adamjee maths

A-LEVEL MATHS / EDEXCEL / FREE RESOURCES

Circles

Question paper

7 questions

Exam questions and marking instructions remain credited to their board.

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2. The circle C has equation

$$(x + 3)^2 + (y - 4)^2 = 24$$

(a) (i) State the coordinates of the centre of C.

(ii) Find the radius of C writing your answer as a fully simplified surd.

(3)

(b) Determine, giving a reason, whether or not the origin lies inside the circle C.

(2)

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Question 2 continued

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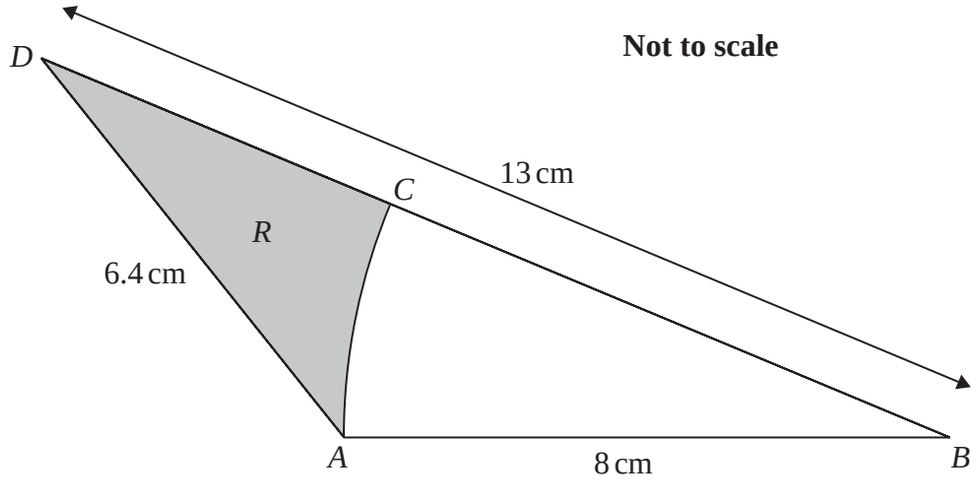


Figure 1

The shape *ABCD*, shown in Figure 1, consists of a triangle *ABD* containing a sector *ABC* of a circle with centre *B*.

Given that

- $AD = 6.4\,\text{cm}$
- $BD = 13\,\text{cm}$
- $BA = BC = 8\,\text{cm}$

(a) show that angle $ABC = 0.394$ radians to 3 significant figures.

(2)

The region *R*, shown shaded in Figure 1, is bounded by the line *CD*, the line *DA* and the arc *AC*.

(b) Find the area of *R*, giving the answer in cm^2 to 3 significant figures.
You must make your method clear.

(3)

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Question 4 continued

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Question 4 continued

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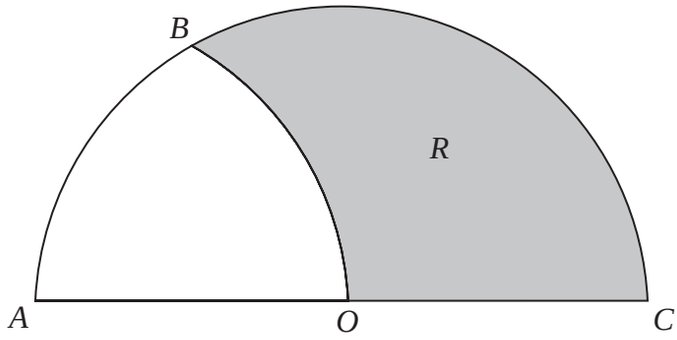


Figure 4

Figure 4 shows the design of a badge.

The shape *ABCOA* is a semicircle with centre *O* and diameter 10 cm.

OB is the arc of a circle with centre *A* and radius 5 cm.

The region *R*, shown shaded in Figure 4, is bounded by the arc *OB*, the arc *BC* and the line *OC*.

Find the exact area of *R*.

Give your answer in the form $(a\sqrt{3} + b\pi)\,\text{cm}^2$, where *a* and *b* are rational numbers.

(4)

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Question 11 continued

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14. The circle C_1 has equation

$$x^2 + y^2 - 6x + 14y + 33 = 0$$

(a) Find

(i) the coordinates of the centre of C_1

(ii) the radius of C_1

(3)

A different circle C_2

- has centre with coordinates (–6, –8)
- has radius k, where k is a constant

Given that C_1 and C_2 intersect at 2 distinct points,

(b) find the range of values of k, writing your answer in set notation.

(5)

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Question 14 continued

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Question 14 continued

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Question 14 continued

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3. A circle has equation

$$x^2 + y^2 - 10x + 16y = 80$$

(a) Find

(i) the coordinates of the centre of the circle,

(ii) the radius of the circle.

(3)

Given that P is the point on the circle that is furthest away from the origin O,

(b) find the exact length OP

(2)

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Question 3 continued

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7. The circle C has equation

$$x^2 + y^2 - 10x + 4y + 11 = 0$$

(a) Find

(i) the coordinates of the centre of C,

(ii) the exact radius of C, giving your answer as a simplified surd.

(4)

The line l has equation $y = 3x + k$ where k is a constant.

Given that l is a tangent to C,

(b) find the possible values of k, giving your answers as simplified surds.

(5)

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Question 7 continued

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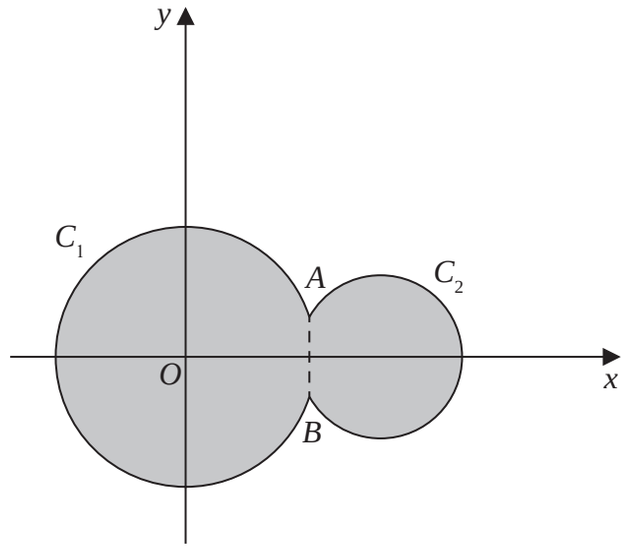


Figure 3

Circle C_1 has equation $x^2 + y^2 = 100$

Circle C_2 has equation $(x - 15)^2 + y^2 = 40$

The circles meet at points A and B as shown in Figure 3.

(a) Show that angle $AOB = 0.635$ radians to 3 significant figures, where O is the origin.

(4)

The region shown shaded in Figure 3 is bounded by C_1 and C_2

(b) Find the perimeter of the shaded region, giving your answer to one decimal place.

(4)

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Question 11 continued

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