

1 Here is a rectangle.

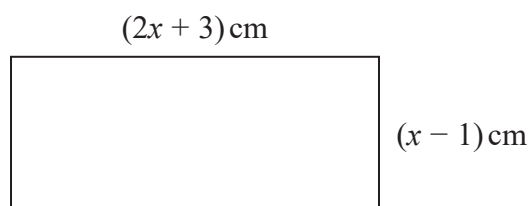


Diagram **NOT**
accurately drawn

Given that the area of the rectangle is less than 75 cm^2

find the range of possible values of x

(Total for Question 1 is 5 marks)

2 The diagram shows a trapezium.

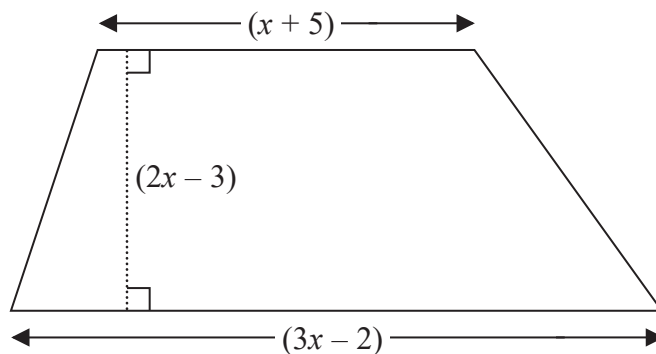


Diagram **NOT**
accurately drawn

All measurements shown on the diagram are in centimetres.

The area of the trapezium is 133 cm^2

(a) Show that $8x^2 - 6x - 275 = 0$

(3)

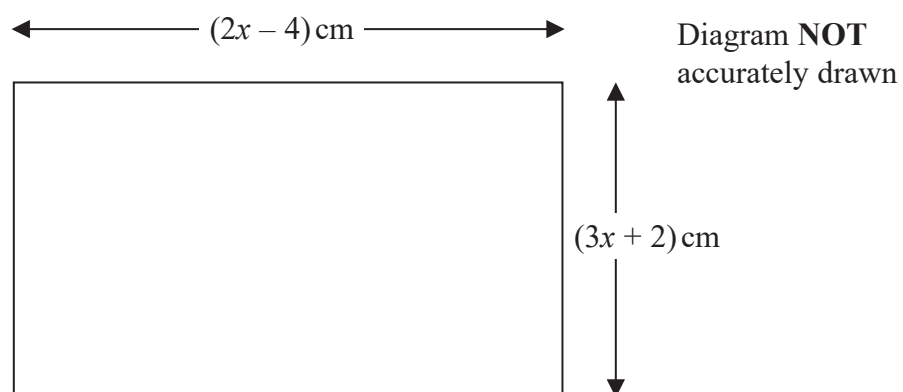
(b) Find the value of x .
Show your working clearly.

$x =$

(3)

(Total for Question 2 is 6 marks)

3 The diagram shows a rectangle.



The area of the rectangle is $A \text{ cm}^2$

Given that $A < 3x + 27$

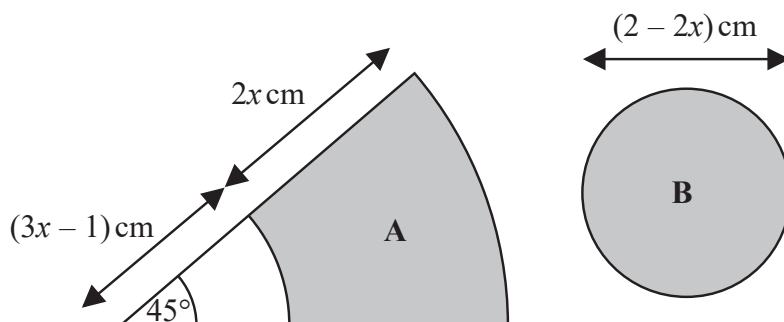
find the range of possible values for x .

(Total for Question 3 is 5 marks)

4 The diagram shows two shaded shapes, **A** and **B**.

Shape **A** is formed by removing a sector of a circle with radius $(3x - 1)$ cm from a sector of the circle with radius $(5x - 1)$ cm.

Shape **B** is a circle of diameter $(2 - 2x)$ cm.



