

12.6 cm

The diagram shows a sector of a circle of radius 12.6 cm. Given that the perimeter of the sector is 31.7 cm, find its area.

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The diagram shows a sector OAB of a circle, centre O and radius 7.3 cm. Given that the area of the sector is 38.4 cm<sup>2</sup>, find

- **a** the size of  $\angle AOB$  in radians,
- **b** the perimeter of the shaded segment.

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The diagram shows a sector of a circle of radius r cm. The area of the sector is 40 cm<sup>2</sup>.

- **a** Show that the perimeter of the sector is  $(2r + \frac{80}{r})$  cm.
- **b** Hence find the set of values of r for which the perimeter of the sector is less than 26 cm.
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The diagram shows three circles with centres A, B and C, and radii 4 cm, 6 cm and 2 cm respectively. Each circle touches the other two circles.

- **a** Prove that triangle *ABC* is a right-angled triangle.
- **b** Find  $\angle ABC$  in radians to 2 decimal places.
- **c** Show that the area of the shaded region enclosed by the three circles is 1.86 cm<sup>2</sup> to 3 significant figures.



The diagram shows a company logo which consists of a circle of diameter 10 cm drawn on top of a rectangle measuring 6 cm by 14 cm. The centres of the circle and rectangle are coincident and the two shapes intersect at A, B, C and D.

- **a** Find the length of the chord of the circle AB.
- **b** Show that the perimeter of the logo is 42.5 cm to 3 significant figures.
- **c** Find the area of the logo.

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*AB*, *CD* and *EF* are arcs of concentric circles, centre *O*, such that *OACE* and *OBDF* are straight lines as shown in the diagram. The area of the shaded region *CEFD* is denoted by  $A_1$  and the area of the shaded sector *OAB* by  $A_2$ .

Given that OA = r cm, AC = 2 cm, OE = 8 cm and  $\angle AOB = \theta$  radians,

- **a** find an expression for  $A_1$  in terms of r and  $\theta$ .
- Given also that  $A_1 = 7A_2$ ,
- **b** show that r = 2.5

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A girl is playing with a paper clip. She straightens the wire and then bends it to form an equilateral triangle, *Shape A* above. She then curves one side of the triangle to form a sector of a circle, *Shape B* above.

Find, to 1 decimal place, the percentage change in the area enclosed by the paper clip when it is changed from *Shape A* to *Shape B*, indicating whether this is an increase or decrease.