GCSE
Mathematics
Specification (8300/1H)

H

Paper 1 Higher tier

Date Morning 1 hour 30 minutes

Materials

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.
- Fill in the boxes at the bottom of this page.
- Answer **all** questions.
- You must answer the questions in the space 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 that you do not want to be marked.
- 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 ask for more answer paper, graph paper and tracing paper. These must be tagged securely to this answer booklet.

Please write clearly, in block capitals, to allow character computer recognition.

Centre number ☐☐☐☐☐ Candidate number ☐☐☐☐

Surname

Forename(s)

Candidate signature _____

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

1 (a) Circle the smallest number.

[1 mark]

2.3 $2.\dot{3}$ 2.33 2.03

1 (b) Circle the largest number.

[1 mark]

2.3 $2.\dot{3}$ 2.33 2.03

2 Here is a sequence.

40 35 30 25 20

Circle the expression for the nth term of the sequence.

[1 mark]

$5n + 35$ $5n - 45$ $45 - 5n$ $n - 5$

3 Which of these is **not** a square number?

Circle your answer.

[1 mark]

4×10^2 4×10^6 9×10^3 9×10^4

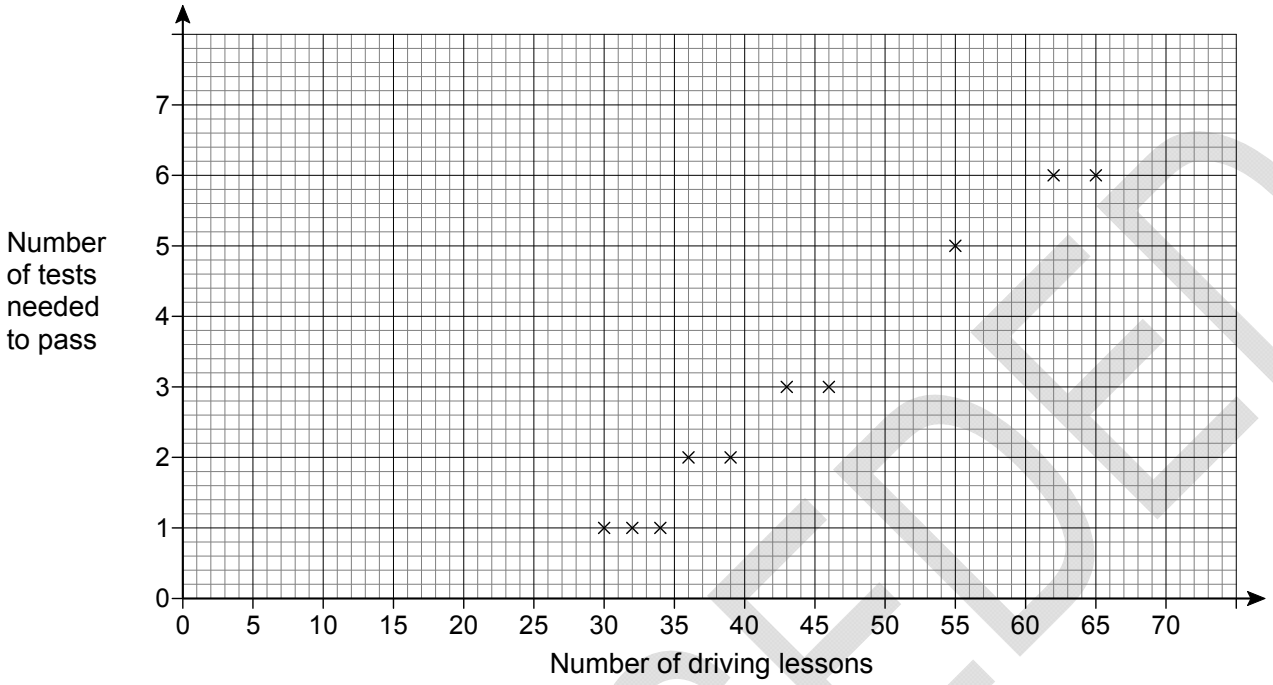
4 Work out $64.32 \div 0.12$

[2 marks]

Answer _____

Turn over for the next question

5 The scatter graph shows the number of driving lessons and the number of tests needed to pass by 10 people.



5 (a) Describe the correlation.

Circle your answer.

