Geometry Agenda

Monday, March 10, 2014

- **Objective** - Review area and circumference of a circle and find sector area and arc lengths.

What is the formula for finding the area of a circle?

$A = \pi \cdot r^2$

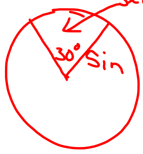
Use the formula for the area of a circle to determine the area of a 16-inch pizza. 16-inch is the diameter of the pizza.

$A = 64\pi$

The 16-inch pizza is divided into 8 equal slices or sectors. Describe how you could determine the area of a slice.

$A/8 = \frac{64\pi}{8} \approx 8\pi$

Sector



Determine the area of a slice of pizza

Instead of dividing the pizza into 8 each slices it is cut into sectors with the following central angle measures: 45°, 90°, 105°, 120°. Determine a method for finding the area of the 4 sectors of pizza. Use the method to calculate each sector area.

45° $45° = 8\pi$

90° $64\pi/4 = 16\pi$

105° $\frac{105}{360} \cdot \frac{64\pi}{1} = \frac{56\pi}{3}$

120°

$\frac{64\pi}{3} =$

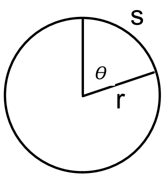
$A = 64\pi$

$\pi \approx 3.1415$

$\frac{22}{7}$

Generalize the method for determining the sector area for any central angle measure and write the sector area formula using degree measure.

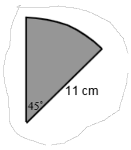
We can use the symbol θ to represent the degrees of the central angle.



$$A = \frac{\theta}{360}\pi r^2$$

Let's try some more...

Find the area of each sector. Round answers to the nearest hundredth.



$A = \frac{45}{360}\pi(11)^2$

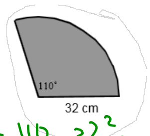
$\frac{45}{360}\left(\frac{121\pi}{1}\right)$

$\frac{1}{8}\left(\frac{121\pi}{1}\right) \approx \frac{121\pi}{8}$

Let's try some more...

Find the area of each sector. Round answers to the nearest hundredth.

$A = \pi \cdot r^2 \cdot \frac{\theta}{360}$



$A \approx \cancel{964.608}$

$\cancel{964.61}$

≈ 982.47

$A = \frac{110}{360} \cdot 32^2 \pi$

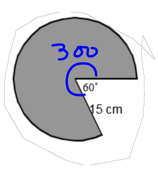
$\frac{110}{360} \cdot 1024\pi$

$A = \frac{110}{360} \cdot 32^2 \pi$

$\frac{11}{36} \cdot \frac{32}{1} \cdot \frac{32}{1}\pi \approx 982.47$

Let's try some more...

Find the area of each sector. Round answers to the nearest hundredth.



$A = 15^2 \pi \cdot \frac{300}{360}$

$\frac{225\pi}{1} \cdot \frac{5}{6}$

$= 588.75 \text{ cm}^2$

How do we determine the circumference of a circle? $C = 2\pi r$ or $d \cdot \pi$

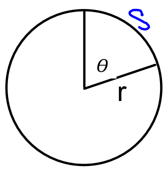
Draw a circle on your paper and draw in a diameter.

Using your fingers, take the length of the diameter and estimate how many diameters would fit around the circle.

The distance around the circle is approximately 3 diameter lengths, hence the discovery of pi.

$C = \pi d$ or $C = 2\pi r$

We can find arc length by finding the circumference and then multiplying it by the fraction the central angle is to the entire circle.



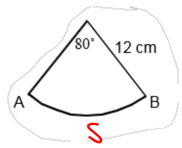
$$S = \text{arc length} = \frac{\theta}{360}\pi d$$

OR

$$S = \text{arc length} = \frac{\theta}{360}2\pi r$$

Let's try some...

Find the length of the arc of each circle. Round to the nearest hundredth.



$$S = \frac{80}{360}(2\pi \cdot 12)$$

or

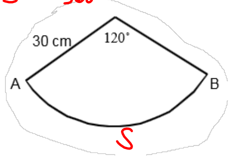
$$S = \frac{\cancel{80}^{\,2}}{\cancel{360}_{\,\cancel{9}\,3}}\left(\frac{\cancel{24}^{\,8}}{1}\pi\right)$$

$$S = \frac{16\pi}{3}$$

Let's try some...

Find the length of the arc of each circle. Round to the ~~nearest hundredth~~. Exact value

$$S = \frac{\theta}{360}2\pi r$$



$$S = 20\pi$$

$$S = \frac{120}{360}(2\pi 30)$$

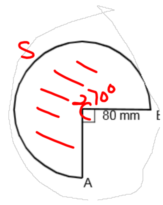
$$\frac{120}{360}(60\pi)$$

$$\frac{1}{3}(60\pi)$$

$$20\pi$$

Let's try some...

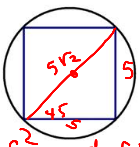
Find the length of the arc of each circle. Round to the nearest hundredth.



$$S = \frac{270}{360}\pi(2 \cdot 80)$$

$$120\pi \approx 376.8\text{mm}$$

How can we use inscribed and circumscribed squares to help us find the radius and diameter of circles?



$5^2+5^2=c^2$

$50=c^2$

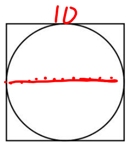
$\sqrt{50}=c$

$5\sqrt{2}$

$d=5\sqrt{2}$

$r=2.5\sqrt{2}$

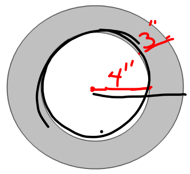
$\frac{5\sqrt{2}}{2}$



$d=s=10$

$r=10/2=5$

STUGO needs to paint only the shaded part of the circular O for O'Connor on the poster. If the shaded part is 3 feet away from the inside edge, what is the approximate area of the outer O? Leave answers in terms of π ?



$A = 7^2\pi = 49\pi$

$-A = 4^2\pi = 16\pi$

33π