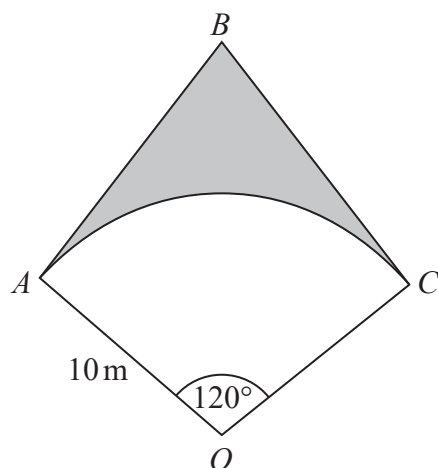
The area of shape **A** is equal to the area of shape **B**.

Find the value of x .

You must show all your working.

(Total for Question 4 is 5 marks)

5



OAC is a sector of a circle, centre O , radius 10 m .

BA is the tangent to the circle at point A .

BC is the tangent to the circle at point C .

Angle $AOC = 120^\circ$

Calculate the area of the shaded region.

Give your answer correct to 3 significant figures.

..... m^2

(Total for Question 5 is 5 marks)

6 The diagram shows four identical circles drawn inside a square.

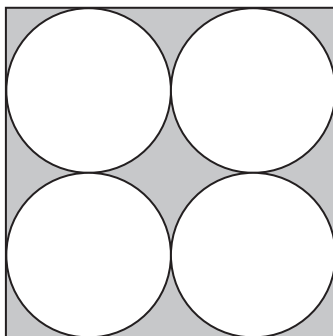


Diagram **NOT**
accurately drawn

Each circle touches two other circles and two sides of the square.

The region inside the square that is outside the circles, shown shaded in the diagram, has a total area of 40 cm^2

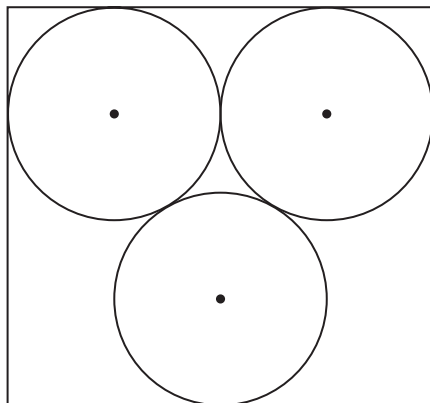
Work out the perimeter of the square.

Give your answer correct to 3 significant figures.

..... cm

(Total for Question 6 is 4 marks)

- 7 The diagram shows 3 identical circles inside a rectangle.
Each circle touches the other two circles and the sides of the rectangle, as shown in the diagram.



The radius of each circle is 24 mm.

Work out the area of the rectangle.

Give your answer correct to 3 significant figures.

..... mm²

(Total for Question 7 is 4 marks)

8 The area of a rectangle is 18 cm^2

The length of the rectangle is $(\sqrt{7} + 1)\text{ cm}$.

Without using a calculator and showing each stage of your working,

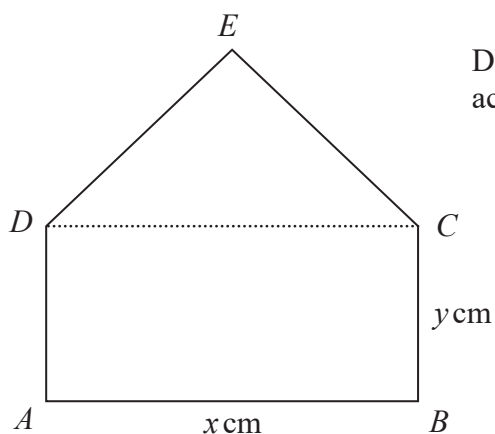
find the width of the rectangle.

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

..... cm

(Total for Question 8 is 3 marks)

9 $ABCED$ is a five-sided shape.



$ABCD$ is a rectangle.

