

**DEGREE and RADIANS CONVERSION**

If  $360^\circ = 2\pi$  radians OR  $180^\circ = \pi$  radians, then to convert between the angle measurements...

DEGREES to RADIANS:

$$\text{Degree} \cdot \frac{\pi}{180^\circ} = \text{Radians}$$

RADIANS to DEGREES:

$$\text{Radians} \cdot \frac{180^\circ}{\pi} = \text{Degree}$$

Example:

$$\text{a) } 40^\circ \rightarrow 40^\circ \cdot \frac{\pi}{180^\circ} = \frac{2\pi}{9} \text{ or } 0.698 \text{ radians}$$

$$\text{b) } 250^\circ \rightarrow 250^\circ \cdot \frac{\pi}{180^\circ} = \frac{25\pi}{18} \text{ or } 4.363 \text{ radians}$$

Example:

$$\text{a) } \frac{3\pi}{5} \rightarrow \frac{3\pi}{5} \cdot \frac{180^\circ}{\pi} = 108^\circ$$

$$\text{b) } 0.5 \rightarrow 0.5 \cdot \frac{180^\circ}{\pi} = 18.648^\circ$$

CONVERSION PRACTICE:

(1) Convert the degree of the angle to radian measure (round to 3 decimal places)

1a.  $31^\circ$

1b.  $147^\circ$

1c.  $293^\circ$

1d.  $630^\circ$

1e.  $434^\circ$

1f.  $-225^\circ$

(2) Convert the degree of the angle to exact radian measure ( $\pi$  as a symbol and fractions)

2a.  $35^\circ$

2b.  $160^\circ$

2c.  $-15^\circ$

2d.  $660^\circ$

2e.  $434^\circ$

2f.  $-10^\circ$

(3) Convert the radian measure to degrees (round to 3 decimal places)

3a. 1.4

3b. 0.33

3c. 0.68

3d. 6.56

3e. 5.8

3f. 9

(4) Convert the radian measure to exact degree.

4a.  $\frac{\pi}{8}$

4b.  $\frac{7\pi}{16}$

4c.  $\frac{11\pi}{9}$

4d.  $\frac{13\pi}{3}$

4e.  $7\pi$

4f.  $\frac{5\pi}{4}$

## CIRCLE and ANGLES:

Angles of a circle are measured from starting on the positive portion of the x-axis.

- POSITIVE Angle Measures → COUNTER CLOCKWISE Rotation
- NEGATIVE Angle Measures → CLOCKWISE Rotation

DEGREE:

$360^{\circ}$  is the angle measure of a circle

RADIANS:

$2\pi$  radians is the angle measure of a circle

COTERMINAL ANGLES: Angles that have same location in a circle.

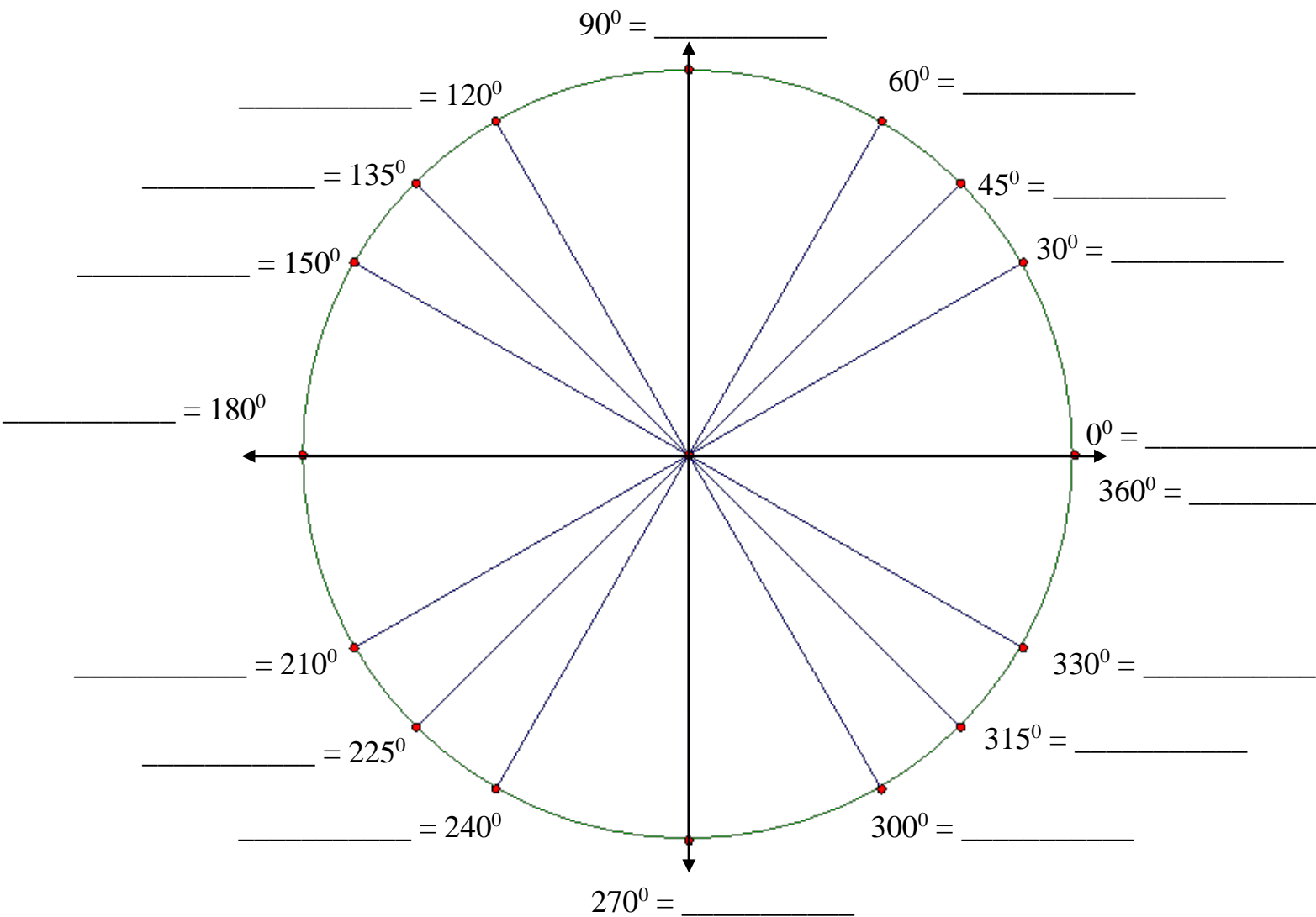
- *Coterminal angles differ by addition or subtraction multiple of 360*
  - Example:  $120^{\circ}$ ,  $-240^{\circ}$ ,  $480^{\circ}$  are all coterminal. ( $120^{\circ} - 360^{\circ} = -240^{\circ}$ ;  $120^{\circ} + 360^{\circ} = 480^{\circ}$ )

I. Define the intervals in DEGREE measure for each quadrant of the coordinate plane. (See Below Circle)

Quadrant I: \_\_\_\_\_ Quadrant II: \_\_\_\_\_ Quadrant III: \_\_\_\_\_ Quadrant IV: \_\_\_\_\_

II. Label each given angle of the circle in EXACT RADIAN measure:

Do you notice any pattern in denominators of the radians?



III. Define the intervals in RADIAN angle measure for each quadrant of the coordinate plane.

Quadrant I: \_\_\_\_\_ Quadrant II: \_\_\_\_\_ Quadrant III: \_\_\_\_\_ Quadrant IV: \_\_\_\_\_