK1A

0.04 0.048 0.049 0.05

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

[1 mark]

AK2A

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

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

Circle the midpoint of *AB*.

[1 mark]

AK3A

(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.

AK4A

[1 mark]

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

Turn over for the next question

4

5 A code has 4 digits.

Each digit is a number from 0 to 9

Digits may be repeated.

AK5A

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 _____

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

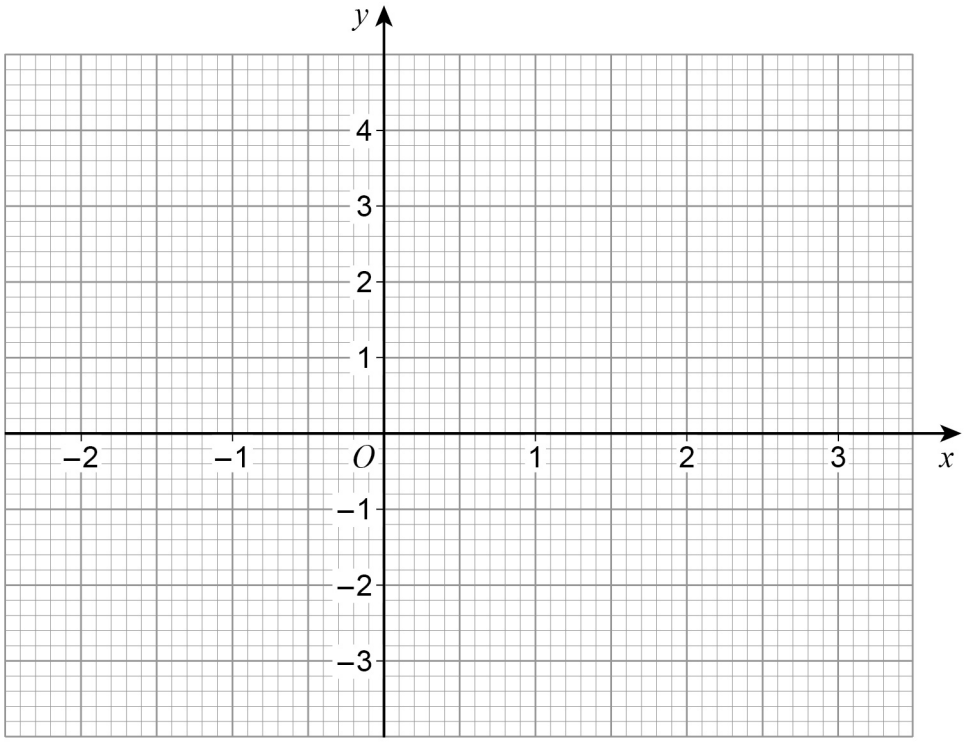
[2 marks]

AK6A

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.

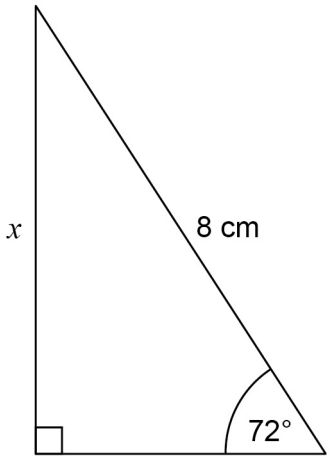
[1 mark]

Answer _____

8

Turn over ►

7 Use trigonometry to work out the length x.



Not drawn accurately

AK7A

[2 marks]