CED is an equilateral triangle.

$$AB = x \text{ cm} \quad BC = y \text{ cm}$$

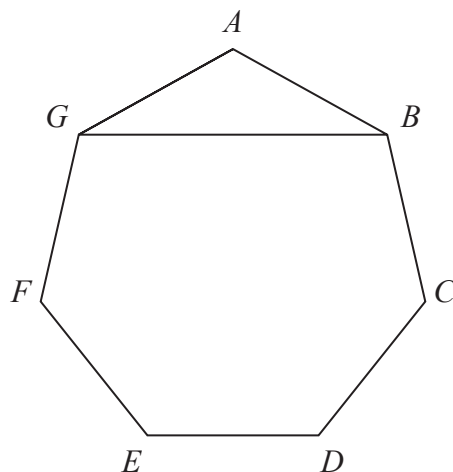
The perimeter of $ABCED$ is 100 cm.

The area of $ABCED$ is $R \text{ cm}^2$

(a) Show that $R = \frac{x}{4} \left(200 - [6 - \sqrt{3}]x \right)$

(Total for Question 9 is 3 marks)

10 $ABCDEFG$ is a regular heptagon.



The area of triangle ABG is 30 cm^2

Calculate the length of GB .

Give your answer correct to 3 significant figures.

You must show all your working.

..... cm

(Total for Question 10 is 5 marks)

11 A , B and C are points on a circle with centre O .

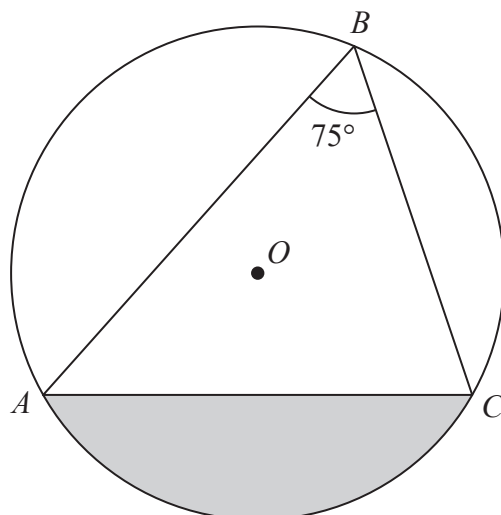


Diagram **NOT**
accurately drawn

Angle $ABC = 75^\circ$

The area of the shaded segment is 200 cm^2

Calculate the radius of the circle.

Give your answer correct to 3 significant figures.

..... cm

(Total for Question 11 is 5 marks)

- 12 The diagram shows two circles such that the region **R**, shown shaded in the diagram, is the region common to both circles.

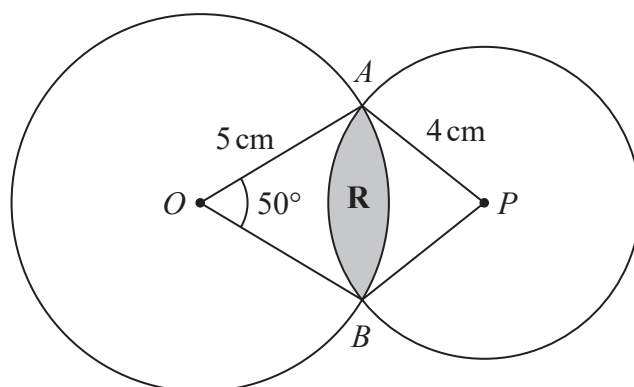


Diagram **NOT**
accurately drawn

One of the circles has centre O and radius 5 cm .
The other circle has centre P and radius 4 cm .
Angle $AOB = 50^\circ$

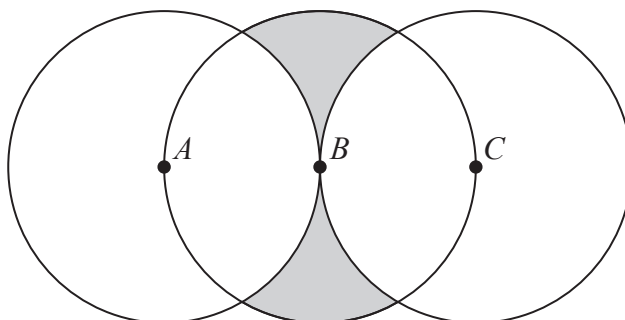
Calculate the area of region **R**.
Give your answer correct to 3 significant figures.

..... cm²

(Total for Question 12 is 6 marks)

13 The diagram shows three circles, each of radius 4 cm.

The centres of the circles are A , B and C such that ABC is a straight line and $AB = BC = 4$ cm.



Work out the total area of the two shaded regions.
Give your answer in terms of π

..... cm²

(Total for Question 13 is 5 marks)