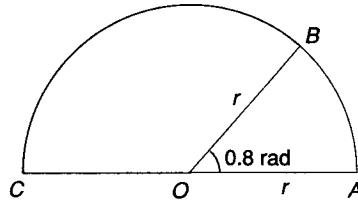
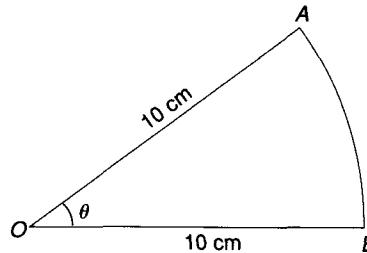


1. The diagram shows a semicircle  $OABC$ . If the arc  $AB$  has length 3.2 cm, calculate
- the length of the radius,
  - the length of the arc  $BC$ .

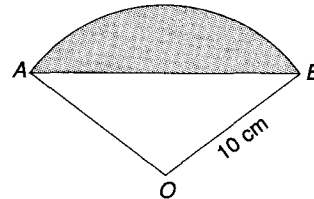


2. The diagram shows a sector  $AOB$  whose angle is  $\theta$  radians. Find
- the value of  $\theta$  if arc  $AB$  has length 14 cm,
  - the length of the arc  $AB$  if  $\theta = 0.6$ ,
  - the area of the sector if the arc  $AB$  has length 5 cm,
  - the length of the arc  $AB$  if the area of the sector is  $30 \text{ cm}^2$ ,
  - the area of the sector if  $\theta = 0.8$ ,
  - the value of  $\theta$  if the area of the sector is  $50 \text{ cm}^2$ .

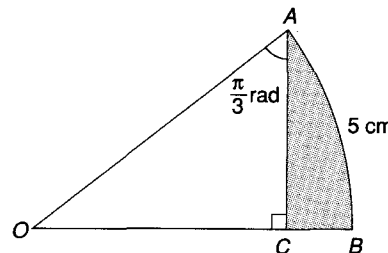


3. A sector cut from a circle of radius 3 cm has a perimeter of 12 cm. Find the area of this sector.
4. A piece of wire 20 cm long is bent to form the shape of a sector. If the arc has length 8 cm, calculate the angle of the sector and the area enclosed by this sector.

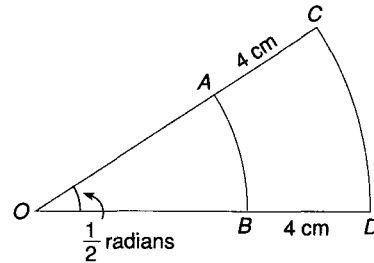
5. The diagram shows part of a circle, centre  $O$ , radius 10 cm. Given that the arc  $AB = 14$  cm, calculate, to 3 significant figures,
- the angle  $AOB$  in radians,
  - the area of the shaded region.



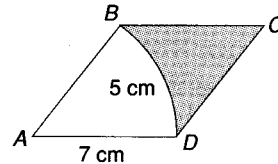
- \*6.  $OAB$  is a sector of the circle, centre  $O$ , with  $\angle OAC = \frac{\pi}{3}$  radians and  $\angle OCA$  a right angle. Given that the arc  $AB$  has length 5 cm,
- show that  $OA = 9.55$  cm,
  - calculate the perimeter of the shaded region,
  - express the area of the shaded region as a percentage of the area of the sector  $OAB$ .



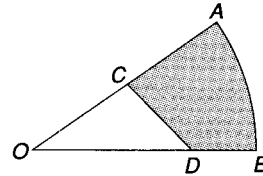
7. The figure shows two sectors in which the arcs  $AB$  and  $CD$  are arcs of concentric circles, centre  $O$ .  $BD = AC = 4$  cm and  $\angle AOB = \frac{1}{2}$  radians. If the perimeter of  $ABCD$  is 16 cm, calculate
- $OB$ ,
  - the area of  $ABCD$ .



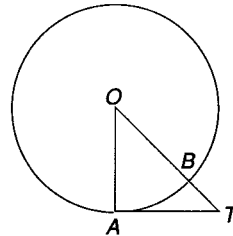
8. The diagram shows a rhombus  $ABCD$  with sides 7 cm. An arc  $BD$ , centre  $A$ , has length 5 cm. Calculate the area of the shaded region.



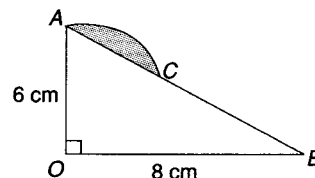
9.  $OAB$  is a sector with  $\angle AOB = 0.4$  radians.  $C$  is the midpoint of  $OA$  and  $D$  lies on  $OB$ . If  $OC = 3$  cm and the area of the shaded region is  $4.5$  cm<sup>2</sup>, calculate the length of  $DB$ .



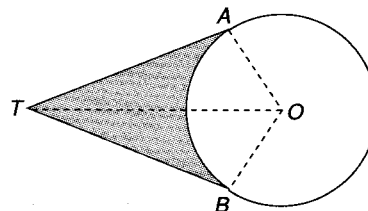
10. The figure shows a circle centre  $O$ , radius 6 cm. The tangent to the circle at  $A$  meets  $OB$  produced at  $T$ . If the area of the triangle  $OAT$  is  $15$  cm<sup>2</sup>, calculate the area and perimeter of the minor sector  $OAB$ .



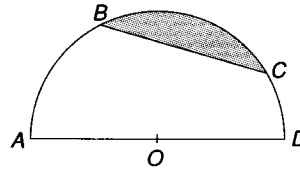
11.  $OAB$  is a right-angled triangle with  $OA = 6$  cm and  $OB = 8$  cm. An arc  $AC$  is drawn with centre at  $O$ . Calculate
- the angle  $AOC$  in radians,
  - the area of the shaded segment.



12. The diagram shows a circle centre  $O$ , radius 10 cm.  $TA$  and  $TB$  are tangents to the circle and the minor sector  $OAB$  has area  $80$  cm<sup>2</sup>. Find
- the angle  $AOT$  in radians,
  - the area of the shaded region.



13. The diagram shows a semicircle with centre at  $O$ . The lengths of the arcs  $AB$ ,  $BC$  and  $CD$  are in the ratio  $2 : 3 : 1$ . If the length of arc  $BC$  is 15 cm, calculate the area of the sector  $AOB$  and that of the shaded region.



14. A hollow cone has base radius 10 cm and height 24 cm. The cone is unrolled to form a sector of a circle. What are the angle and area of this sector?

**Exercise 12.2** (p. 235)

1. (a) 4 cm      (b) 9.37 cm  
 2. (a) 1.4      (b) 6 cm      (c) 25 cm<sup>2</sup>      (d) 6 cm      (e) 40 cm<sup>2</sup>      (f) 1  
 3. 9 cm<sup>2</sup>      4.  $\frac{4}{3}$  rad.; 24 cm<sup>2</sup>      5. (a) 1.40 rad.      (b) 20.7 cm<sup>2</sup>  
 6. (b) 11.1 cm      (c) 17.3%      7. (a) 6 cm      (b) 16 cm<sup>2</sup>  
 8. 14.6 cm<sup>2</sup>      9. 1.38 cm      10. 12.5 cm<sup>2</sup>; 16.2 cm  
 11. (a) 1.29 rad.      (b) 5.89 cm<sup>2</sup>      12. (a) 0.8 rad.      (b) 23.0 cm<sup>2</sup>  
 13. 47.7 cm<sup>2</sup>, 26.0 cm<sup>2</sup>      14. 2.42 rad., 817 cm<sup>2</sup>