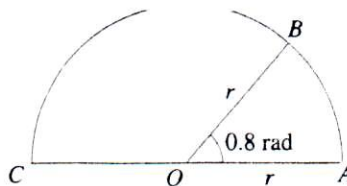


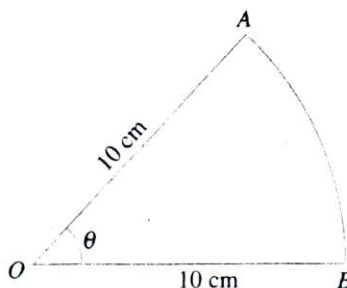
# TRIGONOMETRY – WORKSHEET

Show all working. Round off final answers to 3 s.f. unless otherwise stated.

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  $BC$ .

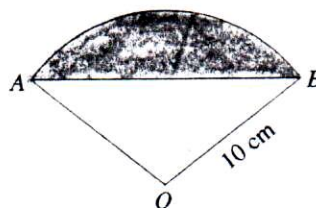


2. The diagram shows a sector  $AOB$  whose angle is  $\theta$  radians. Find
- the value of  $\theta$  if arc  $AB$  has length 14 cm,
  - the length of the arc  $AB$  if  $\theta = 0.6$ ,
  - the area of the sector if the arc  $AB$  has length 5 cm,
  - the length of the arc  $AB$  if the area of the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

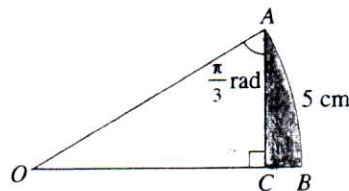


- the area of the sector if  $\theta = 0.8$ ,
  - the value of  $\theta$  if the area of the sector is  $50 \text{ cm}^2$ .
3. A sector cut from a circle of radius 3 cm has a perimeter of 12 cm. Find the area of this sector.
4. A piece of wire 20 cm long is bent to form the shape of a sector. If the arc has length 8 cm, calculate the angle of the sector and the area enclosed by this sector.

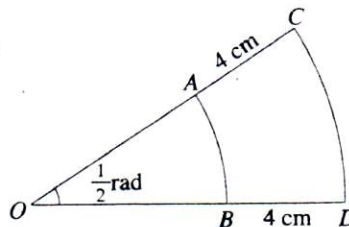
5. The diagram shows part of a circle, centre  $O$ , radius 10 cm. Given that the length of the arc  $AB$  is 14 cm, calculate, to 3 significant figures,
- the angle  $AOB$  in radians,
  - the area of the shaded region.



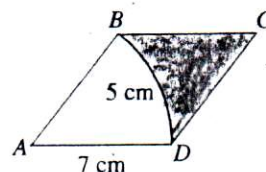
6.  $OAB$  is a sector of the circle, centre  $O$ , with  $\angle OAC = \frac{\pi}{3}$  radians and  $\angle OCA$  a right angle. Given that the arc  $AB$  has length 5 cm,
- show that  $OA = 9.55 \text{ cm}$ ,
  - calculate the perimeter of the shaded region,
  - express the area of the shaded region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



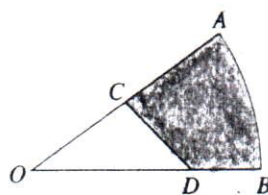
7. The figure shows two sectors in which the arcs  $AB$  and  $CD$  are arcs of concentric circles, centre  $O$ .  $BD = AC = 4 \text{ cm}$  and  $\angle AOB = \frac{1}{2}$  radians. If the perimeter of  $ABDC$  is 16 cm, calculate
- $OB$ ,
  - the area of  $ABDC$ .



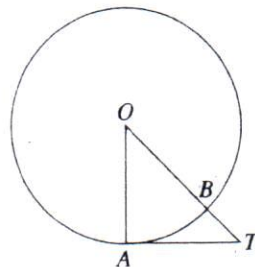
8. The diagram shows a rhombus  $ABCD$  with sides 7 cm. An arc  $BD$ , centre  $A$ , has length 5 cm. Calculate the area of the shaded region.



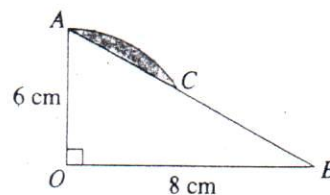
9.  $OAB$  is a sector with  $\angle AOB = 0.4$  radians.  $C$  is the midpoint of  $OA$  and  $D$  lies on  $OB$ . If  $OC = 3$  cm and the area of the shaded region is  $4.5 \text{ cm}^2$ , calculate the length of  $DB$ .



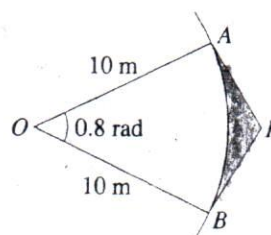
10. The figure shows a circle centre  $O$ , radius 6 cm. The tangent to the circle at  $A$  meets  $OB$  produced at  $T$ . If the area of the triangle  $OAT$  is  $15 \text{ cm}^2$ , calculate the area and perimeter of the minor sector  $OAB$ .



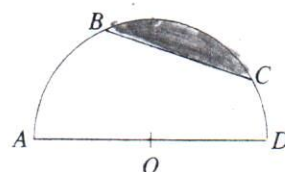
11.  $OAB$  is a right-angled triangle with  $OA = 6$  cm and  $OB = 8$  cm. An arc  $AC$  is drawn with centre at  $O$ . Calculate  
(a) the angle  $AOC$  in radians,  
(b) the area of the shaded segment.



12. The diagram shows part of a circle, centre  $O$ , of radius 10 m. The tangents at the points  $A$  and  $B$  on the circumference of the circle meet at the point  $P$  and the angle  $AOB$  is  $0.8$  radians. Calculate  
(a) the length of the perimeter of the shaded region,  
(b) the area of the shaded region. (C)



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?
15. The diagram shows three points  $A$ ,  $B$  and  $C$  on a circle, centre  $O$  and radius 10 cm. The line  $AD$  is a tangent to the circle. Given that angle  $AOB = 60^\circ$ , find, to one decimal place,  
(a) the length of the arc  $ACB$ ,  
(b) the area of the segment  $ACB$ .  
Given also that the length of  $AD$  equals the length of the arc  $ACB$ , find  
(c) the area of the shaded region  $ACBD$ ,  
(d) the length of  $BD$ . (C)