Answer _____ cm

AK8A

8 Lily goes on a car journey.

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

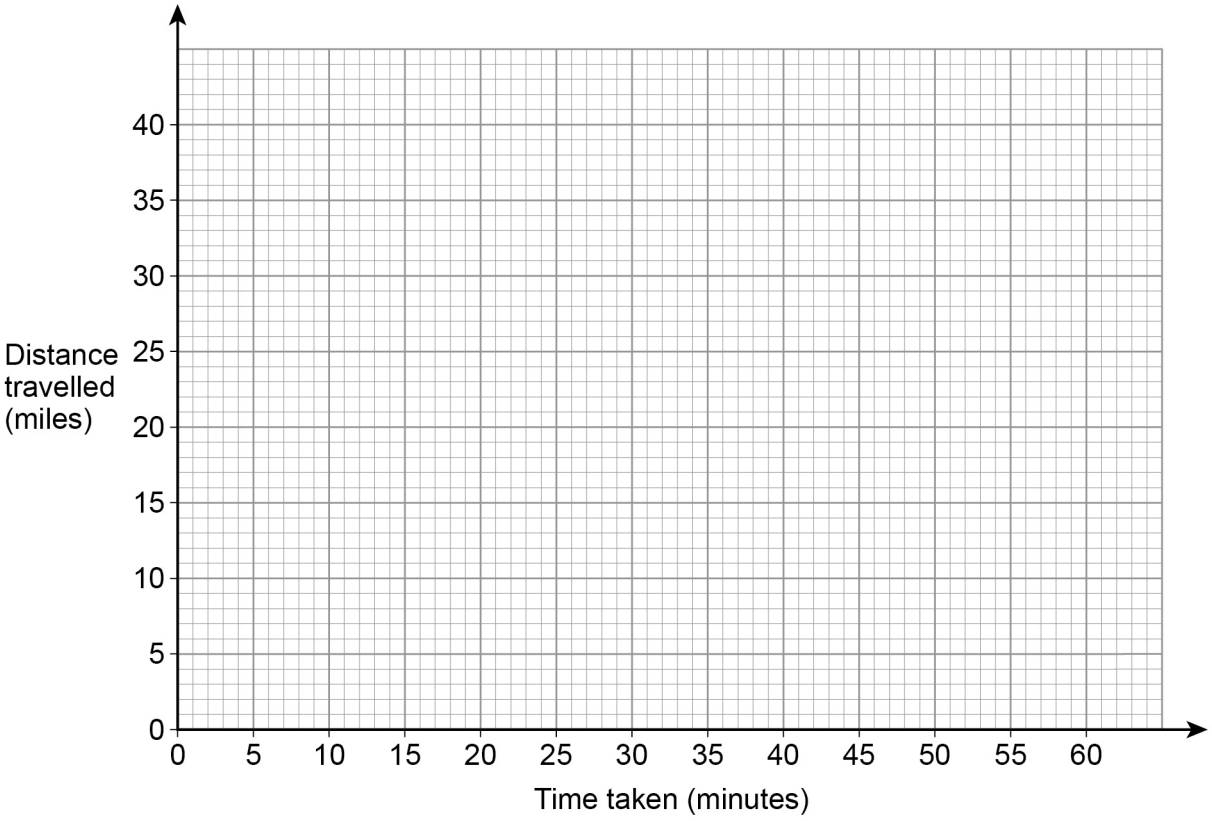
She then stops for 15 minutes.

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

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.

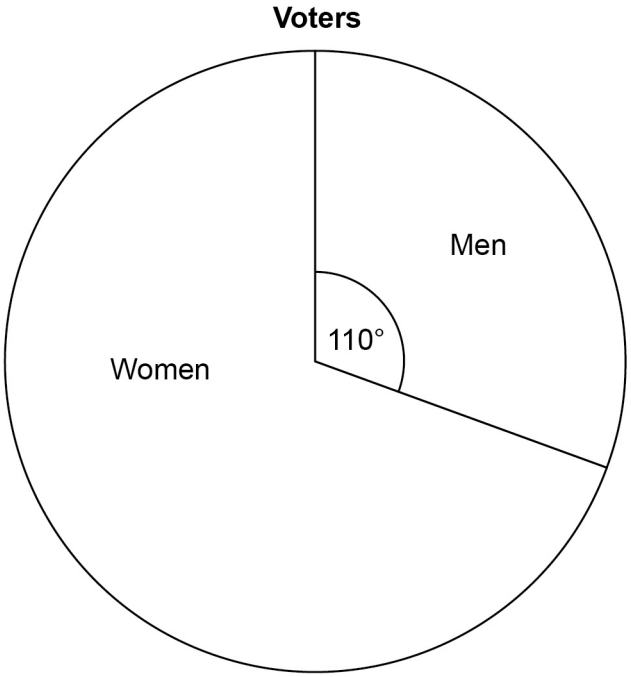
AK9A

[4 marks]

Answer _____

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

AK10A



3360 **more** women voted than men.