[1 mark]

strong positive weak positive weak negative strong negative

5 (b) Use a line of best fit to estimate the number of tests needed to pass by a person who has 50 lessons.

[2 marks]

Answer _____

5 (c) Meera says,

"I can use the trend to predict the number of driving tests needed to pass for any number of driving lessons."

Comment on her statement.

[1 mark]

6 Which of $\frac{2}{5}$ or $\frac{5}{8}$ is closer in value to $\frac{1}{2}$?

You **must** show your working.

[3 marks]

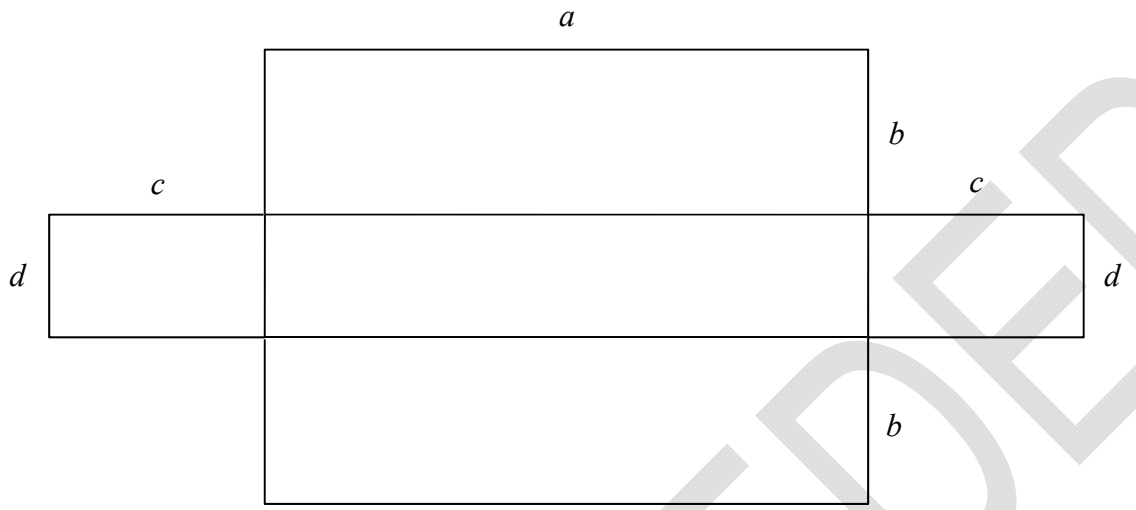
Answer _____

Turn over for the next question

7 A shape is made from rectangles.

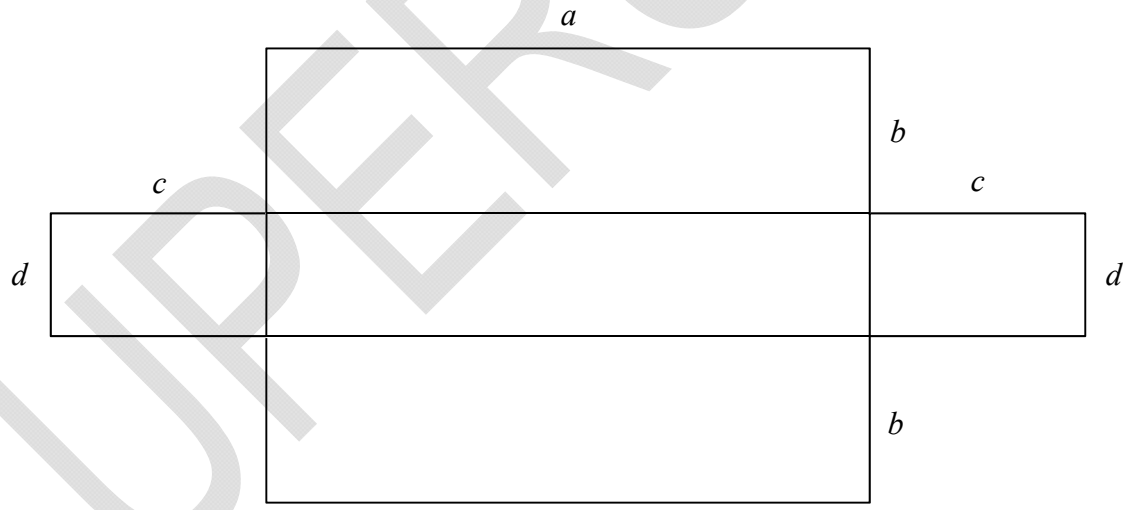
7 (a) On the diagram below shade an area represented by the expression $ad + cd$

