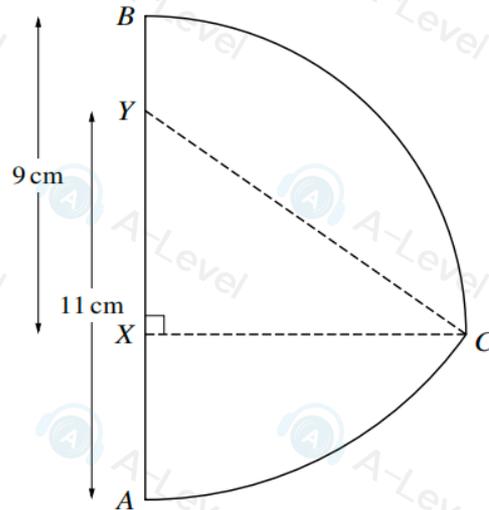


5

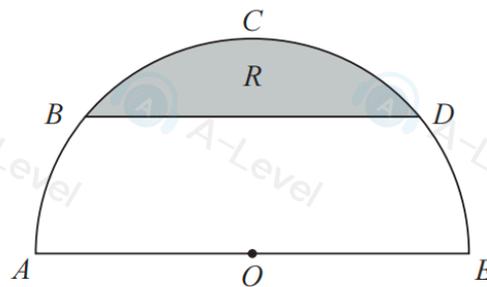


In the diagram, X and Y are points on the line AB such that $BX = 9$ cm and $AY = 11$ cm. Arc BC is part of a circle with centre X and radius 9 cm, where CX is perpendicular to AB . Arc AC is part of a circle with centre Y and radius 11 cm.

- (a) Show that angle $XYC = 0.9582$ radians, correct to 4 significant figures.

[1]

5.



Not to scale

Figure 2

Figure 2 shows a plan view of a semicircular garden $ABCDEOA$

The semicircle has

- centre O
- diameter AOE
- radius 3 m

The straight line BD is parallel to AE and angle BOA is 0.7 radians.

- (a) Show that, to 4 significant figures, angle BOD is 1.742 radians.

(1)

The flowerbed R , shown shaded in Figure 2, is bounded by BD and the arc BCD .

- (b) Find the area of the flowerbed, giving your answer in square metres to one decimal place.

(3)

- (c) Find the perimeter of the flowerbed, giving your answer in metres to one decimal place.

(3)

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DO NOT WRITE IN THIS AREA

DO NOT WRITE IN THIS AREA

10.

In this question you must show all stages of your working.
Solutions relying on calculator technology are not acceptable.

$$(k-1)x^6 + 4x^3 + (k-4) = 0 \quad \text{where } k \text{ is a constant}$$

- (a) Find the exact solutions to the given equation for $k = 4.5$ (3)
- (b) Find the set of possible values of k for which the given equation has no real roots. (4)

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3.

In this question you must show all stages of your working.
Solutions relying on calculator technology are not acceptable.

(i)

$$f(x) = (x + \sqrt{2})^2 + (3x - 5\sqrt{8})^2$$

Express $f(x)$ in the form $ax^2 + bx\sqrt{2} + c$ where a , b and c are integers to be found. (3)

(ii) Solve the equation

$$\sqrt{3}(4y - 3\sqrt{3}) = 5y + \sqrt{3}$$

giving your answer in the form $p + q\sqrt{3}$ where p and q are simplified fractions to be found.

(4)