Candidate surname	Other names

Maths Planner

AQA

2024 Predicted Paper

Mathematics

PAPER 1 (Non-Calculator)

Higher Tier

Time 1 hour 30 minutes

Caution: These topics are not guaranteed to show up, please focus on all topic areas. They have been selected using analysis on previous official exam papers.

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Total Marks

80

Q	Topic(s)	Marks
1	Percentage Multipliers	/ 1
2	Ratio 1:n	/ 1
3	Equations of Linear Graphs	/ 1
4	Reciprocals / Simplifying Fractions	/ 2
5	Splitting Ratio	/ 3
6	Calculating with Approximations	/ 3
7	Simplifying Expressions	/ 1
8	Linear Inequalities / Number Lines	/ 3
9	Plans & Elevations / Circumference	/ 4
10	Laws of Indices	/ 4
11	Column Vectors	/ 5
12	Standard Form	/ 4
13	Calculating with Speed	/ 4

Q	Topic(s)	Marks
14	Area of Quadrilaterals	/ 4
15	Sequences	/ 3
16	Frequency Tables w/ Grouped Data	/ 2
17	Constructions	/ 3
18	Cumulative Frequency Graphs / %'s	/ 3
19	Probability Trees / Expected Outcomes	/ 5
20	Venn Diagram	/ 4
21	Inequality Regions	/ 1
22	Harder Indices / Recurring Decimals	/ 4
23	Quadratic Graphs	/ 4
24	Exact Trig Values / Shaded Areas	/ 5
25	Equation of Circle / Quad. Simultaneous	/ 6

Answers all questions in the spaces provided.

Do not write outside the box

1 Write the percentage multiplier used to **decrease** by 12%

[1 mark]

Answer _____

2 The ratio $x : y = 2 : 3$

If $x : y = 1 : n$

Write down the value of n

[1 mark]

Answer _____

3 A straight line has the equation $y = 4 + 5x$

Write down the coordinates of the y-intercept

[1 mark]

Answer _____

Do not write outside the box

4 Write down the reciprocal of 0.8
Give your answer in its simplest form.

[2 marks]

Answer _____

5 Divide 42 in the ratio 5 : 7

[3 marks]

Answer _____ and _____

Do not write outside the box

6 $\dfrac{4.85 \times 0.429}{0.0501}$

Keertan works out that the answer to this calculation is 0.04
Use approximations to decide if he is correct.

[3 marks]

7 Simplify $8x - 2(x + 3)$

Circle your answer.

[1 mark]

$10x - 6$ $6x - 6$ $10x + 6$ $6x + 3$

Do not write outside the box

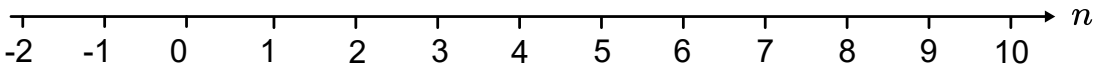
8 (a) Solve $5 < 4n - 3 \leq 25$

[2 marks]

Answer _____ $< n \leq$ _____

8 (b) Represent the inequality for n on the number line below.

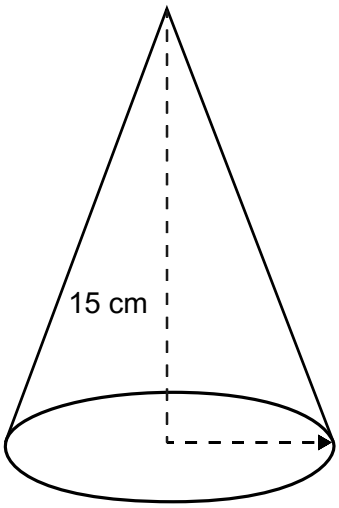
[1 mark]



Do not write outside the box

9 (a) Draw a plan view of this cone on the centimetre grid.