[1 mark]



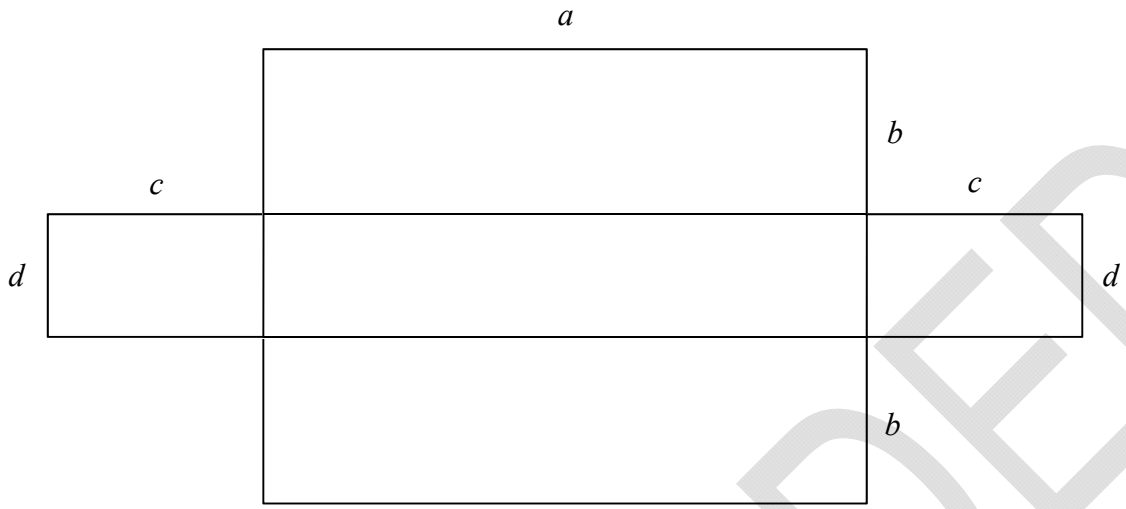
7 (b) On the diagram below shade the area represented by the expression $d(a + 2c)$

[1 mark]



7 (c) Write down an expression for the area of the whole shape.

[1 mark]



Answer _____

8 Circle the value of cos 30°

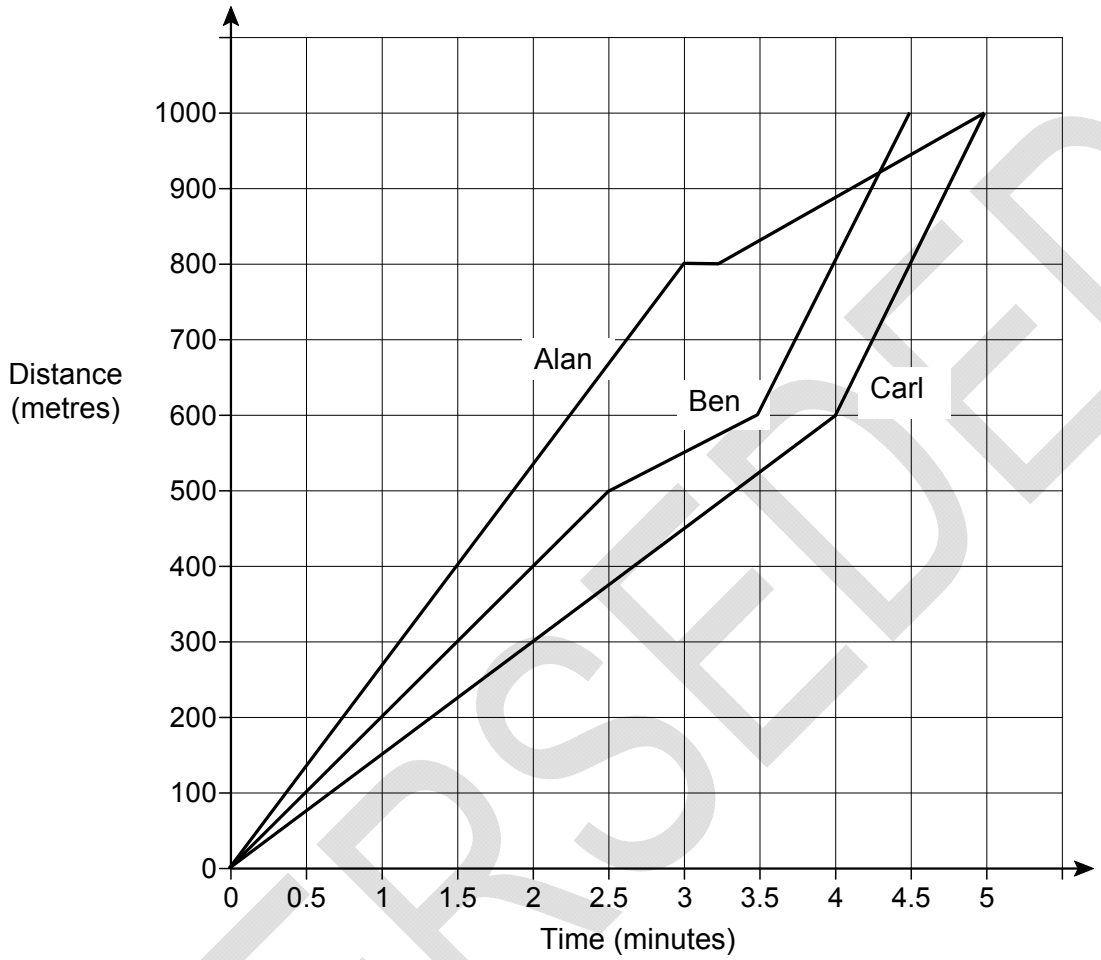
[1 mark]

