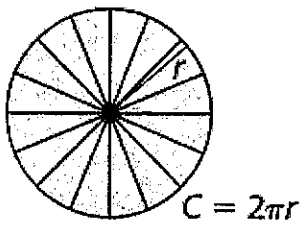
Name

Area of Circles and Sectors

on Objective I WBAT use formula for area of a ⊙ find + use area of sectors

You can divide a circle into congruent sections and rearrange the sections to form a figure that approximates a parallelogram. Increasing the number of congruent sections increases the figure's resemblance to a parallelogram.



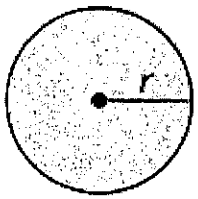
The base of the parallelogram that the figure approaches is half of the circumference, so the base of the parallelogram is $b = \frac{1}{2}C = \frac{1}{2}(2\pi r) = \pi r$

The height of the parallelogram is the radius, $h = r$

So, the area of the parallelogram is $A = bh = (\pi r)(r) = \pi r^2$

Area of a Circle

The area of a circle is πr^2, where r is the radius of the circle.



*units²

Examples:

1. Find the area of a circle with a radius of 2.5 cm.

$A = \pi r^2$

$A = \pi(2.5)^2$

$A = \pi(6.25)$

$= 6.25\pi \text{ cm}^2$

$\approx 19.63 \text{ cm}^2$

2. Find the diameter of a circle with an area of 113.1 square cm.

$A = \pi r^2$

$\frac{113.1}{\pi} = \frac{\pi r^2}{\pi}$

$\sqrt{r^2} = \sqrt{36.001}$

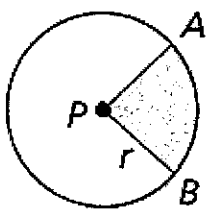
$r \approx 6.00$ cm → $d \approx 12.00$ cm

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

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

Area of a Sector

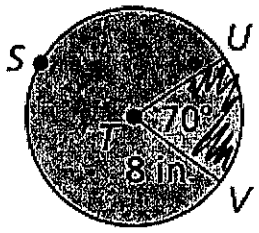
The ratio of the area of a sector of a circle to the area of the whole circle (πr^2) ual to the ratio of the measure of the intercepted arc and 360°.



$$\frac{\text{sector area}}{\odot \text{ area}} = \frac{\text{central } \angle}{360}$$

Example:

3. Find the areas of the small sector formed by $\angle UTV$.

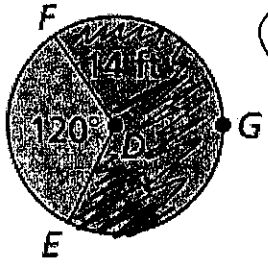


$$\frac{\text{sec. area}}{\pi(8)^2} = \frac{70}{360}$$

$$\text{sec. area} = \frac{7 \cdot 64\pi}{9\ 36}$$

$$= \frac{112\pi}{9}\ \text{in}^2 \approx 39.10\ \text{in}^2$$

4. Find the area of the large sector formed by $\angle FDE$.

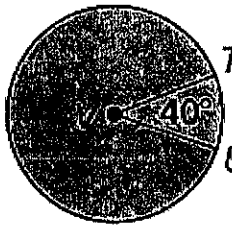


$$\frac{\text{sec area}}{\pi(14)^2} = \frac{240}{360}$$

$$3(\text{sec. area}) = \frac{392\pi}{3}$$

$$\text{sec. area} = \frac{392\pi}{3}\ \text{ft}^2 \approx 410.5\ \text{ft}^2$$

5. Find the area of $\odot V$.

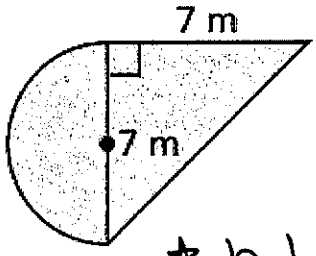


$A = 35\ \text{m}^2$

$$\frac{35}{\odot\ \text{area}} = \frac{40}{360}$$

$$\odot\ \text{area} = 315\ \text{m}^2$$

6. Find the area of the figure.



$\Delta: \frac{1}{2}bh$

$= \frac{1}{2}(7)(7)$

$= 24.5\ \text{m}^2$

★ $b \perp h$

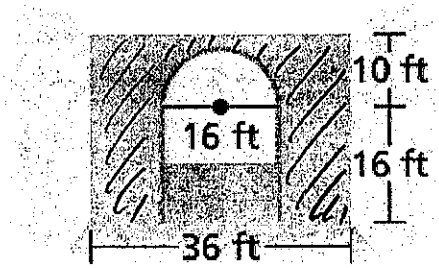
$\text{semi}_{\odot} = \frac{\pi r^2}{2}$

$= \frac{\pi(3.5)^2}{2}$

$= 6.125\pi\ \text{m}^2 \approx 19.24\ \text{m}^2$

$\approx 43.74\ \text{m}^2$

7. A rectangular wall has an entrance cut into it. You want to paint the wall. To the nearest square foot, what is the area of the region you need to paint?



big rect. $-$ (semi$_{\odot}$ + small rect.)

$$(26)(36) - \left(\frac{\pi(8)^2}{2} + (16)(16)\right)$$

$$936 - 32\pi - 256$$

$$= 680 - 32\pi\ \text{ft}^2 \approx 579.47\ \text{ft}^2$$