[2 marks]



height : radius $= 5 : 1$

9 (b) Calculate the circumference of the cone's base, in centimetres.
Give your answer in terms of π

[2 marks]

Answer _____ cm

Do not write outside the box

10 **(a)** Simplify $(2b^3)^3$

[2 marks]

Answer _____

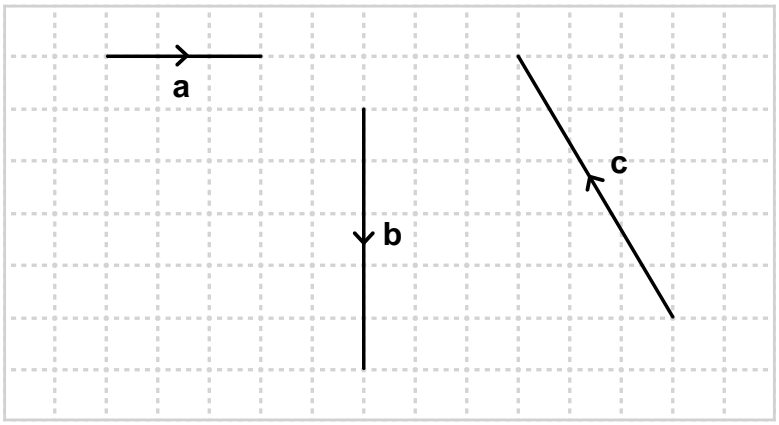
10 **(b)** $(4 \times 2^3)^5 = 2^x$

Find the value of x **[2 marks]**

Answer $x =$ _____

Do not write outside the box

11 The diagram shows the vectors **a**, **b** and **c**.



11 (a) What is **c** as a column vector?

[2 marks]

Answer $\begin{pmatrix} \ldots\ldots \\ \ldots\ldots \end{pmatrix}$

11 (b) Work out **a** + **b** as a column vector.

[2 marks]

Answer $\begin{pmatrix} \ldots\ldots \\ \ldots\ldots \end{pmatrix}$

11 (c) What mathematical word describes the relationship of the resultant vector **a** + **b** and vector **c**?

[1 mark]

Do not write outside the box

12 (a) Tick the **correct** box for this statement.

[1 mark]

	False	True
$5.2 \times 10^{-3} = 0.00052$	☐	☐

12 (b) Joanne is asked to write an answer to a question in standard form.

She writes 23.1×10^{-4}

The teacher marks it incorrect, explain why.

[1 mark]

12 (c) Work out $4 \times 5.1 \times 10^{3}$

Give your answer in standard form

[2 marks]

Answer _____

Do not write outside the box

13 Road works were being carried out between two motorway junctions **32 km apart**. Due to the road works, the speed limit was reduced from **80 mph** to **50 mph**.

Average speed check cameras were installed to fine anyone exceeding the speed limit.

5 miles = 8 km

A car took **20 minutes** to travel between the two junctions.

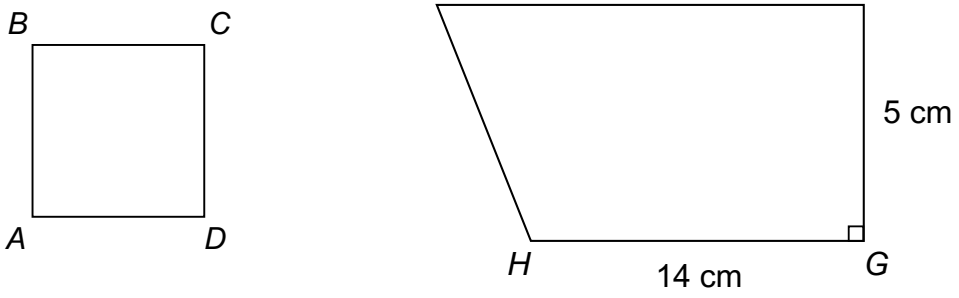
Will the driver receive a speeding fine? You must fully justify your answer.

[4 marks]

Yes ☐ **No** ☐

Do not write outside the box

14 *ABCD* is a square.
EFGH is a trapezium.



ABCD has a perimeter of 200 mm

The area of the square is **one third** the area of the trapezium.

Work out the size of length *EF.*

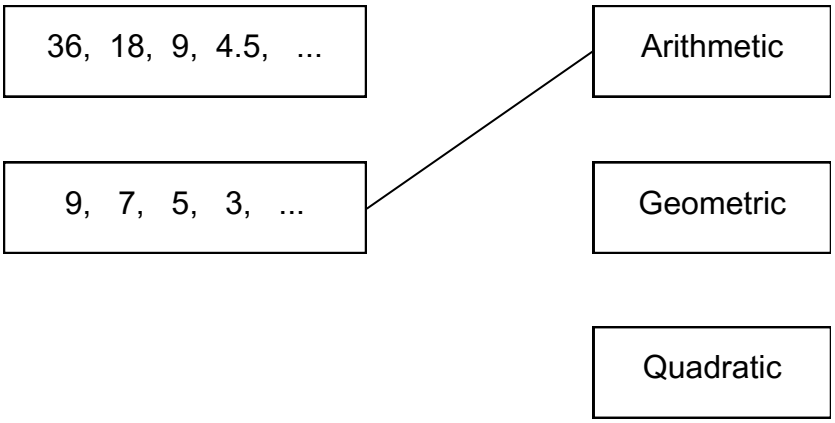
[4 marks]

Answer _____ cm

Do not write outside the box

15 (a) Match the sequence on the left with the correct type on the right.
One has been done for you.

