1. What is a radian? _____
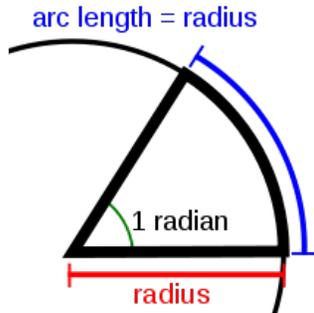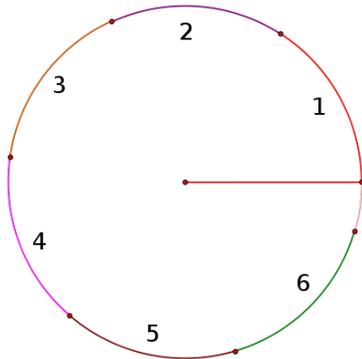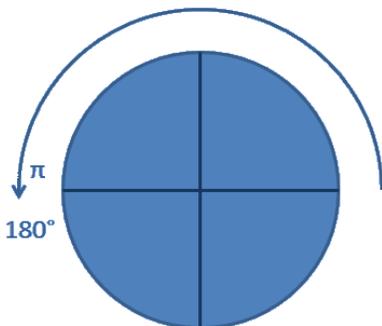
arc length = radius

_____

_____

1 radian

_____

radius

_____

2. About how many radians are in a full circle? Use the formula for the
    circumference of a circle to show exactly how many radians are in a circle.

2

3

1

_____

4

_____

6

_____

5

_____

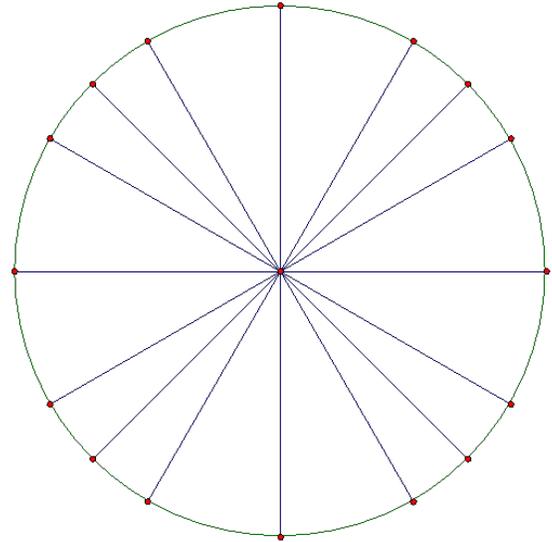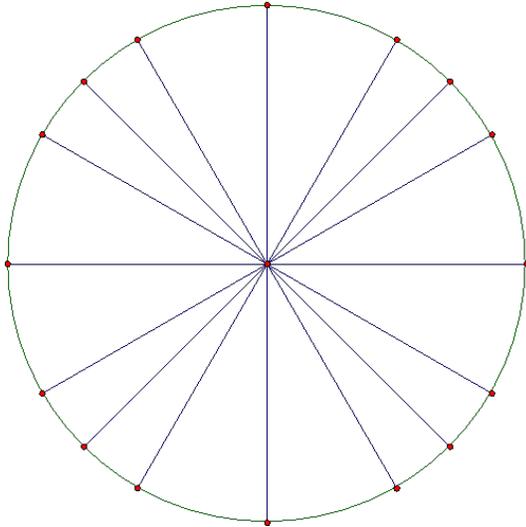3. If $360^{\circ} = 2\pi$ radians, how many degrees equal one radian? _____

4. Convert the following quantities from degrees to radians or from radians to
    degrees.

π

180°

a) $105^{\circ} = $ _____radians

b) 3.2 radians = _____$^{\circ}$

5. Fill in the points around the first circle with degrees and the points on the second circle with radians.

6. Degrees can be broken down into "minutes" (notated by one apostrophe: '), and into "seconds" (notated by quotation marks: "). There are 60 minutes in one degree and 60 seconds in one minute.

For example, one reads $42^{o}15'30"$ as 42 degrees, 15 minutes and 30 seconds.

Note: $10^{o}30'$ (ten degrees and thirty minutes) is not the same as 10.30 degrees. Since there are sixty minutes in one degree, thirty minutes are half of a degree so:

$10^{o}30' = 10.5^{o}$
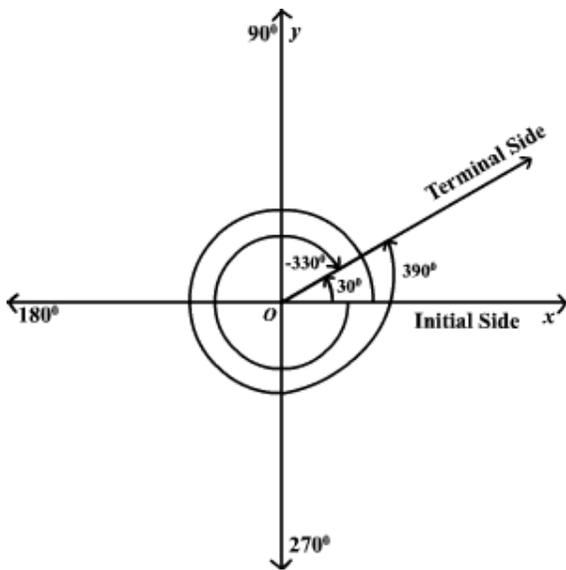
Convert $42^{o}15'30"$ to degrees: _____

7. Regardless of whether angles are measured in degrees or radians, angles measured in the counterclockwise direction are positive, and angles measured in the clockwise direction are negative.
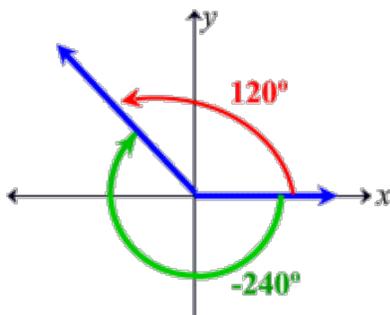
Coterminal angles share a terminal side.

120°

-240°

Coterminal Angles

You can generate coterminal angles by adding or subtracting 360° (or 2π radians) to/from an angle.

Give two coterminal angles for the given angle, one positive and one negative:

a) 20° _____ , _____

b) $\dfrac{\pi}{3}$ radians _____ , _____

In your groups:

8. What are the degree and radian measures of the angle formed by the hour and minute hands of a clock at 2:40 pm? Consider carefully the position of both the hour and minute hands before deciding your final answer.

9. A gear revolves at 40 $\dfrac{rev}{min}$. Find its angular speed in both $\dfrac{deg}{min}$ and $\dfrac{rad}{min}$.

This will require the use of several "conversion factors" not unlike what some of you have done in chemistry.