Work out the total number of voters.

[3 marks]

Answer _____

7

Turn over ►

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

AK11A

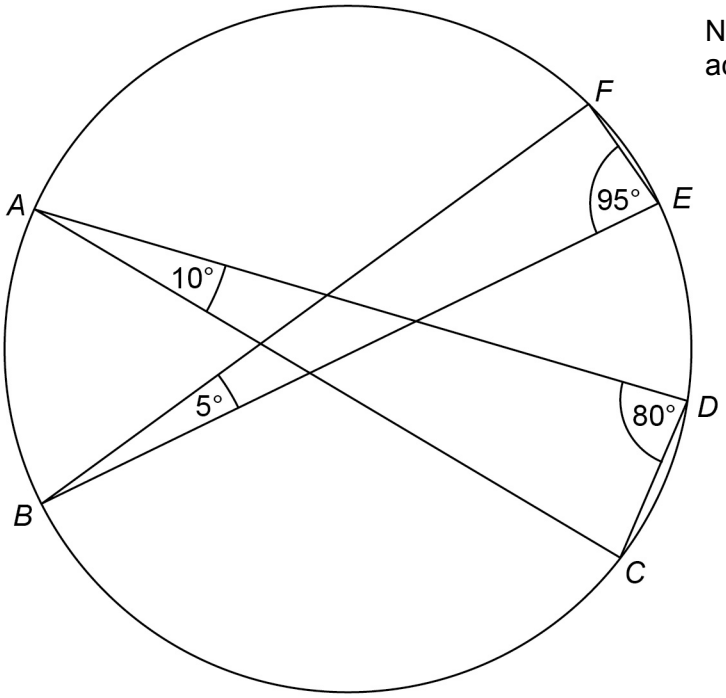
9563 9.56×10^3 9.56×3^{10}

[2 marks]

Answer _____ , _____ , _____

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

AK12A



Circle the line that is a diameter of the circle.

[1 mark]

BE *AD* *AC* *BF*

Turn over for the next question

3

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.

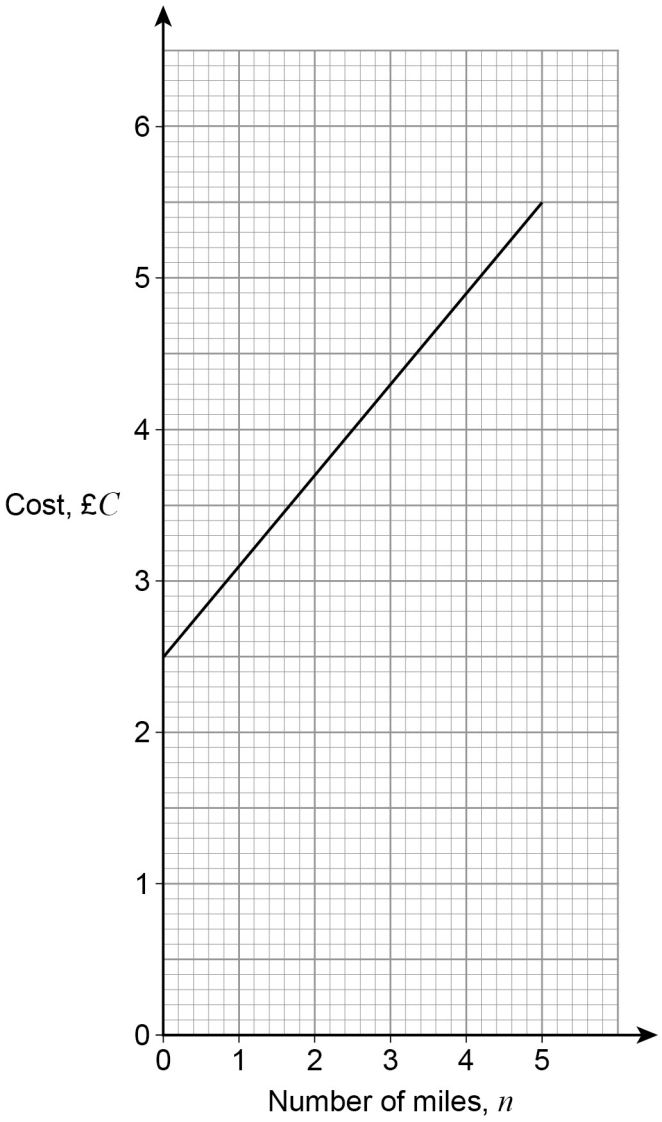
Work out the least amount she can spend.

