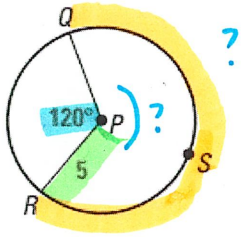
c.) Arc Length of $\overset{\frown}{QSR}$



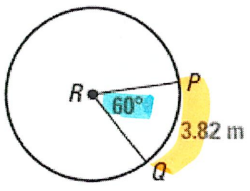
$? = 360° - 120°$

$? = 240°$

$\text{Arc Length } \overset{\frown}{QSR} = \frac{240°}{360°} \cdot 2\pi(5)$

$= 20.94 \text{ units}$

d.) Circumference of $\odot R$



$\frac{3.82}{C} = \frac{60°}{360°}$

$\frac{1375.2}{60} = \frac{60°C}{60}$

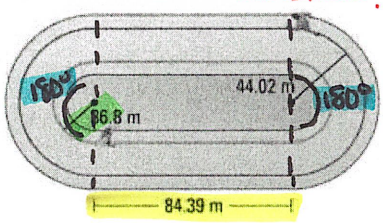
$C = 22.92 \text{ m}$

Example #4: The curves at the ends of the track show are 180° arc of circles. The radius of the arc for a runner on the inside path is 36.8 meters. About how far does this runner travel to go once around the track? Round to the nearest tenth of a meter.

Distance!

Distance = curve + straight + curve + straight

(curve: ↖ Arc Length)



$\text{Arc Length} = \frac{180°}{360°} \cdot 2\pi(36.8)$

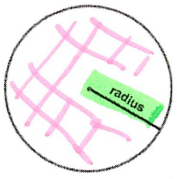
$= 115.6 \text{ m}$

$D = 115.6 + 84.39 + 115.6 + 84.39$ $\quad D \approx 400 \text{ m}$

Chapter 11.5: Areas of Circles and Sectors

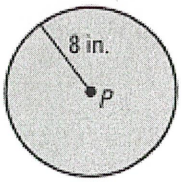
Area of a Circle (Theorem 11.9):

$A = \pi r^2$ ← squared is only with the radius NOT the π.



Example #1: Find the indicated measure

a.) Find the area of $\odot P$.

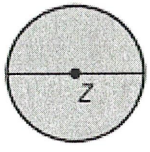


$A = \pi(8)^2$

$A = 64\pi \text{ in}^2$ ← Exact

$A = 201.06 \text{ in}^2$ ← Approx.

b.) Find the diameter of $\odot Z$ if the $A = 96cm^2$



$\frac{96}{\pi} = \frac{\pi r^2}{\pi}$

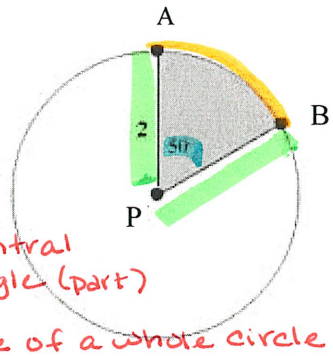
$\sqrt{\frac{96}{\pi}} = \sqrt{r^2}$

$r = 5.53 \text{cm}$

$d = 2(5.53) = 11.06 \text{cm}$

Sector of a Circle: is the region bounded by two radii of the circle and their intercepted arc.

In the diagram, sector APB is bounded by… $\overline{AP}$, $\overline{BP}$ and Arc Length $\overset{\frown}{AB}$



Area of a Sector (Theorem 11.10):

The ratio of the area of a sector of a circle to the area of the whole circle (πr^2) is equal to the ratio of the measure of the intercepted arc to 360°

Portion of the area of the circle → $\frac{\text{Area of Sector } \overset{\frown}{APB}}{\pi r^2 = A} = \frac{m\overset{\frown}{AB}}{360°}$ ← central angle (part)

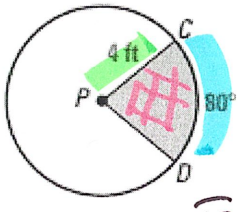
Whole → Area of Circle

↑ measure of a whole circle

$$\text{Area of Sector } \overset{\frown}{AB} = \frac{m\overset{\frown}{AB}}{360°} \cdot \pi r^2$$

Example #2: Find the area of the **shaded** area shown.

