Chapter 6: Trigonometric Functions


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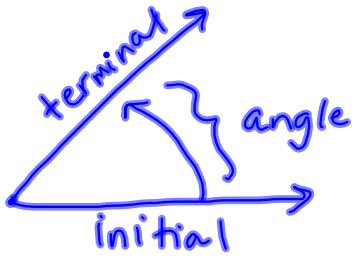
6.1 Radian and Degree Measure

Define the following words:

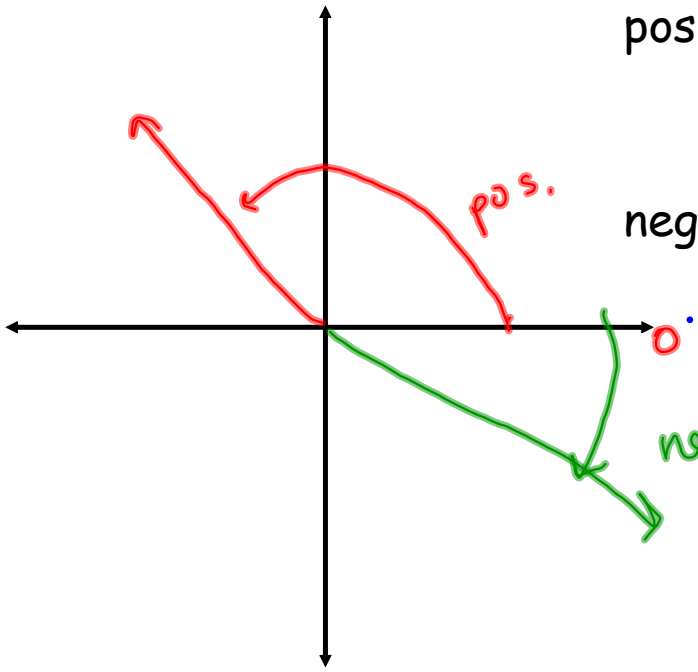
1) angle- two rays share common pt

2) initial side-

3) terminal side-



4) vertex- common pt.

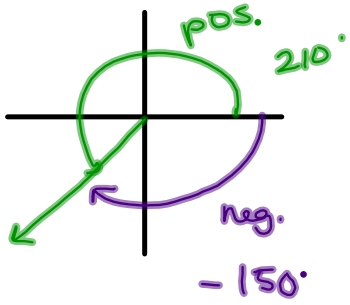


positive angle:

counter clockwise

negative angles:

clockwise



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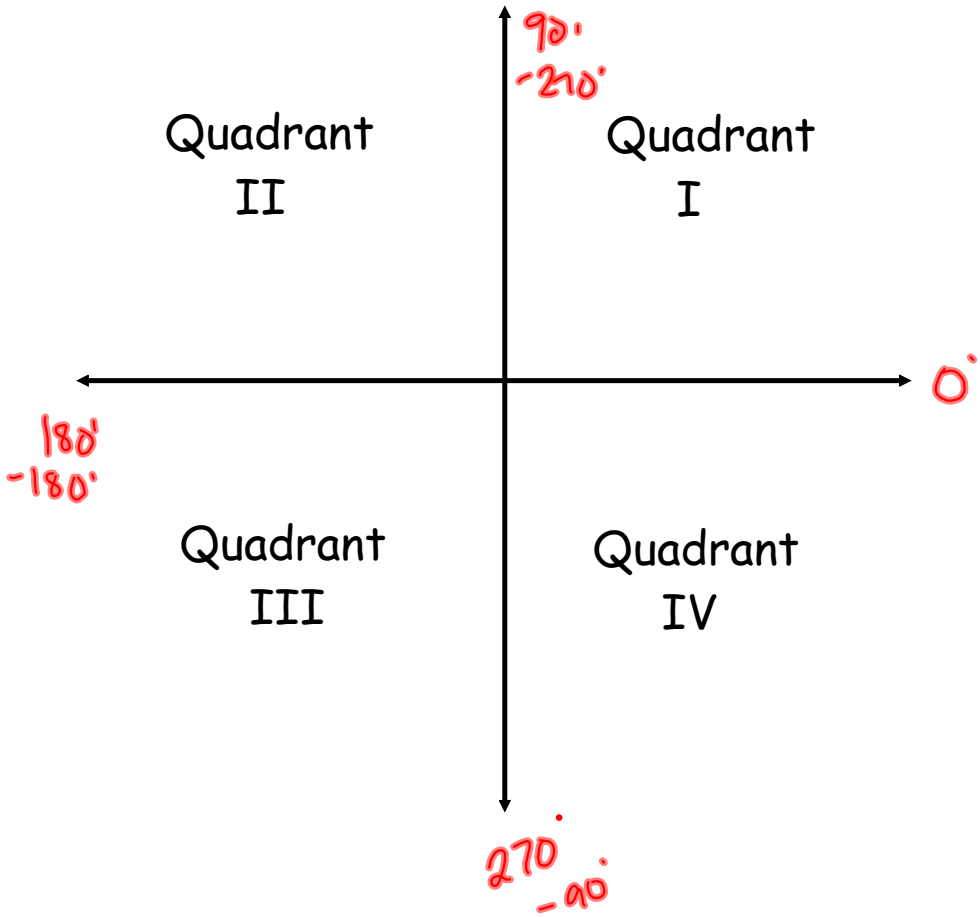
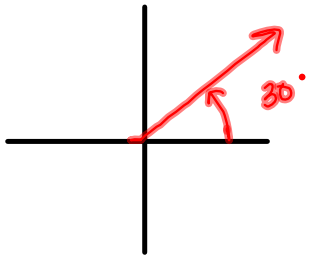
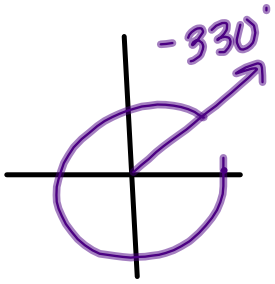