[4 marks]

Answer £ _____

14 The graph shows the cost of some taxi journeys.

AK14A



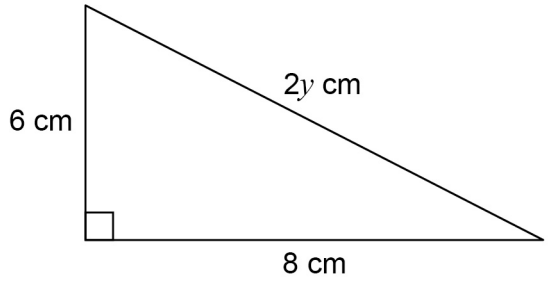
Work out a formula for C in terms of n.

[3 marks]

Answer _____

7

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



Not drawn accurately

Here is her working.

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

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

$$2y^2 = 100$$

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

$$y^2 = 50$$

$$y = \sqrt{50}$$

AK15A

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

[1 mark]

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?

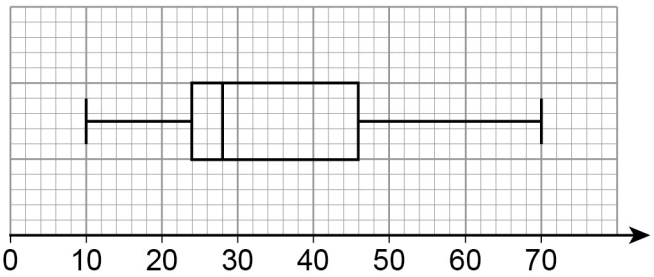
Tick a box.

Yes ☐ No ☐

Give a reason for your answer.

[1 mark]

16 Here is a box plot.



AK16A

Circle the median value.

[1 mark]

28 35 24 22

3

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

Q is a rectangle with width y cm

Not drawn accurately

P

Q

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.

AK17A

[4 marks]

Answer _____ : _____

18 A school has 86 teachers.

42 are male and 44 are female.

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

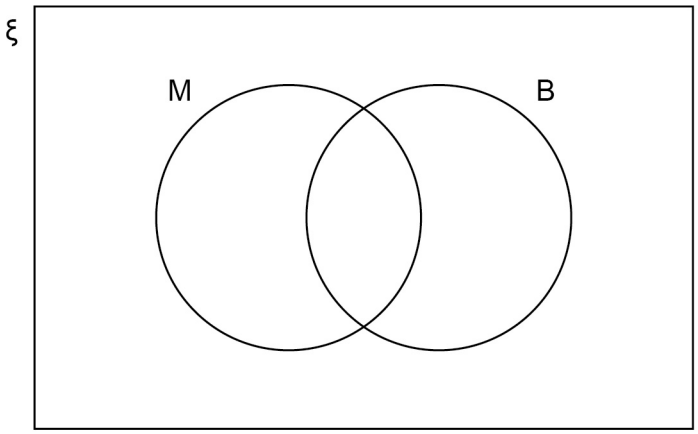
$\frac{1}{4}$ of the female teachers have blue eyes.

AK18A

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

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

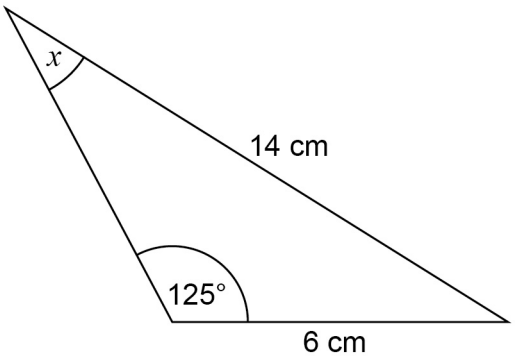
Work out the profit for one small cake.