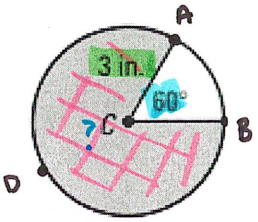
a.)



$$\text{Area of Sector } \overset{\frown}{AB} = \frac{80°}{360°} \cdot \pi (4)^2$$

$$= 11.17 \text{ ft}^2$$

b.)



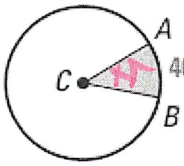
? = 360° − 60°

? = 300°

$$\text{Area of Sector } \overset{\frown}{ADB} = \frac{300°}{360°} \cdot \pi (3)^2$$

$$= 23.56 \text{ in}^2$$

Example #3: Find the radius of $\odot C$.



Shaded Sector Area

Area = 59 in.²

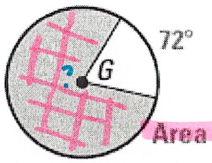
$$\frac{59}{\pi r^2} = \frac{40°}{360°} \Rightarrow \frac{21240}{40\pi} = \frac{40\pi r^2}{40\pi}$$

$$\sqrt{169.02} \approx \sqrt{r^2}$$

$$r \approx 13 \text{ in}$$

Example #4: Find the diameter of $\odot G$.

Need to find radius 1st



Area = 277 m² ← Shaded Sector Area

? = 360° − 72°

? = 288°

$$\frac{277}{\pi r^2} = \frac{288°}{360°} \Rightarrow \frac{99720}{288\pi} = \frac{288\pi r^2}{288\pi}$$

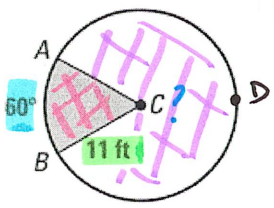
$$\sqrt{110.21} \approx \sqrt{r^2}$$

$$r = 10.5 \text{ m}$$

$$d = 2(10.5)$$

$$d = 21 \text{ m}$$

Example #5: Find the areas of the sectors formed by $\angle ACB$



? = 300°

Shaded Sector:

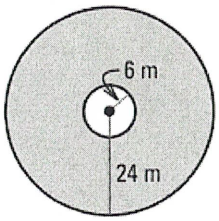
Area of Sector $\overset{\frown}{AB} = \frac{60^\circ}{360^\circ} \cdot \pi (11)^2 = 63.46\ ft^2$

Non-Shaded Sector:

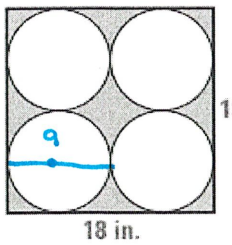
Area of Sector $\overset{\frown}{ADB} = \frac{300^\circ}{360^\circ} \pi (11)^2 = 316.78\ ft^2$

Example #6: Find the area of the shaded region.

a.)



b.)



* r = 4.5 in

* Shaded Area = Total Area - Unshaded Area *

Total Area = $\pi (24)^2$

$= 576\pi\ m^2$

Unshaded Area = $\pi (6)^2$

$= 36\pi\ m^2$

Shaded Area = $576\pi - 36\pi$

$= 540\pi$

$= 1696.46\ m^2$

Total Area = $18 \cdot 18$

$= 324\ in^2$

Unshaded Area = $\pi (4.5)^2$

$= 20.25\pi$ ← Area of one circle

$= 4(20.25)\pi$ ← Area of all 4

$= 81\pi\ in^2$

Shaded Area = $324 - 81\pi$

$= 69.53\ in^2$