90°
-270°
Quadrant II
Quadrant I
0°
180°
-180°
Quadrant III
Quadrant IV
270°
-90°

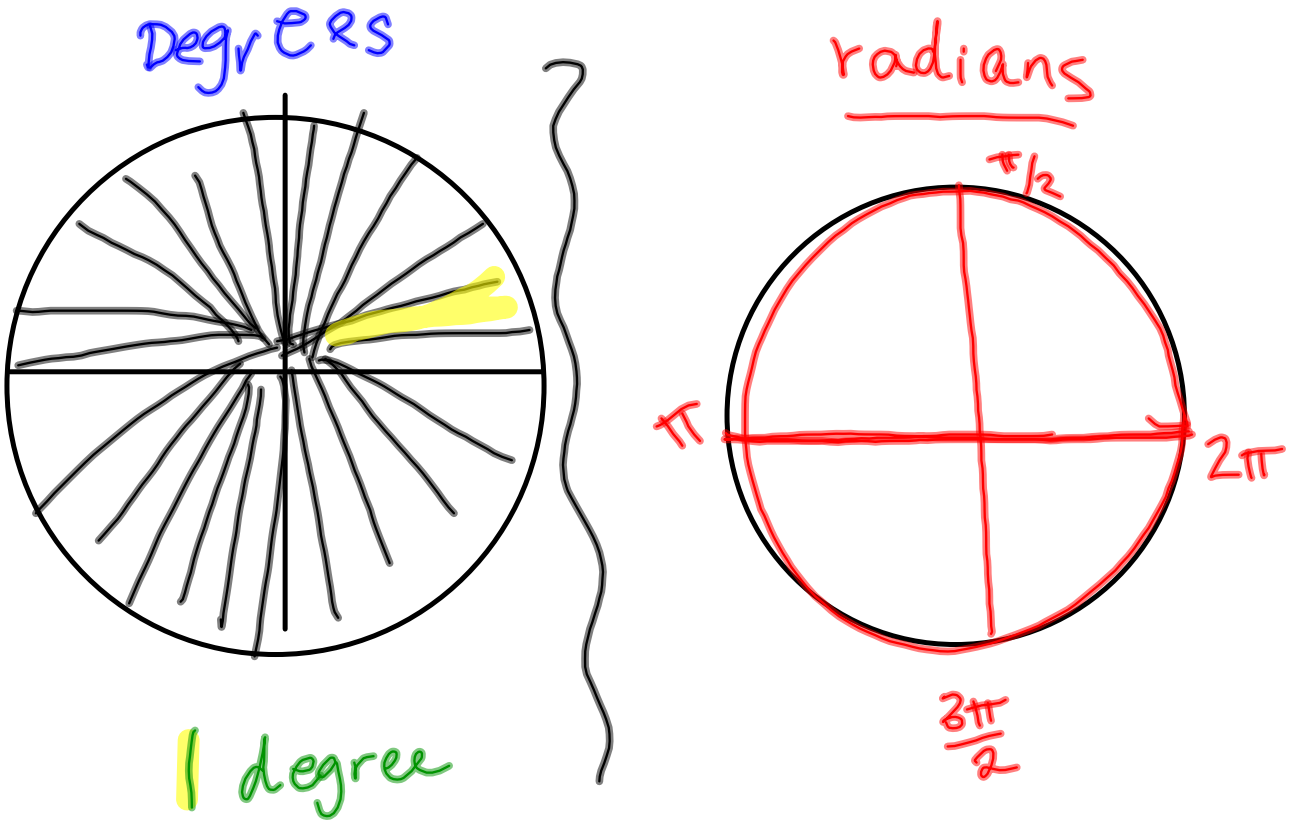
Sketch:

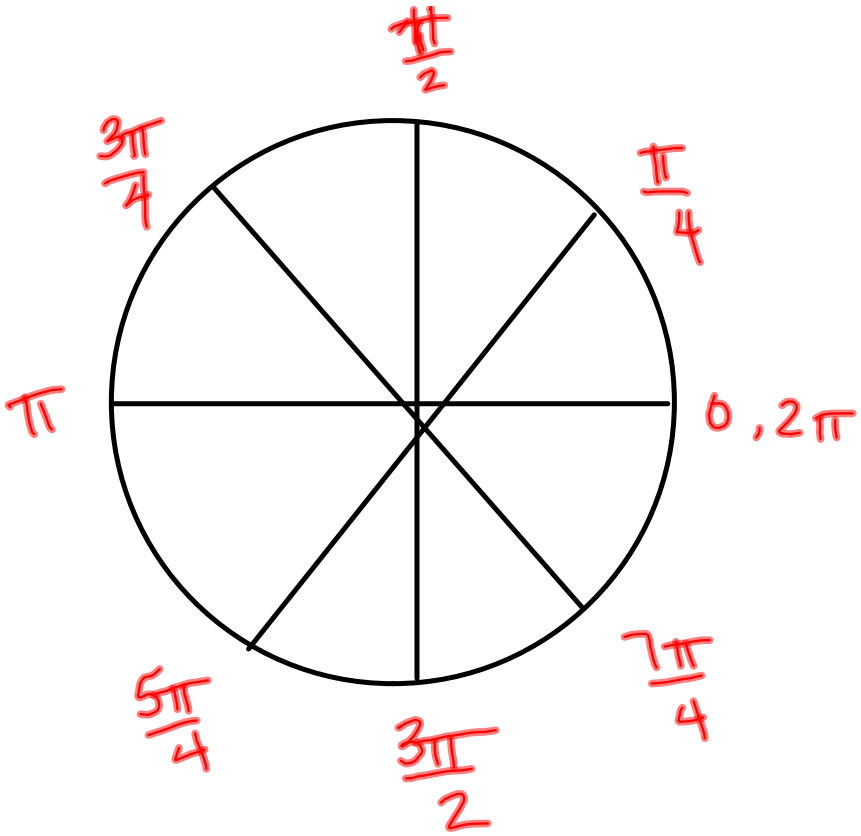
a) 30°

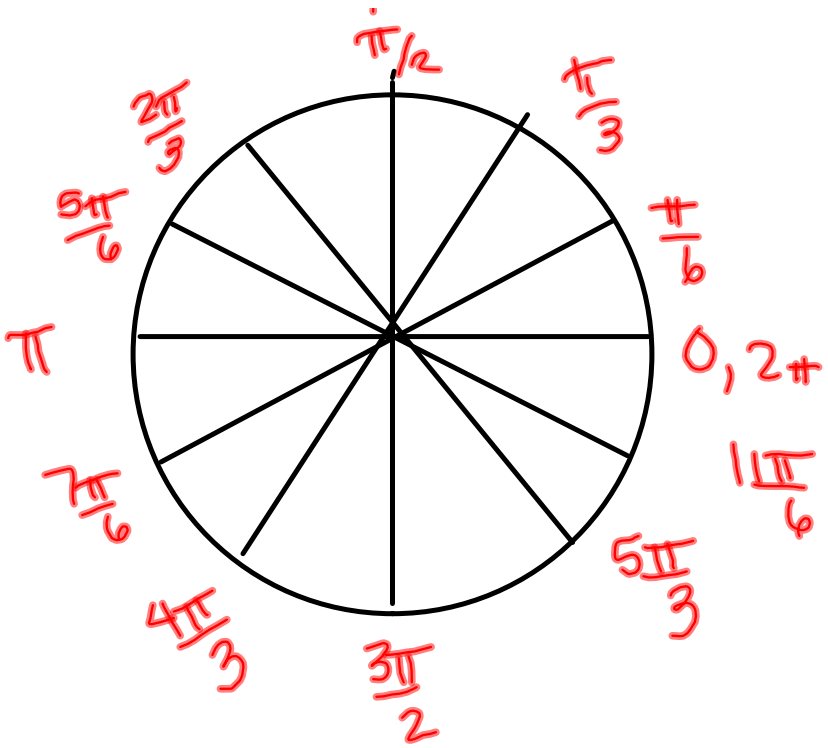


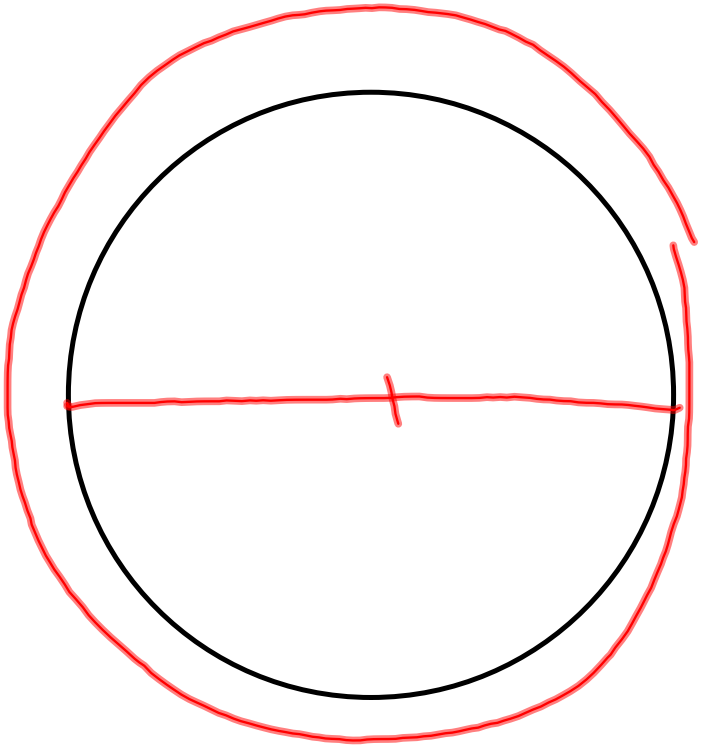
b) -330°




Degrees
1 degree
radians
π/2
π
2π
3π/2


π/2
3π/4
π/4
π
0, 2π
5π/4
3π/2
