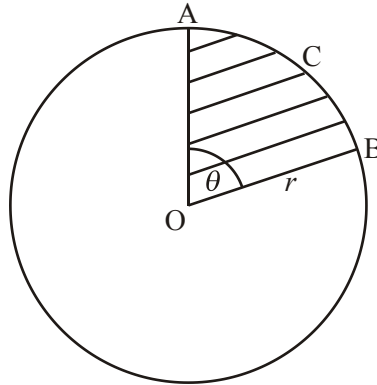


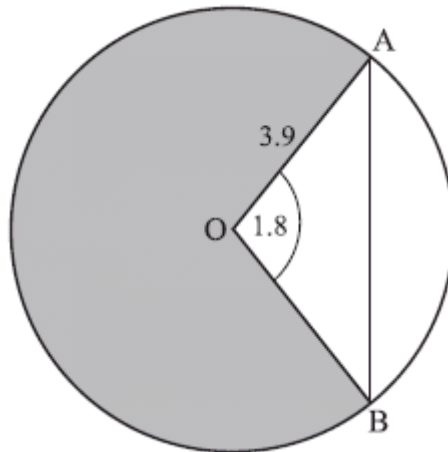
# SATPREP

## Assignment : Circular Measurement

1. The following diagram shows a circle of centre  $O$ , and radius  $r$ . The shaded sector  $OACB$  has an area of  $27 \text{ cm}^2$ . Angle  $\widehat{AOB} = \theta = 1.5$  radians.



- (a) Find the radius.
- (b) Calculate the length of the minor arc  $ACB$ .
2. The circle shown has centre  $O$  and radius  $3.9$  cm.

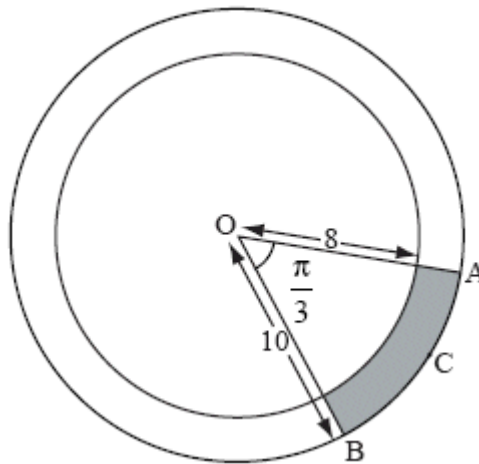


*diagram not to scale*

Points  $A$  and  $B$  lie on the circle and angle  $\widehat{AOB}$  is  $1.8$  radians.

- (a) Find  $AB$ .
- (b) Find the area of the shaded region.

3. The diagram shows two concentric circles with centre O.

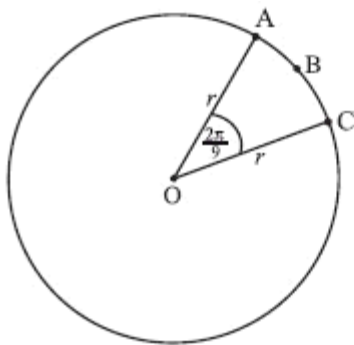


*diagram not to scale*

The radius of the smaller circle is 8 cm and the radius of the larger circle is 10 cm.

Points A, B and C are on the circumference of the larger circle such that  $\widehat{AOB}$  is  $\frac{\pi}{3}$  radians.

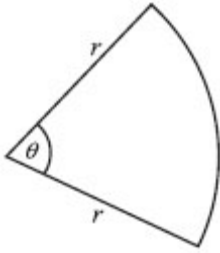
- (a) Find the length of the arc ACB.
- (b) Find the area of the shaded region.
4. The diagram below shows a circle centre O, with radius  $r$ . The length of arc ABC is  $3\pi$  cm and  $\widehat{AOC} = \frac{2\pi}{9}$ .



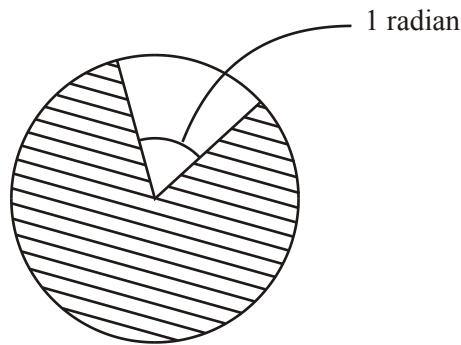
*diagram not to scale*

- (a) Find the value of  $r$ .
- (b) Find the perimeter of sector OABC.
- (c) Find the area of sector OABC.

5. The following diagram shows a sector of a circle of radius  $r$  cm, and angle  $\theta$  at the centre. The perimeter of the sector is 20 cm.