$\frac{1}{\sqrt{3}}$ $\frac{1}{2}$ $\frac{\sqrt{3}}{2}$ $\frac{2}{\sqrt{3}}$

Turn over for the next question

9 Alan, Ben and Carl ran a 1000 metre race.

The distance-time graph shows the race.



9 (a) Who won the race?

Give a reason for your answer.

[1 mark]

Answer _____

Reason

_____

_____

9 (b) Describe the race.

[4 marks]

Turn over for the next question

10 $2x + 3y = 15.5$

$x + y = 6$

Work out the values of x and y.

[3 marks]

$x =$ _____

$y =$ _____

11 Five integers have

a mode of 6
a median of 8
a mean of 10

What is the **greatest** possible range of the five integers?

You **must** show your working.

[3 marks]

Answer _____

12 Write $2(7x + 4) - 4(x + 6) + 1$ in the form $a(bx + c)$

where a, b and c are integers and $a > 1$

[3 marks]

Answer _____

Turn over for the next question

13 Here is a map of France.

Scale: 1 cm represents 80 km

13 (a) Estimate the time it would take to drive from Paris to Marseille.

Assume

- the road is straight
- an average speed of 100 km/h

[4 marks]

Answer _____ hours

13 (b) Comment on how each assumption affects the accuracy of your estimate.

[2 marks]

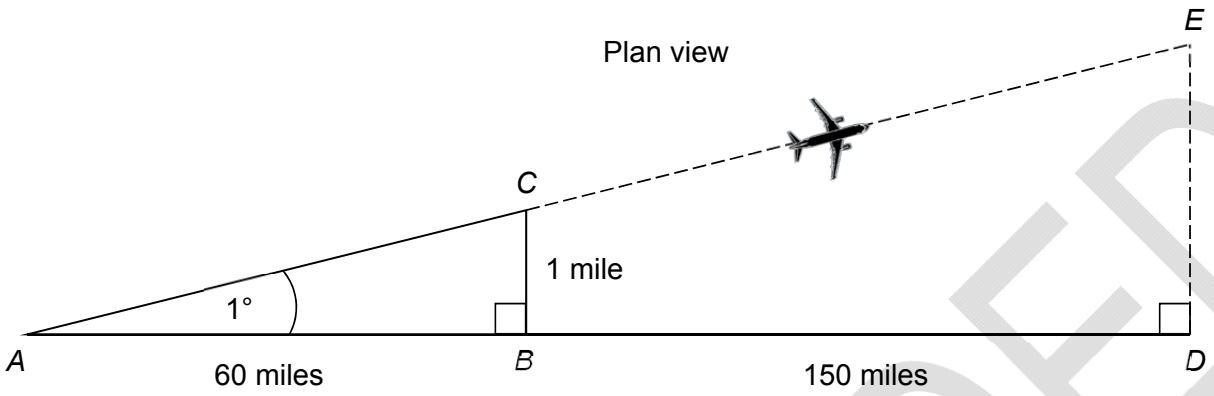
Assumption 1 _____

Assumption 2 _____

14 The pilot of an aircraft wants to fly from *A* to *D*.

The aircraft flies from *A* to *E*, 1° off course.