[5 marks]

AK19A

Answer £ _____

20 Work out the size of angle x.



Not drawn accurately

[3 marks]

AK20A

Answer _____ degrees

Turn over for the next question

8

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

Give your answers to 2 decimal places.

[4 marks]

AK21A

Answer _____

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?

AK22A

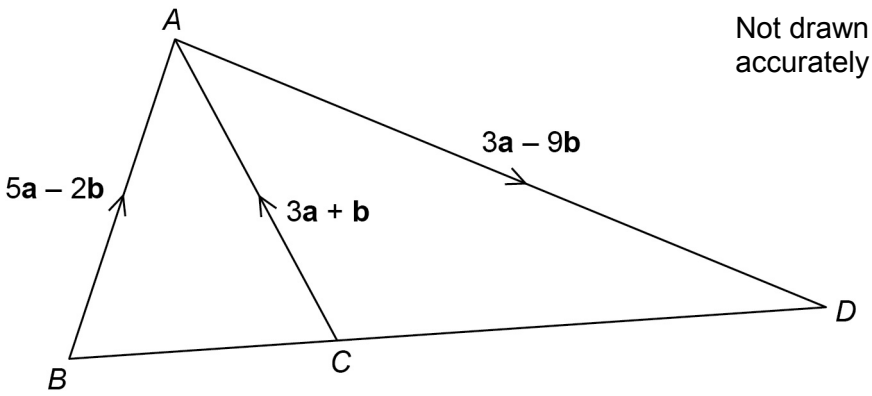
[4 marks]

Answer _____ metres

Turn over for the next question

8

23



AK23A

Is *BCD* a straight line?

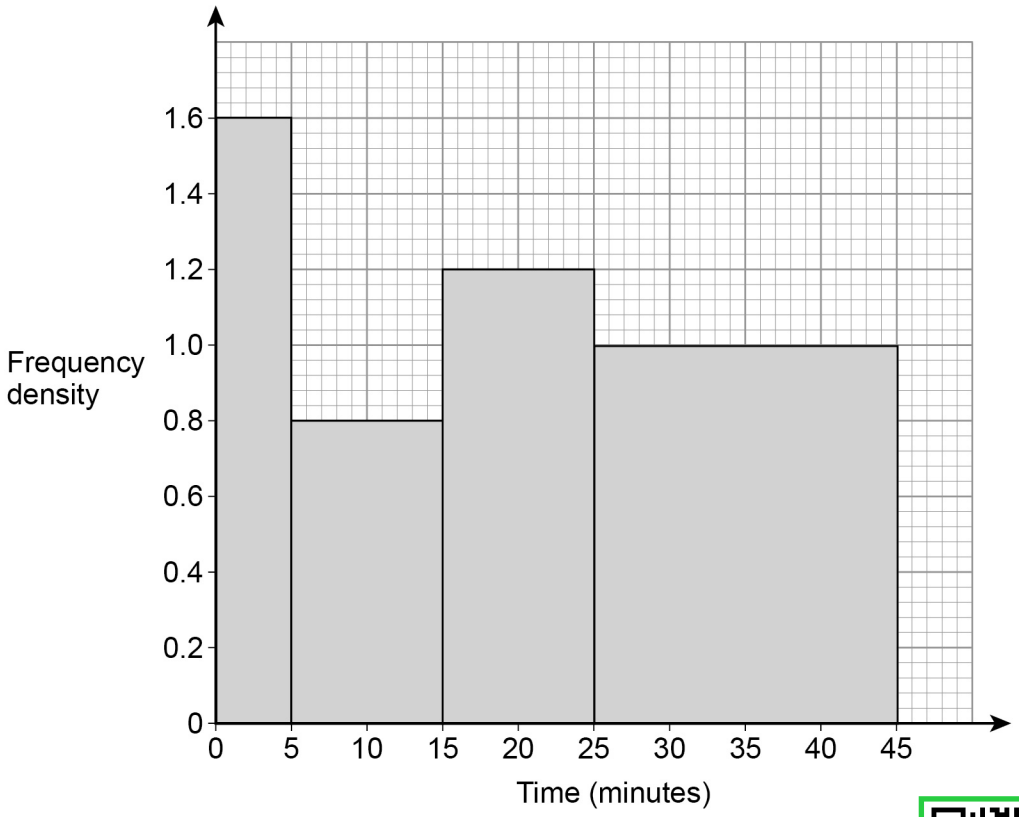
Show working to support your answer.

