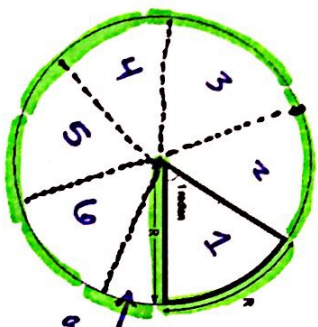


# 7.1b Radian and Degree Measures

What's a Radian?



How many radii (radians) would it take to cover the circumference of the circle?

$C = 2\pi r$   
 $2(3.14)(1) = 6.28$   
 It takes  $2\pi$  radians to get the whole way!  
 a little more

Converting Between Degrees and Radians

To convert FROM...	TO...	MULTIPLY by...
Degrees	Radians	$\frac{\pi}{180^\circ}$
Radians	Degrees	$180^\circ$

$2\pi = 360$   
 $\frac{2\pi}{2} = \frac{360}{2}$   
 $\pi = 180^\circ$

\*\*Remember that the TOP of your multiplier is the unit you're converting TO\*\*

Note: Radians must always be in  $\pi$  form. Degrees must always be in decimal form.

$\pi$  is always in the answer

Convert from...	To...	Multiply by	To get...
$90^\circ$	Radians	$90 \left( \frac{\pi}{180} \right) = \frac{90\pi}{180}$	$\frac{\pi}{2}$
$\frac{7\pi}{6}$ radians	Degrees	$\frac{7\pi}{6} \left( \frac{180^\circ}{\pi} \right) = \frac{7 \cdot 180}{6}$	$210^\circ$
$200^\circ$	Radians	$200 \left( \frac{\pi}{180} \right) = \frac{200\pi}{180}$	$\frac{10\pi}{9}$
$\frac{5\pi}{4}$ radians	Degrees	$\frac{5\pi}{4} \left( \frac{180^\circ}{\pi} \right) = \frac{5 \cdot 180}{4}$	$225^\circ$

Convert from...	To...	Multiply by	To get...
$-150^\circ$	Radians		
5 radians	Degrees		
$540^\circ$	Radians		
$-\frac{7\pi}{8}$ radians	Degrees		
$\frac{6\pi}{7}$ radians	Degrees		
$52^\circ$	Radians		
3π radians	Degrees		

Yesterday, we said that to find a coterminal angle, we had to add and subtract 360 degrees. What would be add or subtract when the angle is in radians?

Add or Subtract  $2\pi$  radians

Example 2: Find each coterminal angle between 0 and  $2\pi$ .

a)  $-\frac{7\pi}{8}$  radians

$-\frac{7\pi}{8} + \frac{2\pi \cdot 8}{8} = \frac{9\pi}{8}$   
 Can't add without a common denominator!

c)  $\frac{4\pi}{3}$  radians

$-\frac{4\pi}{3} + \frac{2\pi \cdot 3}{3} = \frac{2\pi}{3}$

b)  $-\pi$  radians

$-\pi + \frac{2\pi \cdot 6}{6} = \frac{10\pi}{6}$

d)  $-\frac{3\pi}{4}$  radians

$-\frac{3\pi}{4} + \frac{2\pi \cdot 4}{4} = \frac{5\pi}{4}$

$-\frac{\pi}{6}$

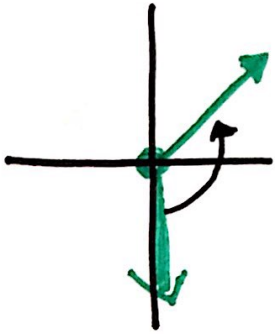
$-\frac{\pi}{6} + \frac{12\pi}{6} = \frac{11\pi}{6}$

$-\frac{3\pi}{4}$

$-\frac{3\pi}{4} + \frac{8\pi}{4} = \frac{5\pi}{4}$

Ex 3 Graphing in Standard Position

a)  $\frac{2\pi}{3} \left( \frac{180^\circ}{\pi} \right) = \frac{2 \cdot 180}{3} = 120^\circ$



b)  $-\frac{5\pi}{4} \left( \frac{180^\circ}{\pi} \right) = \frac{-5 \cdot 180}{4} = -225^\circ$

