

## 5A Converting Between Radians & Degrees

1. Convert the following angle to degrees

a)  $\frac{7\pi}{8} \text{ rad}$

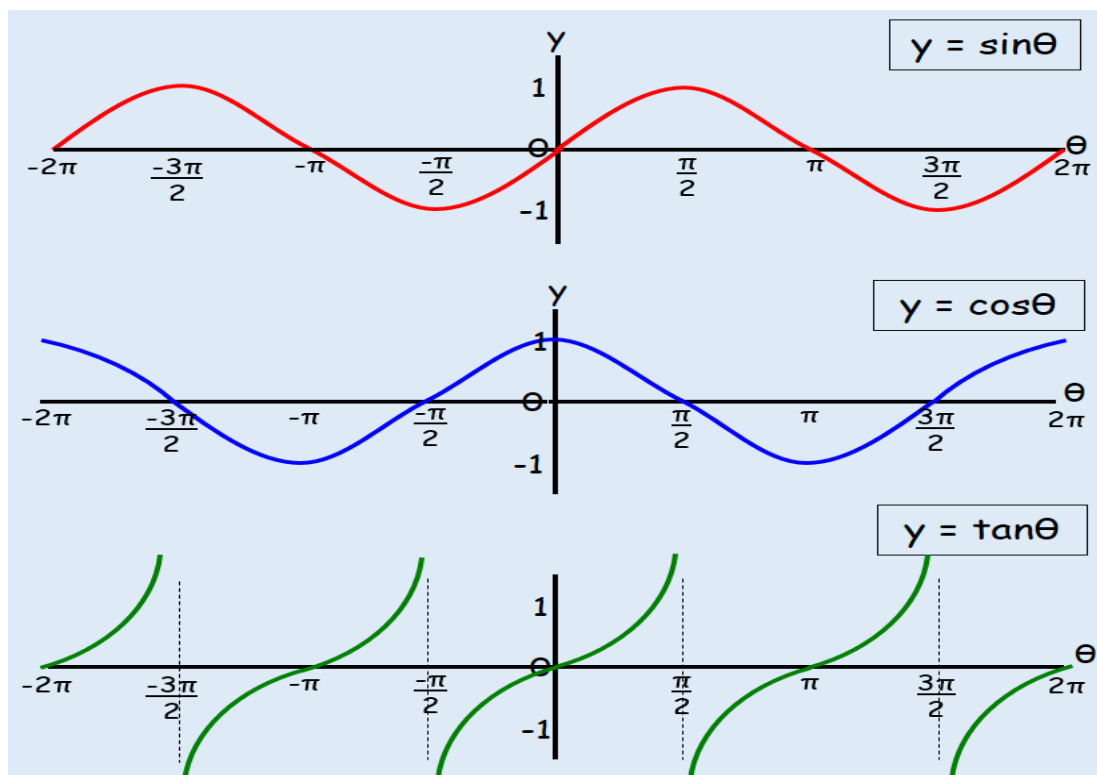
b)  $\frac{4\pi}{15} \text{ rad}$

2. Convert the following angle to degrees

a)  $150^\circ$

b)  $110^\circ$

Equivalence relationships



3. Sketch the graph of  $y = \cos(x + \pi)$  for  $0 \leq x \leq 2\pi$ .

### 5B Trig Key Values as Radians

| Degrees | Radians         | <i>sin</i> | <i>cos</i> | <i>tan</i> |
|---------|-----------------|------------|------------|------------|
| 0       | 0               |            |            |            |
| 30      | $\frac{\pi}{6}$ |            |            |            |
| 45      | $\frac{\pi}{4}$ |            |            |            |
| 60      | $\frac{\pi}{3}$ |            |            |            |
| 90      | $\frac{\pi}{2}$ |            |            |            |

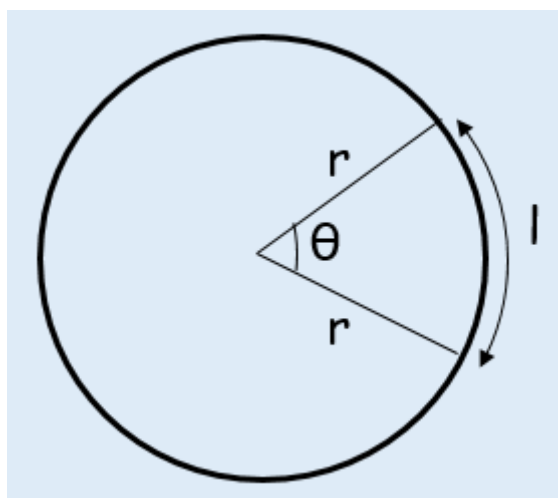
1. Find the exact value of:

