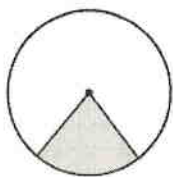
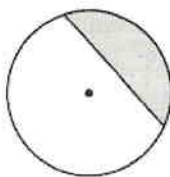


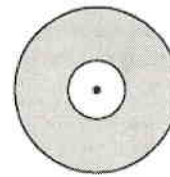
Use the pictures below to help you fill in the blanks.



Sector of a circle



Segment of a circle



Annulus

A Sector is the region between two radii and an arc of the circle.

A Segment is the region between a chord and an arc of the circle.

An Annulus is the region between two concentric circles.

"Picture equations" are helpful when trying to visualize the areas of these regions. The picture equations below show you how to find the area of a sector of a circle, the area of a segment of a circle, and the area of an annulus.

$$\frac{\theta}{360} \cdot \pi r^2 = A_{\text{sector}}$$

$$\frac{\theta}{360} \pi r^2 - \frac{1}{2}bh = A_{\text{segment}}$$

$$\pi R^2 - \pi r^2 = A_{\text{annulus}}$$

Write the appropriate equation for each area:

Area of a sector: $\frac{\theta}{360^\circ} \cdot \pi r^2$ { fraction of circle · Area

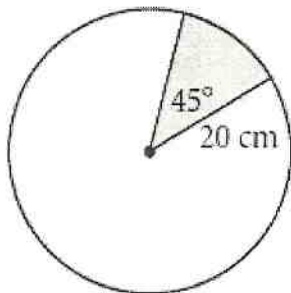
Area of a segment of a circle: $\frac{\theta}{360^\circ} \pi r^2 - \frac{1}{2}bh$ { $\triangle - \triangle = \text{segment}$

Area of an annulus: $\pi R^2 - \pi r^2$ { Big O - Little o

Complete the following examples. Be sure to show all work!

(Remember to write each equation first!)

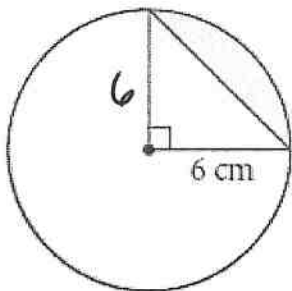
Example: Find the **exact** area of the shaded sector.



$$\begin{aligned}
 A &= \frac{x}{360} \pi r^2 \\
 &= \frac{45}{360} \cdot 20^2 \pi \\
 &= \frac{1}{8} \cdot 400 \pi \\
 &= 50\pi
 \end{aligned}$$

Area of shaded sector: 50π

Example: Find the exact area of the shaded segment.

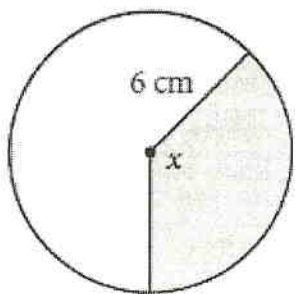


Plan:

$$\begin{aligned}
 A &= \frac{x}{360} \pi r^2 - \frac{1}{2}bh \\
 A &= \frac{90}{360} 36\pi - \frac{1}{2} 6 \cdot 6 \\
 &= 9\pi - 18
 \end{aligned}$$

Area of shaded segment: 9π - 18

Example: The shaded area is $14\pi \text{ cm}^2$, and the radius is 6 cm . Find the **exact** value of x .



$$\begin{aligned}
 A &= \frac{x}{360} \pi r^2 \\
 \left(\frac{10}{\pi}\right) 14\pi &= \frac{x}{360} \pi 36 \left(\frac{10}{\pi}\right) \\
 &= 140^\circ = x
 \end{aligned}$$

$x =$ 140°