Not drawn accurately



14 (a) The distance *BC* is 1 mile.

Work out the distance *DE*.

[2 marks]

Answer _____ miles

14 (b) How should the aircraft have turned at *C* to fly directly towards *D*?

Tick a box.

[1 mark]

1° clockwise ☐

between 1° and 2° clockwise ☐

2° clockwise ☐

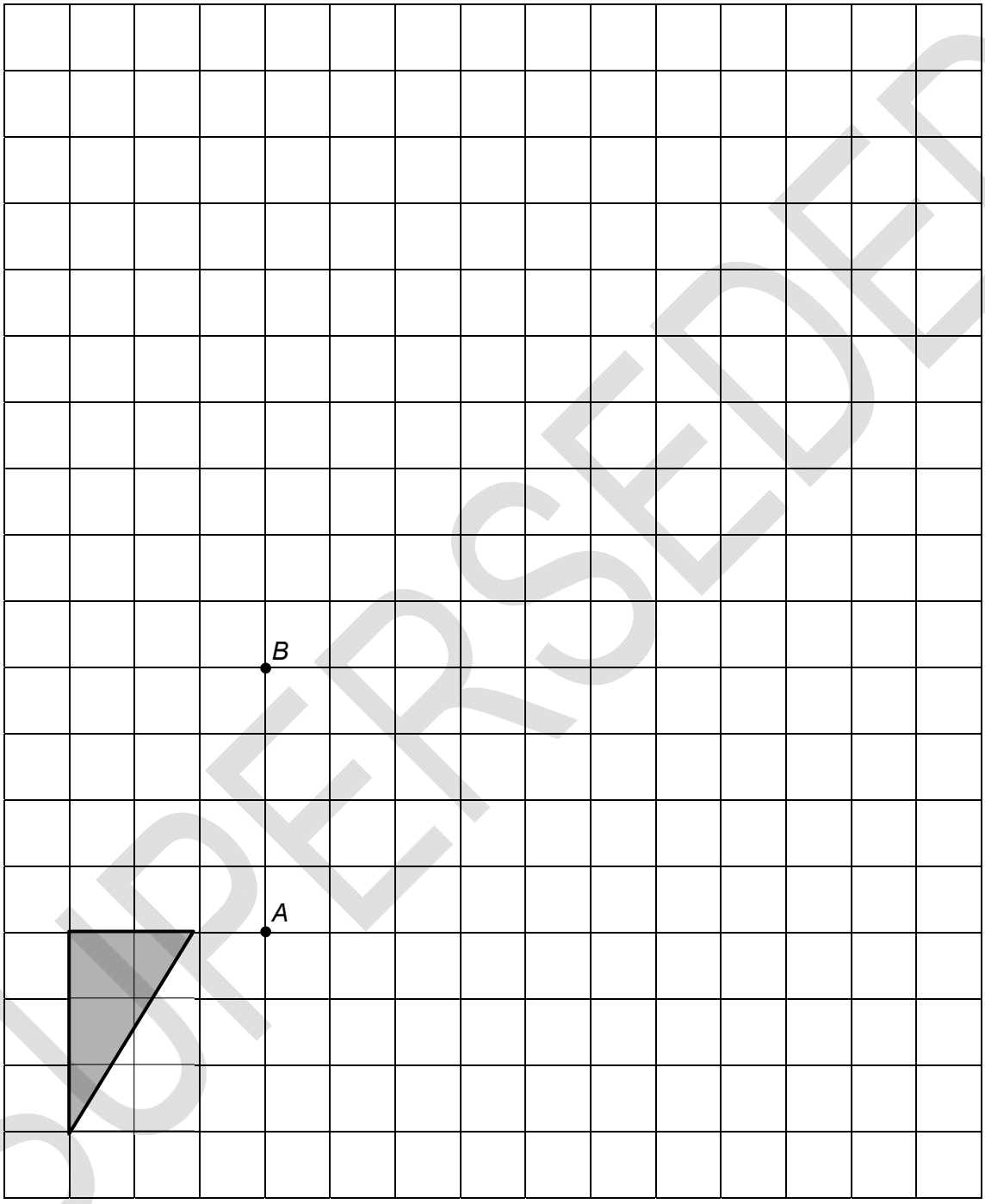
more than 2° clockwise ☐

15 The shape is **rotated** 90° clockwise about point *A*.

It is then **enlarged** by scale factor −2, centre *B*.