$$\cos \frac{4\pi}{3}$$

2. Find the exact value of:

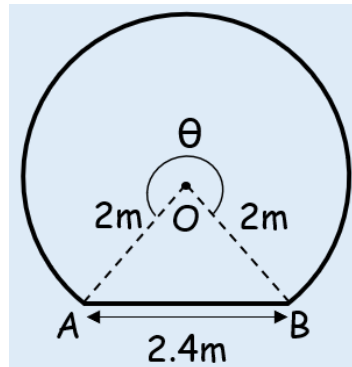
$$\sin\left(-\frac{7\pi}{6}\right)$$

## 5C Arc Length



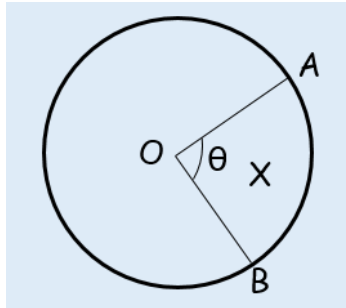
1. Find the length of the arc of a circle of radius 5.2cm. The arc subtends an angle of  $0.8^\circ$  at the centre of the circle.
  
  
  
  
  
  
  
  
  
  
2. Arc AB of a circle, with centre O and radius  $r$ , subtends an angle of  $\theta$  radians at O. The Perimeter of sector AOB is  $P$  cm. Express  $r$  in terms of  $P$  and  $\theta$ .

3. The border of a garden pond consists of a straight edge AB of length 2.4m, and a curved part C, as shown in the diagram below. The curved part is an arc of a circle, centre O and radius 2m. Find the length of C.

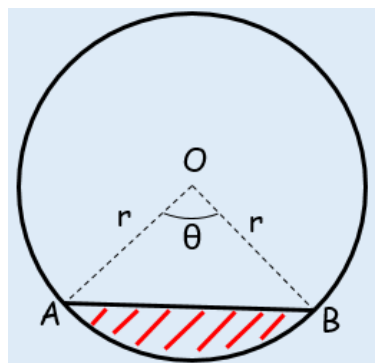


## 5D Area of Sectors & Segments

Sectors

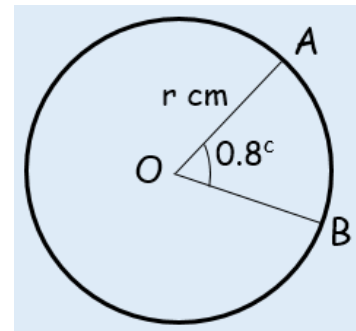


Segments



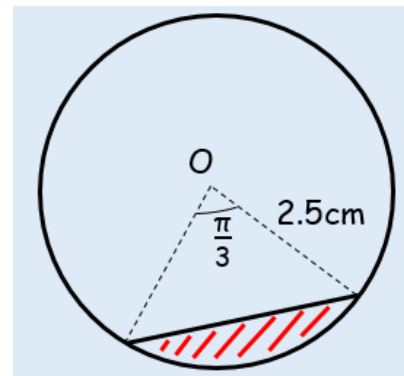


1. In the diagram, the area of the minor sector AOB is  $28.9\text{cm}^2$ . Given that angle AOB is  $0.8$  rad, calculate the value of  $r$ .

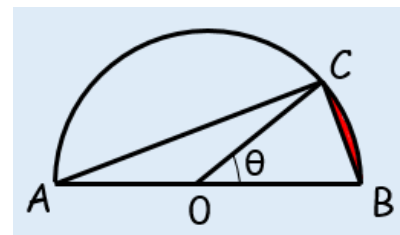


2. A plot of land is in the shape of a sector of a circle of radius  $55\text{m}$ . The length of fencing that is needed to enclose the land is  $176\text{m}$ . Calculate the area of the plot of land.

3. Calculate the Area of the segment shown in the diagram below.



4. In the diagram  $AB$  is the diameter of a circle of radius  $r$  cm, and angle  $BOC = \theta$  radians. Given that the Area of triangle  $AOC$  is 3 times that of the shaded segment, show that  $3\theta - 4\sin\theta = 0$ .



## 5E Solving Equations in Radians

1. Solve the equation:

$$4\cos\theta = 2, \quad 0 \leq \theta \leq 2\pi$$

2. Solve the equation:

$$17\cos\theta + 3\sin^2\theta = 13, \quad 0 \leq \theta \leq 2\pi$$

3. Solve the equation:

$$\sin 3\theta = \frac{\sqrt{3}}{2}, \quad 0 \leq \theta \leq 2\pi$$

## 5F Small Angle Approximations

1. When  $\theta$  is small, find the approximate value of:

$$\frac{\sin 2\theta + \tan \theta}{2\theta}$$

2. When  $\theta$  is small, find the approximate value of:

$$\frac{\cos 4\theta - 1}{\theta \sin 2\theta}$$

3.

a) Show that, when  $\theta$  is small:

$$\sin 5\theta + \tan 2\theta - \cos 2\theta \approx 2\theta^2 + 7\theta - 1$$

b) Hence, state the approximate value of  $\sin 5\theta + \tan 2\theta - \cos 2\theta$  for small values of  $\theta$