[3 marks]

Answer _____

24 48 students completed some homework.

This histogram shows information about the times taken.



AK24A

Work out an estimate of the interquartile range.

You **must** show your working.

[4 marks]

Answer _____ minutes

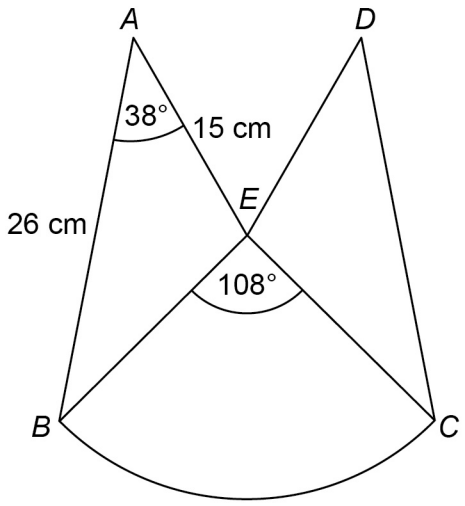
7

Turn over ►

25 The diagram shows a logo.

ABE and *DCE* are congruent triangles.

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



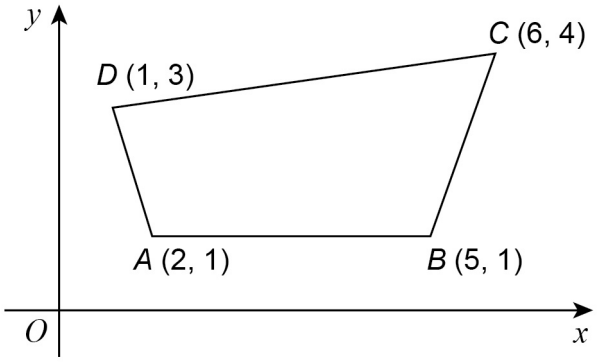
Not drawn accurately

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

AK25A

[5 marks]

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



Not drawn accurately

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

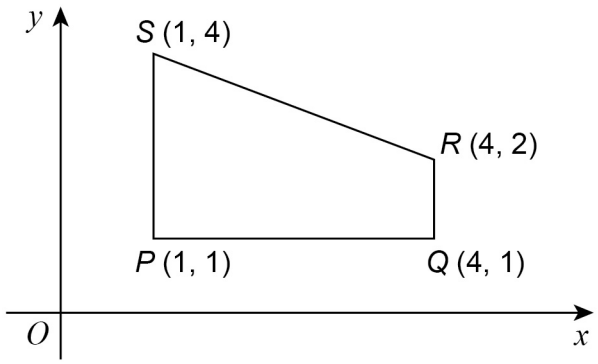
Circle the vertex that is invariant.

AK26A

[1 mark]

A *B* *C* *D*

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



Not drawn accurately

PQRS is reflected in the line $y = x$

Circle the vertex that is invariant.

[1 mark]