Draw the final shape on the diagram.

[3 marks]



16 Rearrange $y = \dfrac{4 - 3x}{x - 5}$ to make x the subject.

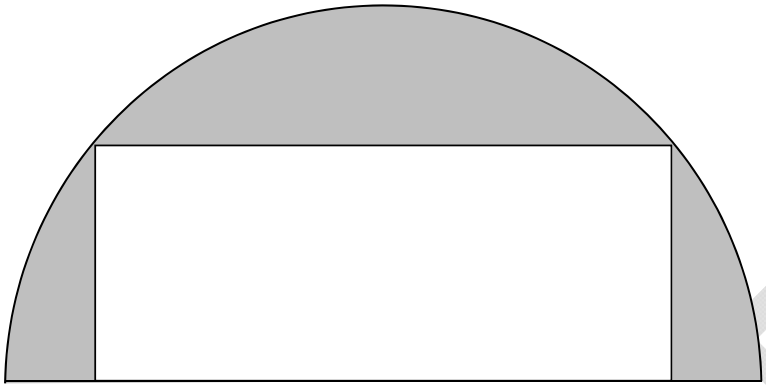
[4 marks]

Answer _____

17 The diagram shows a rectangle inside a semicircle.

The rectangle has dimensions 16 cm by 6 cm

Not drawn accurately



Work out the shaded area.

Give your answer in terms of π.

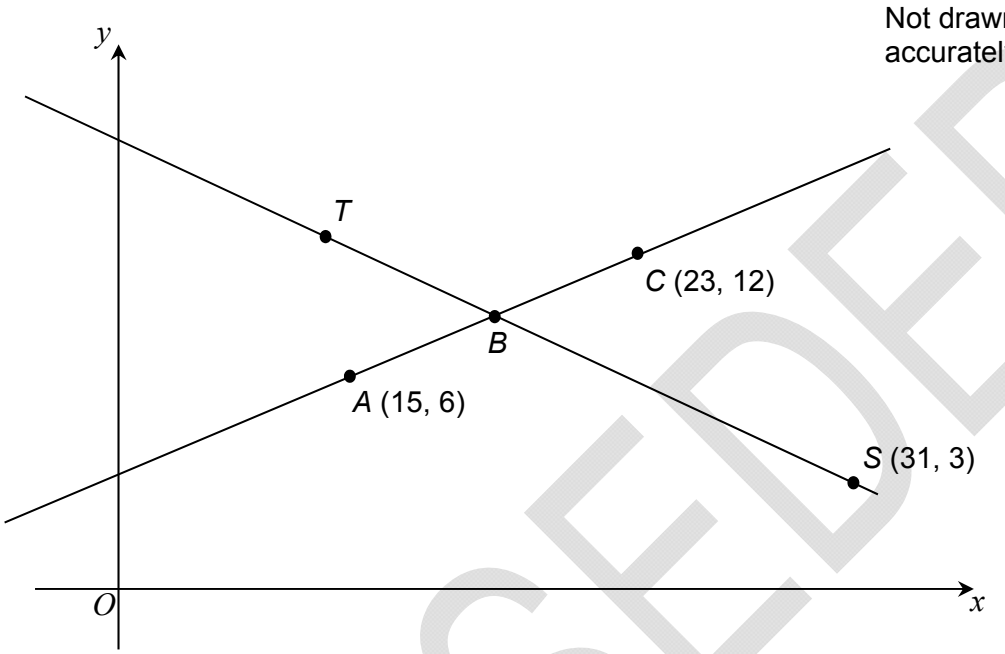
[4 marks]

Answer _____ cm^2

18 Two straight lines are shown.

B is the midpoint of AC.