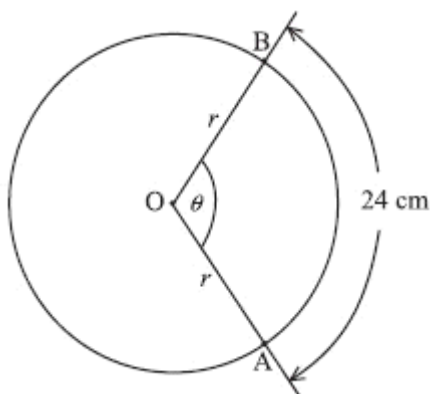


- (a) Show that  $q = \frac{20-2r}{r}$ .
- (b) The area of the sector is  $25 \text{ cm}^2$ . Find the value of  $r$ .
6. The diagram shows a circle of radius 5 cm.



Find the perimeter of the shaded region.

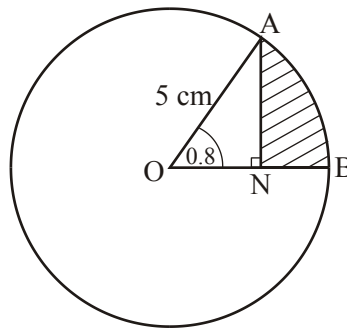
7. The diagram below shows a circle of radius  $r$  and centre O. The angle  $\widehat{AOB} = q$ .



The length of the arc AB is 24 cm. The area of the sector OAB is  $180 \text{ cm}^2$ .

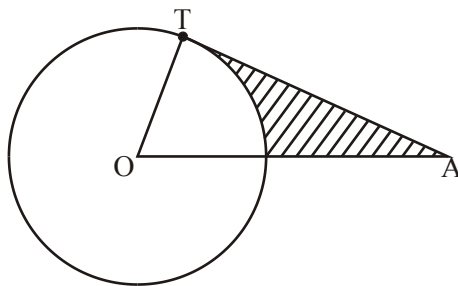
Find the value of  $r$  and of  $q$ .

8. The diagram below shows a circle of radius 5 cm with centre O. Points A and B are on the circle, and  $\widehat{AOB}$  is 0.8 radians. The point N is on [OB] such that [AN] is perpendicular to [OB].



Find the area of the shaded region.

9. In the following diagram, O is the centre of the circle and (AT) is the tangent to the circle at T.

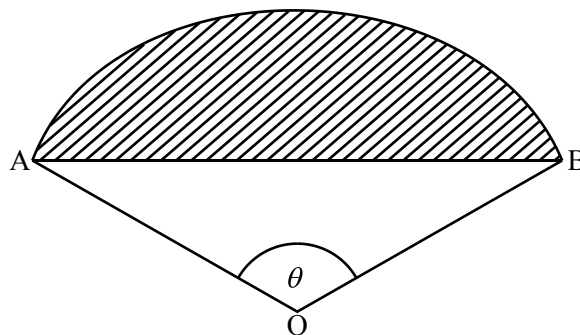


**Diagram not to scale**

If  $OA = 12$  cm, and the circle has a radius of 6 cm, find the area of the shaded region.

10. The diagram below shows a sector AOB of a circle of radius 15 cm and centre O. The angle  $\theta$  at the centre of the circle is 2 radians.

**Diagram not to scale**



- Calculate the area of the sector AOB.
- Calculate the area of the shaded region.

## Answer to Assignment circular measure

1. (a)  $r = 6 \text{ cm}$   
(b) Arc length = 9 cm
  
2. (a)  $AB = 6.11 \text{ (cm)}$   
(b) area = 34.1 (cm<sup>2</sup>)
  
3. (a) arc length =  $\frac{20\pi}{6} \left( = \frac{10\pi}{3} \right)$   
(b) area shaded =  $6\pi \left( \text{accept } \frac{36\pi}{6}, \text{ etc.} \right)$
  
4. (a)  $r = 13.5 \text{ (cm)}$   
(b) perimeter =  $27 + 3\pi \text{ (cm)} (= 36.4)$   
(c) area =  $20.25\pi \text{ (cm}^2\text{)} (= 63.6)$
  
5. (a)  $\theta = \frac{20 - 2r}{r}$   
(b)  $r = 5 \text{ cm}$
  
6. Perimeter =  $(10\pi + 5) \text{ cm} (= 36.4, \text{ to 3 sf})$
  
7.  $r = 1 \theta = 1.6 (= 91.7^\circ)$
  
8. Shaded area =  $10 - 6.249.. = 3.75 \text{ (cm}^2\text{)}$
  
9. Area =  $12.3 \text{ cm}^2 \text{ (or } 18\sqrt{3} - 6\pi)$
  
10. (a) Area = 225 (cm<sup>2</sup>)  
(b) Area =  $225 - 102.3 = 122.7 \text{ (cm}^2\text{)}$   
 $= 123 \text{ (3 sf)}$