[1 mark]



15 (b) Complete the **first two missing terms** in this sequence.

[2 marks]

....., ..., $2\sqrt{2}$, 4, $4\sqrt{2}$, ...

Do not write outside the box

16 The table below gives information about the time taken for a group of runners to complete a 5 km park run.

Time (t minutes)	Frequency
$20 < t \leq 22$	2
$22 < t \leq 24$	4
$24 < t \leq 28$	3
$28 < t \leq 32$	7
$32 < t \leq 36$	4

Tick **one box** for each statement.

[2 marks]

	Cannot be true	**Might be true**	**Definitely true**
The range of the running times is 16 minutes	☐	☐	☐
The median running time was 31 minutes	☐	☐	☐

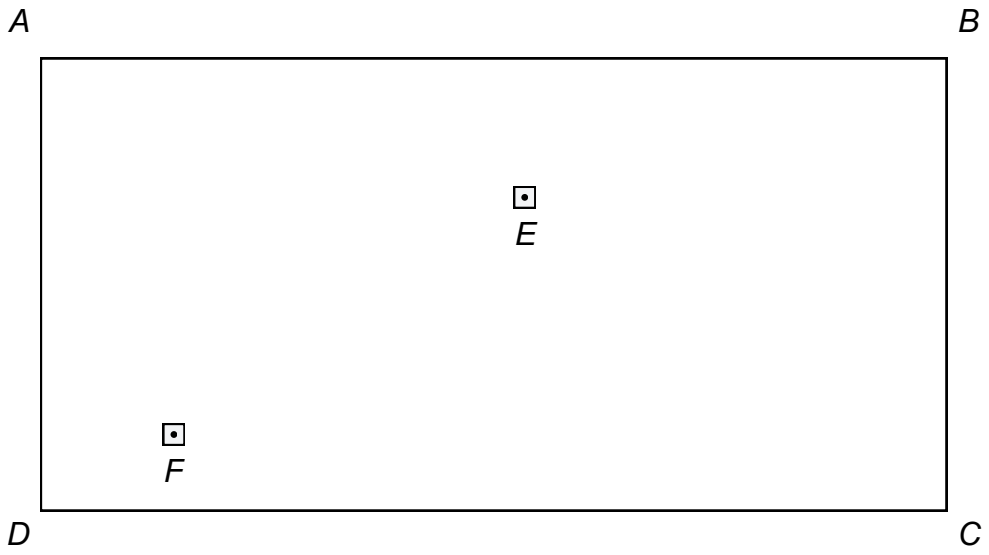
Do not write outside the box

17 Use a ruler and compasses in this question.

ABCD represents a car park.

Object *E* and *F* represent parking meters.

