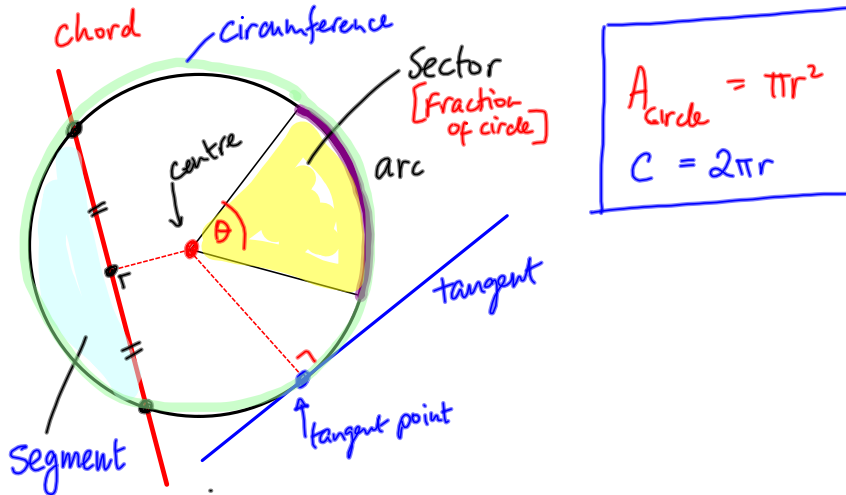


chapter **6** Length – Area – Volume 197

**Section 6.2 Sectors of circles**

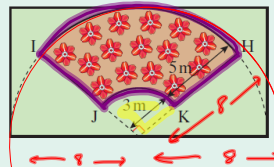


**Example 1**

A flowerbed in the shape of a section of a sector of a circle is placed in the centre of a rectangular lawn, as shown in the diagram.

- Calculate
- (i) the length of edging needed for the flowerbed
- (ii) the area of grass in the garden.

Correct each answer to one place of decimals.



$x = \frac{2\pi r}{4} = \frac{6\pi}{4} = \frac{3\pi}{2}$   
 $p = 5 + 5 + 4\pi + \frac{3\pi}{2} \approx 27.3 \text{ m}$

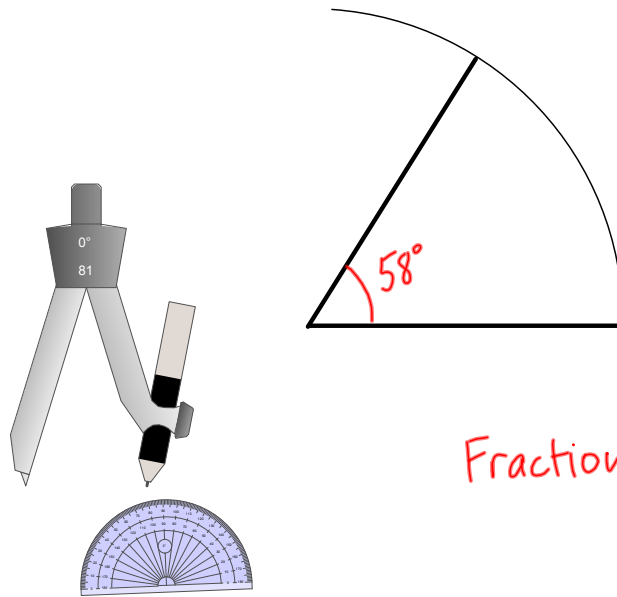
$A = \frac{\pi r^2}{4} = \frac{9\pi}{4} \text{ m}^2$

$A = \frac{\pi r^2}{4} = \frac{\pi(8)^2}{4} = 16\pi \text{ m}^2$

$A = 16\pi - \frac{9\pi}{4} = 43.2 \text{ m}^2$

$A_g = LB = 8(6) = 128$   
 $A_c = 128 - 43.2 = 84.8 \text{ m}^2$

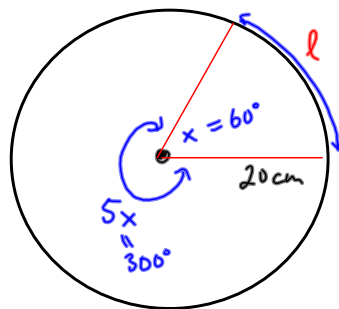
# What fraction?



$$\text{Fraction} = \frac{58^\circ}{360^\circ}$$

## Example 2

A minor arc CD of a circle, centre O and radius 20 cm, subtends an angle  $x$  radians at O. The major arc CD of the circle subtends an angle  $5x$  radians at O. Find, in terms of  $\pi$ , the length of the minor arc.

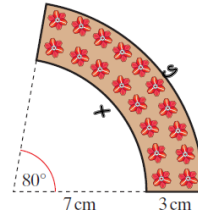


$$C = 2\pi r$$

$$\begin{aligned} l &= \frac{2\pi r}{6} = \frac{2\pi(20)}{6} \\ &= \frac{40\pi}{6} = \frac{20}{3}\pi \end{aligned}$$

## Exercise 6.2

1. A drawing of a curved flower bed is shown.  
The scale in the drawing is 1 cm : 1 m.  
Calculate, correct to 1 place of decimals,
- the perimeter of the bed.
  - the area of the bed.



$$\text{Fraction of circle} = \frac{80^\circ}{360^\circ} = \frac{2}{9}$$

Consider small Sector - let  $x = \text{arc}$   
 $r = 7$

Consider large Sector  
let  $y = \text{arc}$   
 $r = 7 + 3 = 10$   
add 4 sides:

$$A_{\text{circle}} = \pi r^2$$

Small sector

Large sector

$$\text{Bed area} = \text{Large} - \text{Small Sector}$$

(i) Perimeter of bed?

$$C = 2\pi r$$

$$x = \frac{2}{9}(2\pi r) = \frac{2}{9}(2\pi(7)) = 9.8 \text{ cm}$$

$$y = \frac{2}{9}(2\pi r) = \frac{2}{9}(2\pi(10)) = 14.0 \text{ cm}$$

$$P = 3 + 3 + 9.8 + 14 = 29.8 \text{ cm}$$

(ii) Area of bed?

$$A = \frac{2}{9}(\pi r^2) = \frac{2}{9}(\pi(7)^2) = 34.2 \text{ m}^2$$

$$A = \frac{2}{9}(\pi r^2) = \frac{2}{9}(\pi(10)^2) = 69.8 \text{ m}^2$$

$$\text{Area of Bed} = 35.6 \text{ m}^2$$