Chapter (8) Circular Measure
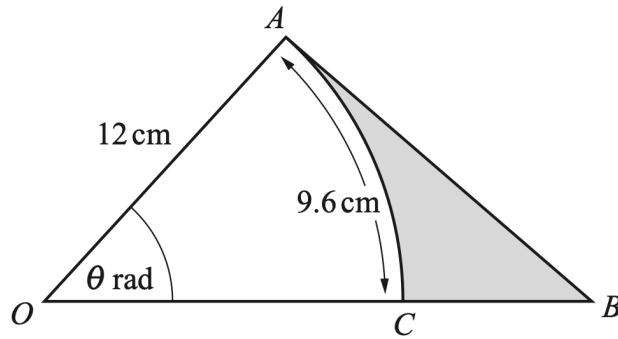
1.

The diagram shows the right-angled triangle *OAB.* The point *C* lies on the line *OB.* Angle *OAB=* $\frac{\pi}{2}$ radians and angle *AOB* = θ radians. *AC* is an arc of the circle, centre *O*, radius 12 cm and *AC* has length 9.6 cm.
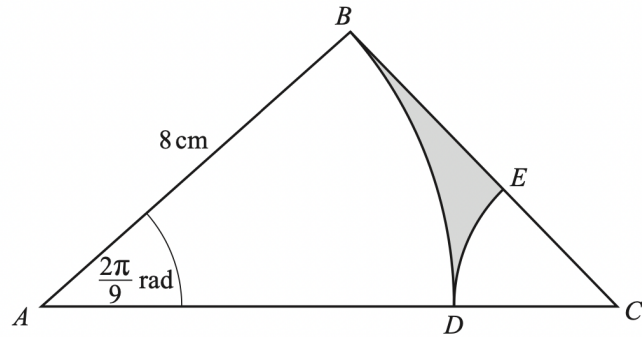
    a. Find the value of θ.

[2]

    b. Find the area of the shaded region.

[4]

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2.

The diagram shows a right-angled triangle ABC with $AB = 8$ cm and angle $ABC = \frac{\pi}{2}$ radians. The points D and E lie on AC and BC respectively. BAD and ECD are sectors of the circles with centres A and C respectively. Angle $BAD = \frac{2\pi}{9}$ radians.

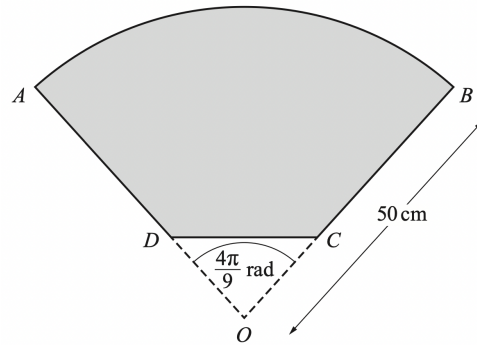   a. Find the area of the shaded region

[6]

b. Find the perimeter of the shaded region.

[3]

3.

The diagram shows a company logo, *ABCD*. The logo is part of a sector, *AOB*, of a circle, centre *O* and radius 50 cm. The points *C* and *D* lie on *OB* and *OA* respectively. The lengths *AD* and *BC* are equal and *AD* : *AO* is 7 : 10. The angle *AOB* is $\frac{4\pi}{9}$ radians.
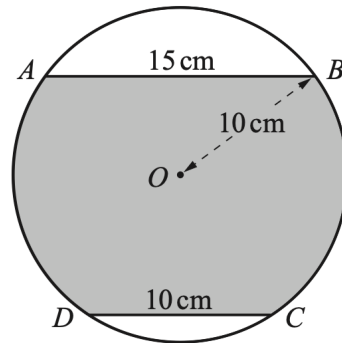
a. Find the perimeter of *ABCD*.

[5]

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b. Find the area of *ABCD*.

[3]

4.

The diagram shows a circle with centre O and radius 10 cm. The points A, B, C and D lie on the circle such that the chord AB = 15 cm and the chord CD = 10 cm. The chord AB is parallel to the chord DC.

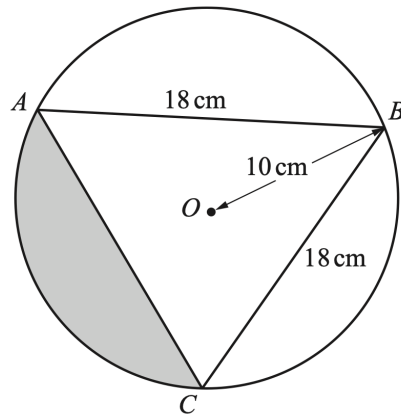   a. Show that the angle AOB is 1.70 radians correct to 2 decimal places.

[2]

   b. Find the perimeter of the shaded region.

[4]

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c. Find the area of the shaded region.

[4]

5.

The diagram shows a circle centre *O*, radius 10 cm. The points *A*, *B* and *C* lie on the circumference of the circle such that *AB* = *BC* = 18 cm.

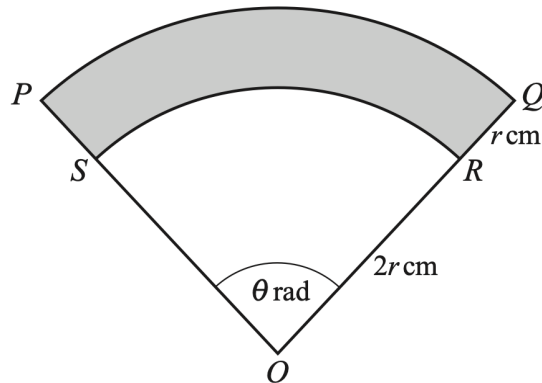   a. Show that angle *AOB* = 2.24 radians correct to 2 decimal places.

[3]

   b. Find the perimeter of the shaded region.

[5]

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c. Find the area of the shaded region.

[3]

6

The diagram shows a sector *OPQ* of the circle centre *O*, radius *3r* cm. The points *S* and *R* lie on *OP* and *OQ* respectively such that *ORS* is a sector of the circle centre *O*, radius *2r* cm. The angle *POQ* = θ radians. The perimeter of the shaded region *PQRS* is 100 cm.

.   a. Find θ in terms of *r*.

[2]

b. Hence show that the area, A cm^2, of the shaded region *PQRS* is given by $A = 50r - r^2$.

[2]