Scale: 1 cm = 2 m



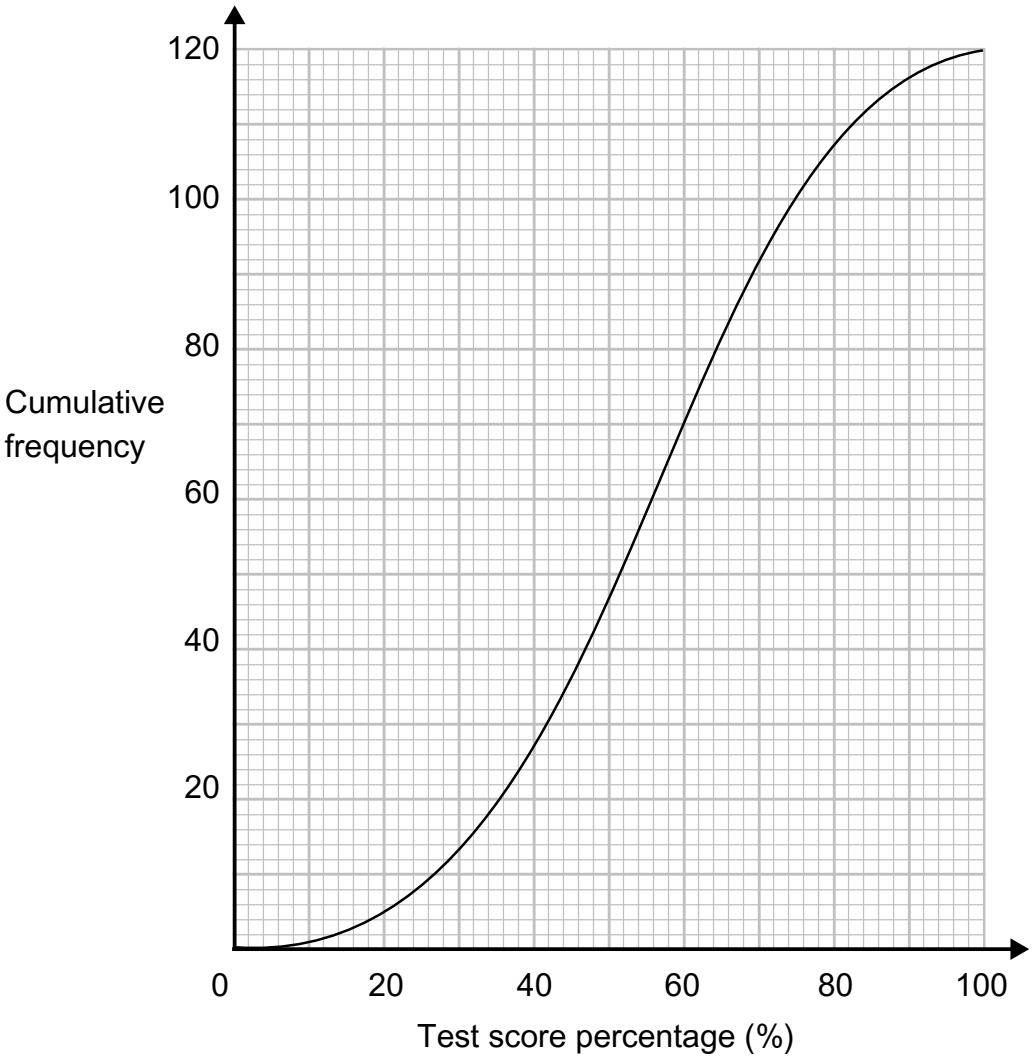
A car enters the car park.
It parks closer to *AD* than to *CD,* and within **7 m** of the parking meter *E*.

Label the region, **R**, where the car could have parked.
Show all your construction lines.

[3 marks]

Do not write outside the box

18 The cumulative frequency graph gives information about the test score percentages of a year group.



Students needed to achieve at least 38% in order to pass the test.

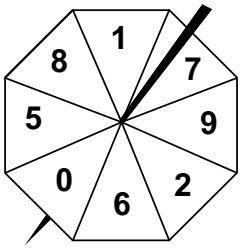
Work out an estimate for the percentage of students that failed the test.

[3 marks]