$TB : BS = 2 : 3$

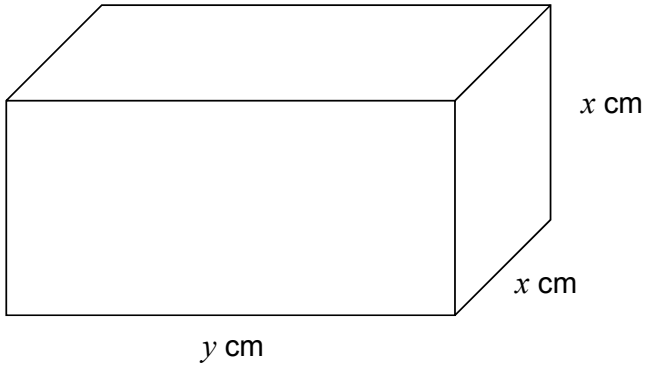


Work out the coordinates of T.

[4 marks]

Answer (_____ , _____)

19 A cuboid has dimensions x cm, x cm and y cm



x is increased by 10%

y is decreased by 20%

Work out and describe the percentage change in the volume of the cuboid.

[4 marks]

Answer _____

20 Circle the value of $9^{-\frac{1}{2}}$

[1 mark]

$\frac{1}{81}$ $\frac{1}{3}$ -3 $-4\frac{1}{2}$

21 Expand and simplify $(2x + 5)(2x - 5)(3x + 7)$

[3 marks]

Answer _____

22 Write $\frac{26}{\sqrt{2}} - \frac{12}{\sqrt{18}} + 2\sqrt{50}$ in the form $a\sqrt{2}$ where a is an integer.

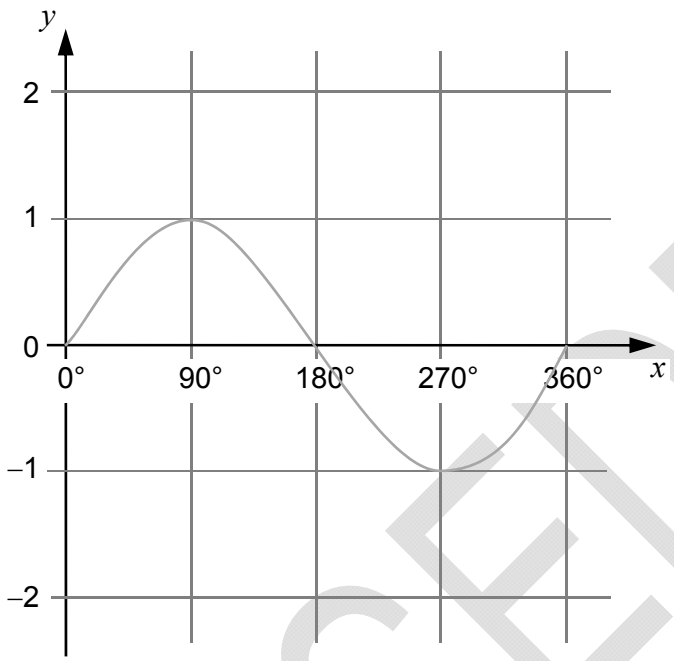
[4 marks]

Answer _____

23 (a) The graph of $y = \sin x$ is shown for $0° \leqslant x \leqslant 360°$

On the grid sketch the graph of $y = \sin x - 1$ for $0° \leqslant x \leqslant 360°$

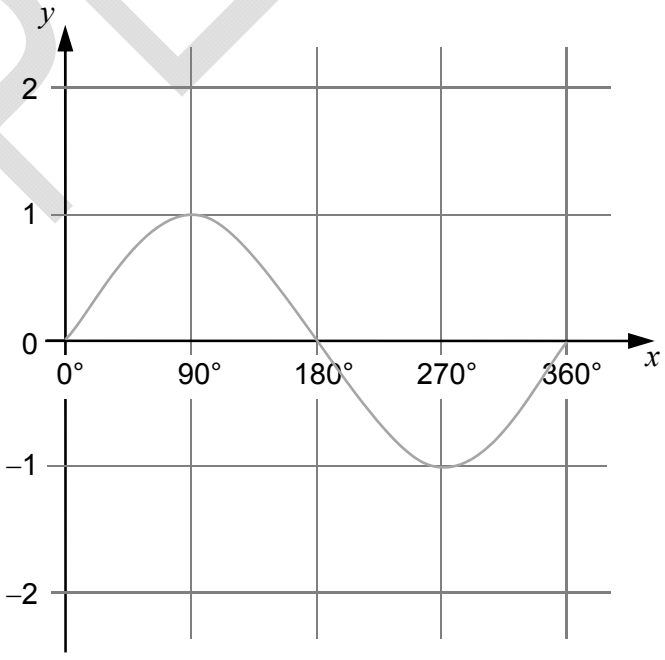
[1 mark]



