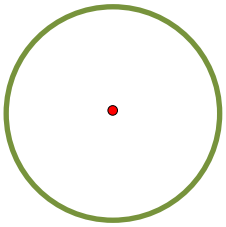
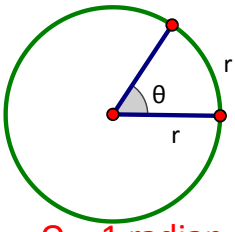
Geometry (G.C.5)
Unit Five: Radian Measure (IC15)

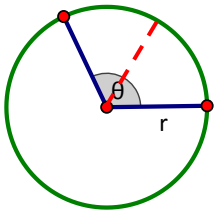
We use radians b/c in calculus it is easier to take derivatives and limits

Name: _____
Date: _____ Period: _____

Measuring Angles: Degrees versus Radians

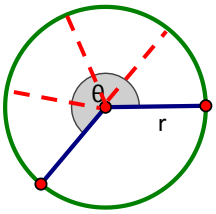
Degrees: 1 rotation = 360° ≈ 360 days to orbit the sun Babylonians counted by 60 instead of 10, so 360 was a multiple. 	Radians: An angle that intersects an arc with a length equal to the radius of the circle.  Θ = 1 radian

Remembering that the angle above is exactly 1 radian - estimate the angles values below in both radians and degrees:



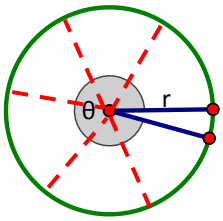
__2__ **radian**

__110__ **degrees**



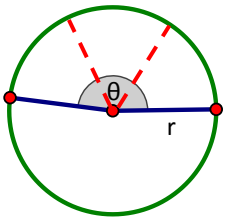
__4__ **radian**

__210__ **degrees**



__6__ **radian**

__350__ **degrees**



__3__ **radian**

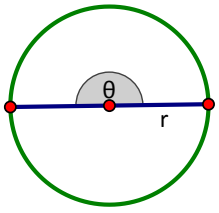
__175__ **degrees**

How many radii exactly fit around the entire circumference of a circle? (Hint: The circumference formula should help you know this value) __2π__ C = 2π(r) where r = radius of circle

How does that value help you to know EXACTLY how many radians there are in one full circle?

360° = __2π__ radians

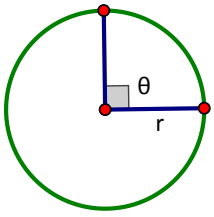
180° = π radians



180° is exactly ½ of 360°.

How many radians would form the same angle?

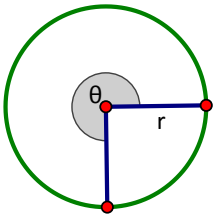
__π__ radians $\frac{2\pi}{2}$



90° is exactly ¼ of 360°.

How many radians would form the same angle?

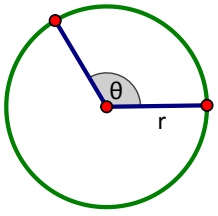
$\frac{\pi}{2}$ radians $\frac{2\pi}{4}$



270° is exactly ¾ of 360°.

How many radians would form the same angle?

$\frac{3\pi}{2}$ radians $\frac{2\pi}{1} * \frac{3}{4} = \frac{6\pi}{4}$



120° is exactly 1/3 of 360°.

How many radians would form the same angle?

$\frac{2\pi}{3}$ radians

To convert from degree measures to radian measure:	**To convert from radian measure to degree measure:**
(deg. measure)$(\frac{\pi}{180})$ = radian measure	(radian measure)$(\frac{180}{\pi})$ = deg measure

Convert the following degree measurements to radian measures.

a) 270° = $\frac{3\pi}{2}$

$(270)(\frac{\pi}{180}) = \frac{270\pi}{180}$

b) 135° = $\frac{3\pi}{4}$

$(135)(\frac{\pi}{180}) = \frac{135\pi}{180}$

c) 210° = $\frac{7\pi}{6}$

$(210)(\frac{\pi}{180}) = \frac{210\pi}{180}$

d) 240° = $\frac{4\pi}{3}$

$(240)(\frac{\pi}{180}) = \frac{240\pi}{180}$

e) 150° = $\frac{5\pi}{6}$

$(150)(\frac{\pi}{180}) = \frac{150\pi}{180}$

f) 315° = $\frac{7\pi}{4}$

$(315)(\frac{\pi}{180}) = \frac{315\pi}{180}$

Convert the following radian measurements to degree measures.

a) $\frac{11\pi}{12}$ = 165°

$(\frac{11\pi}{12})(\frac{180}{\pi}) = 165°$

b) $-\frac{3\pi}{5}$ = −108°

$(\frac{-3\pi}{5})(\frac{180}{\pi}) = -108°$

c) 4 = $\frac{720}{\pi}° \approx 229.18°$

$(4)(\frac{180}{\pi}) = \frac{720}{\pi}°$

d) $\frac{\pi}{3}$ = 60°

$(\frac{\pi}{3})(\frac{180}{\pi}) = 60°$

e) $\frac{2\pi}{9}$ = 40°

$(\frac{2\pi}{9})(\frac{180}{\pi}) = 40°$

f) $-\frac{11\pi}{10}$ = −198°

$(\frac{-11\pi}{10})(\frac{180}{\pi}) = -198°$