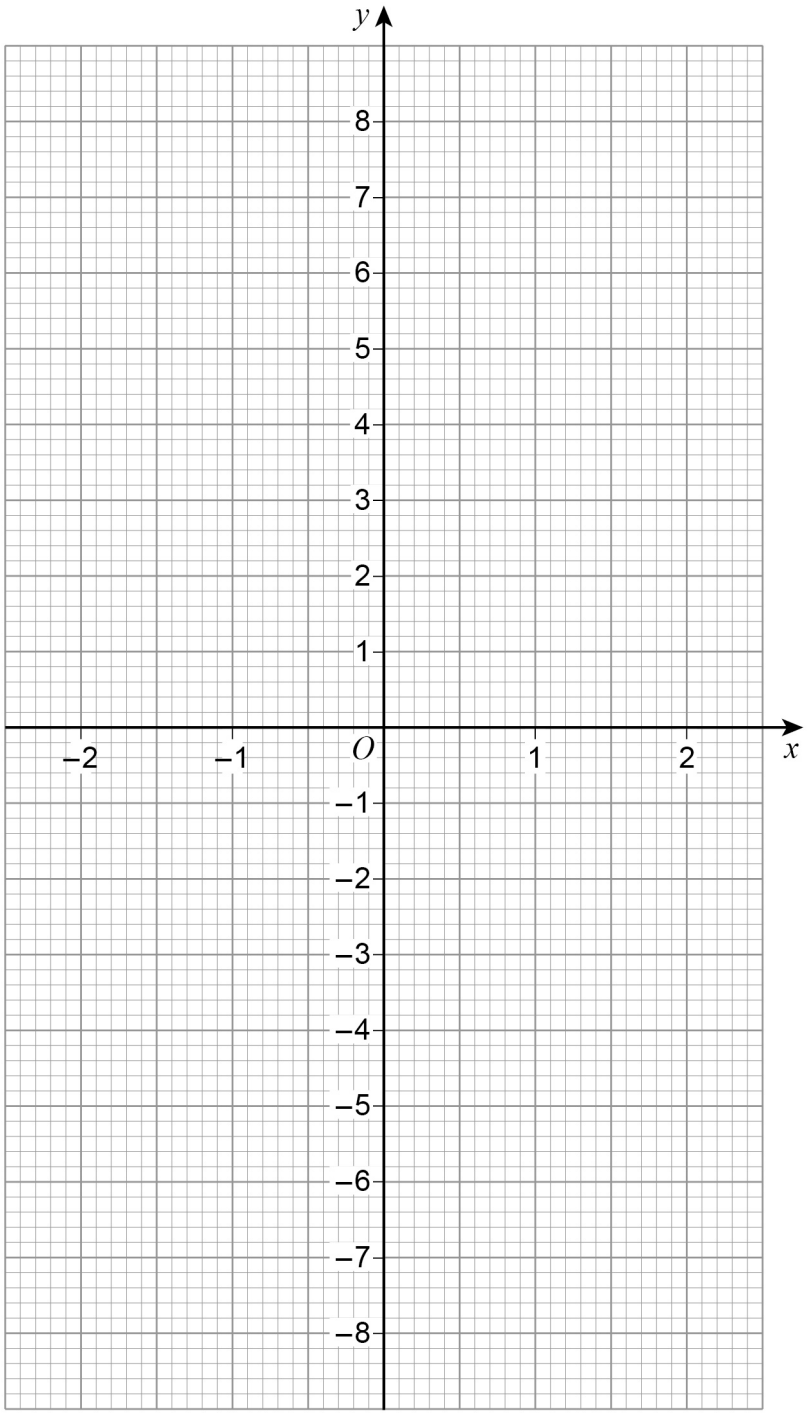
P *Q* *R* *S*

7

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]



AK27A

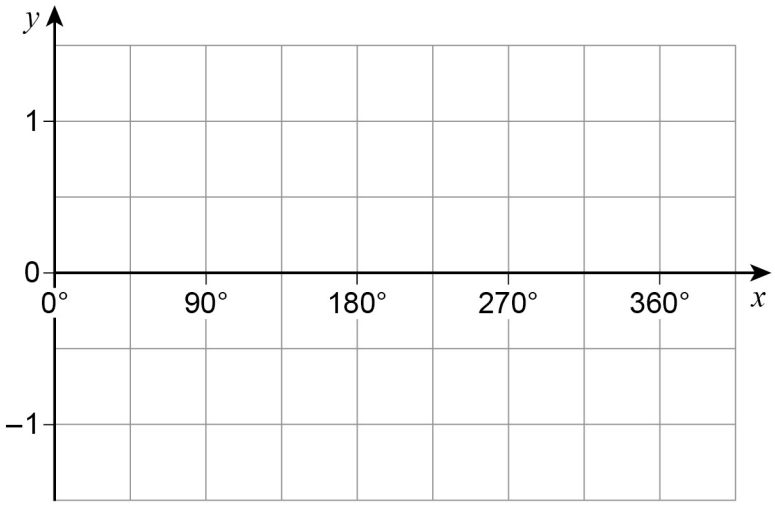
27 (b) For all values of x

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