

Name: _____ Date: _____

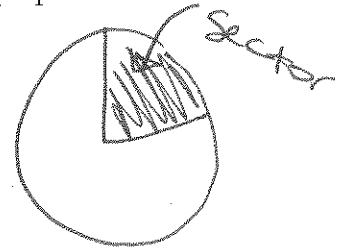
Period: _____

**Area of a Sector & Arc Length
Using Proportions**

When finding the area of a sector of a circle you can use the following proportion:

part
whole

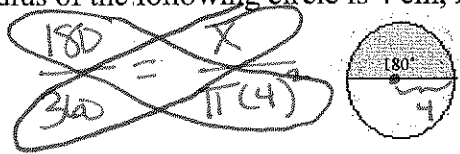
$$\frac{\text{Shaded Area}}{\text{Total Area}} = \frac{\text{Degrees in Shaded Portion}}{360^\circ}$$



Use the following information in your proportion:

- Total Degrees in a circle is always 360° .
- The formula for the area of a circle is πr^2 .

If the radius of the following circle is 4 cm, find the area of the shaded region:



$$\frac{2880\pi}{360} = \frac{360X}{360}$$

$$\frac{8\pi}{1} = \frac{X}{1}$$

First fill in the values for the proportion:

$$\frac{\text{Shaded Area}}{\pi 4^2} = \frac{180^\circ}{360^\circ}$$

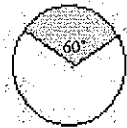
area of the sector

Solve the proportion you set up: $\text{Shaded Area} = \frac{180^\circ \cdot 16\pi}{360^\circ} = 8\pi$.

So the area of the sector is 8π cm.

Find the area of the shaded region for the following circles.

1. Find the area of the shaded region of the following circle with a radius of 3 cm.



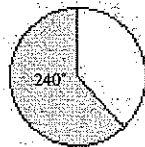
First set up your proportion: $\frac{\text{Shaded Area}}{\pi(3)^2} = \frac{60}{360}$

Then solve.

$$\frac{540\pi}{1} = \frac{360X}{1}$$

$$1.5\pi = X$$

2. Find the area of the shaded region of the following circle with a radius of 6 cm.



First set up your proportion: $\frac{\text{Shaded Area}}{\pi(6)^2} = \frac{240}{360}$

Then solve.

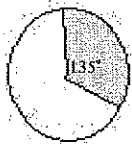
$$8640\pi = 360X$$

$$24\pi = X$$

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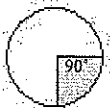
3. Find the area of the shaded region of the following circle with a radius of 2.3 in.



First set up your proportion: $\frac{135}{360} = \frac{X}{\pi(2.3)^2}$

Then solve. $714.15\pi = 360X$
 $1.98375\pi = X$

4. Find the area of the shaded region of the following circle with a radius of 3 cm.



$\frac{90}{360} = \frac{X}{\pi(3)^2}$

$810\pi = 360X$
 $2.25\pi = X$

The length of a arc can be found using a similar proportion:

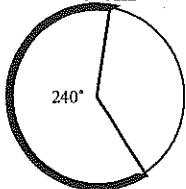
$$\frac{\text{Arc Length}}{\text{Circumference}} = \frac{\text{Degrees in Arc}}{\text{Total Degrees}}$$

Use the following information in your proportion:

- Total degrees in a circle are always 360°.
- The formula for the circumference of a circle is $2\pi r$.

Find the arc length indicated by the given angle.

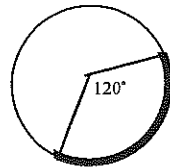
1. $r = 6$ cm



$\frac{240}{360} = \frac{X}{2\pi(6)}$

$2880\pi = 360X$
 $8\pi = X$

2. $r = 3$ in cm



$\frac{120}{360} = \frac{X}{2\pi(3)}$

$720\pi = 360X$
 $2\pi = X$

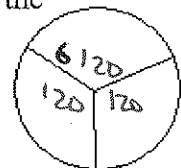
1. Michael has decided to make a paper fan in the shape of a sector of a circle defined by 110° . The fan will be 6 inches long. How many square inches of paper will he need?



$\frac{110}{360} = \frac{X}{\pi(6)^2}$

2. Maria wants to decorate the outside of a 12 inch pizza pan with three different colors of ribbon. She wants an equal length of each color of ribbon around the pan. How much ribbon does she need of each color?

$\frac{X}{2\pi(6)} = \frac{120}{360}$



$\frac{360}{3} = 120$