Answer _____

Do not write outside the box

19 Here is a fair 8-sided spinner and dice.



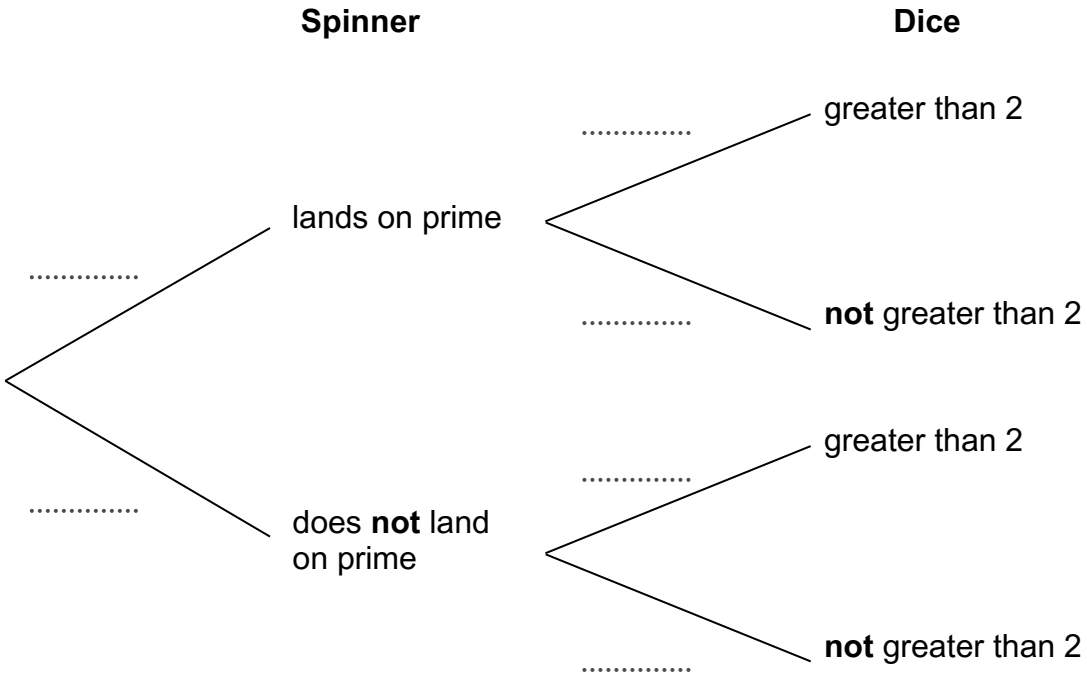
Spinner

Dice

Sophie spins the spinner and then rolls the dice.

19 (a) Complete the probability tree diagram.

[2 marks]



19 (b) Sophie is going to do this 200 times.

Work out how many times she should expect the spinner to land on a prime and the dice to be greater than 2.

[3 marks]

Answer _____

Do not write outside the box

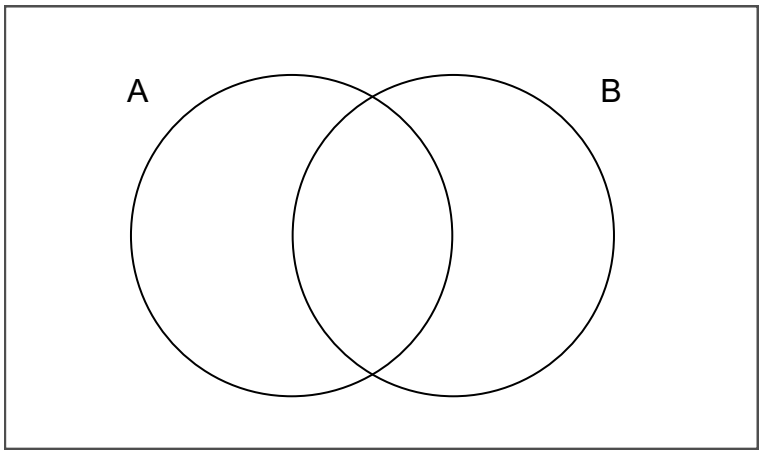
20 $P(A') = 0.4$

$P(B) = 0.3$

$P(A \cup B) = 0.7$

20 (a) Complete the Venn diagram.

[3 marks]



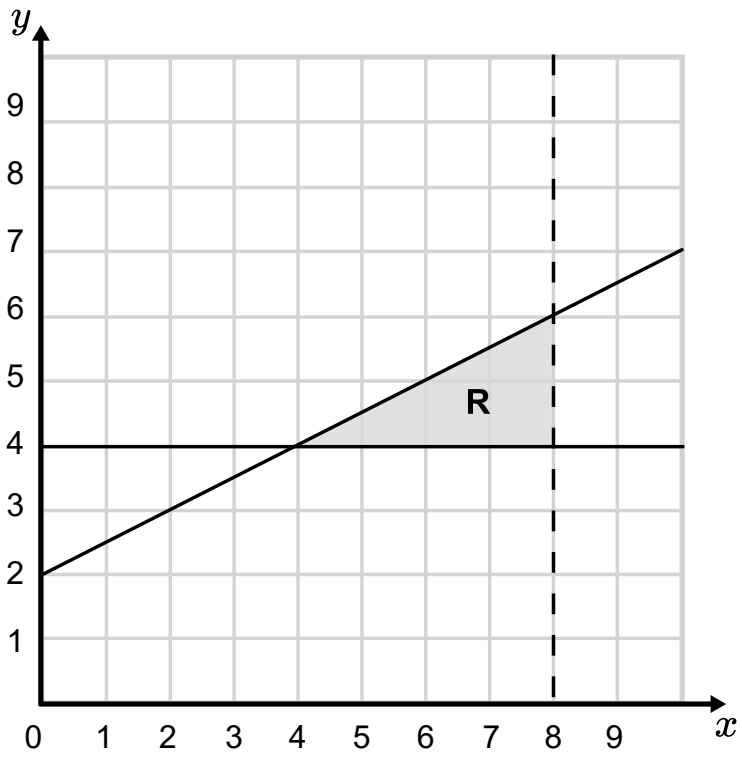
20 (b) Find $P(A \cup B)'$

[1 mark]