23 (b) The graph of $y = \sin x$ is shown on the grid for $0° \leqslant x \leqslant 360°$

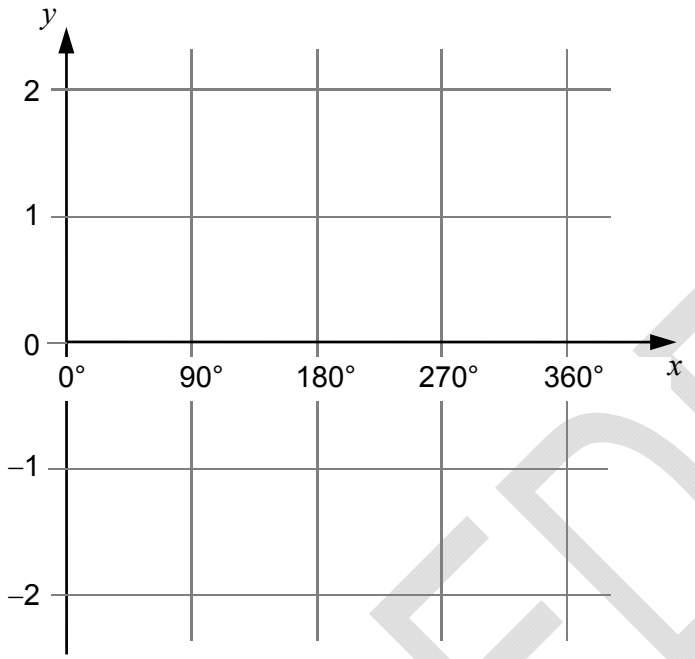
On this grid sketch the graph of $y = -\sin x$ for $0° \leqslant x \leqslant 360°$

[1 mark]



23 (c) On this grid sketch the graph of $y = \tan x$ for $0° \leqslant x \leqslant 360°$

[1 mark]



Turn over for the next question

24 A bag contains n beads.

One bead is black and the rest are white.

Two beads are taken from the bag at random.

24 (a) Show that the probability that **both** beads are white is $\frac{n-2}{n}$

[2 marks]

24 (b) The probability that **both** beads are white is greater than 0.9

Work out the **least** possible value of n.

[3 marks]

Answer _____

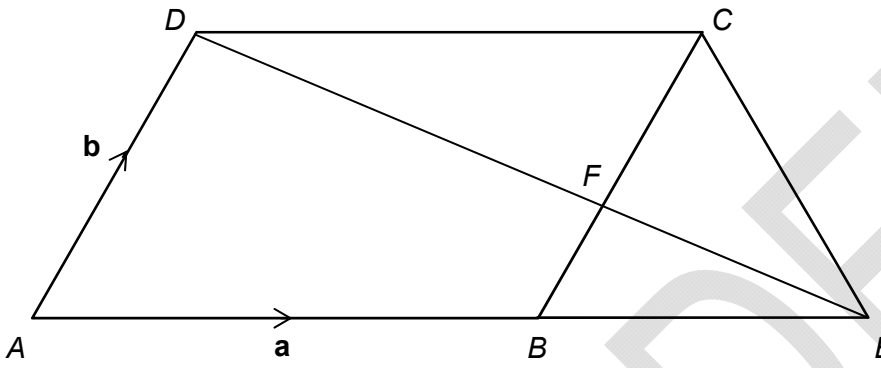
25 *ABCD* is a parallelogram.

ABE is a straight line and $AB : BE = 3 : 2$

BC and *ED* intersect at *F.*

$\overrightarrow{AB} = \mathbf{a}$ and $\overrightarrow{AD} = \mathbf{b}$

Not drawn accurately



25 (a) Work out $\overrightarrow{ED}$ in terms of **a** and **b**.

Give your answer in its simplest form.

[3 marks]

Answer _____

25 (b) Deduce $\overrightarrow{EF}$ in terms of **a** and **b**.

[2 marks]

Answer _____

END OF QUESTIONS

There are no questions printed on this page

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