Answer _____

Do not write outside the box

21 The shaded region **R** is bounded by three inequalities.



Tick the **correct set** of inequalities for the region **R.**

[1 mark]

Set A ☐

$x < 8$

$y \geq 4$

$y \leq 2 + \frac{1}{2}x$

Set B ☐

$x > 4$

$y \leq 8$

$y > \frac{1}{2}x + 2$

Set C ☐

$x < 8$

$y \geq 4$

$y \geq 2x + 2$

Do not write outside the box

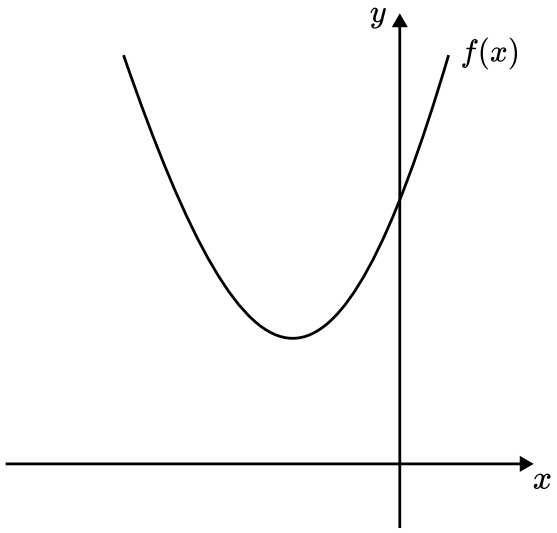
22 Work out $\left(\frac{27}{8}\right)^{-\frac{2}{3}} \div 0.6\dot{1}$

[4 marks]

Answer _____

Do not write outside the box

23 The graph shows the graph $f(x)$



23 (a) How many roots does $f(x)$ have?

Circle your answer.

[1 mark]

No real roots One root Two roots

23 (b) Given $f(x) = x^2 + px + q$ and the turning point is (-1, 4)

Work out the integer values of p and q

[3 marks]

Answer _____

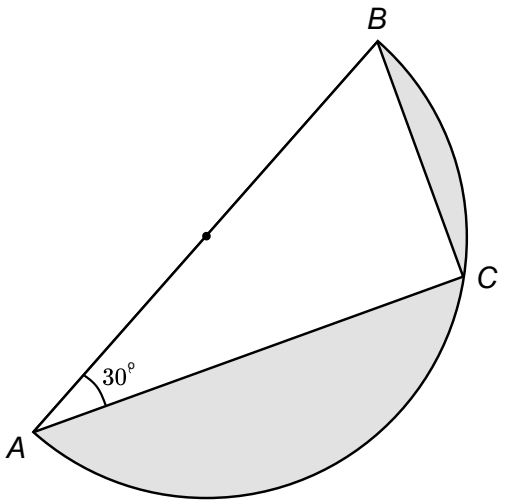
Do not write outside the box

24 Shown is a semi-circle, where *AB* is the diameter.

$\angle BAC = 30^\circ$

$AC = 3\sqrt{6}$ cm

Diagram not drawn to scale



Work out the exact area of the shaded region.

Give your answer in the form $a\pi - b\sqrt{3}$

[5 marks]

Answer _____ cm

Do not write outside the box

25 Circle $\mathbf{C_1}$ has the equation $x^2 + y^2 + 11 = 36$

25 (a) Work out the radius of the circle $\mathbf{C_1}$

[1 mark]

Answer _____

25 (b) Circle $\mathbf{C_1}$ is translated 1 unit to the right to form circle $\mathbf{C_2}$

The line **L** has the equation $y + x = 2$

Find the points of interception between circle $\mathbf{C_2}$ and line **L**.

[5 marks]

Answer _____

END OF QUESTIONS