7π/4

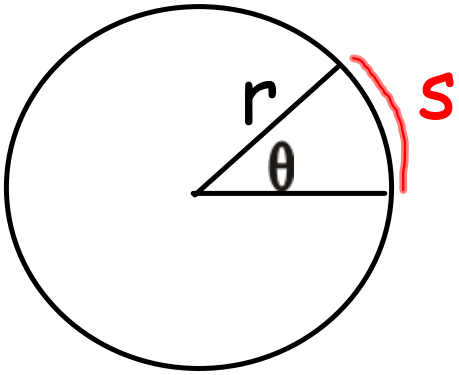

π/2
π/3
π/6
0, 2π
11π/6
5π/3
3π/2
4π/3
7π/6
π
5π/6
2π/3



$\frac{C}{d} \Rightarrow \pi$

$\frac{2\pi}{2} = \pi$

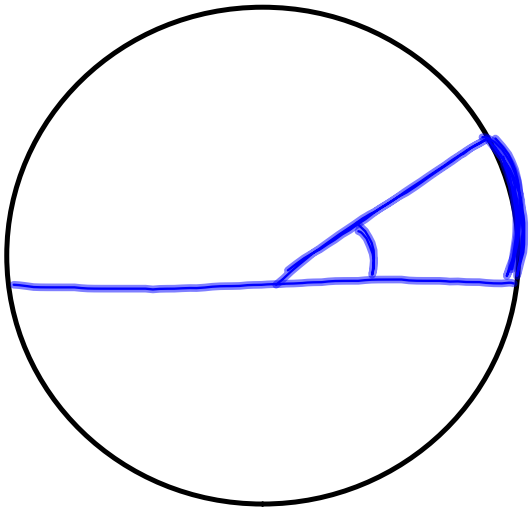
Radian:



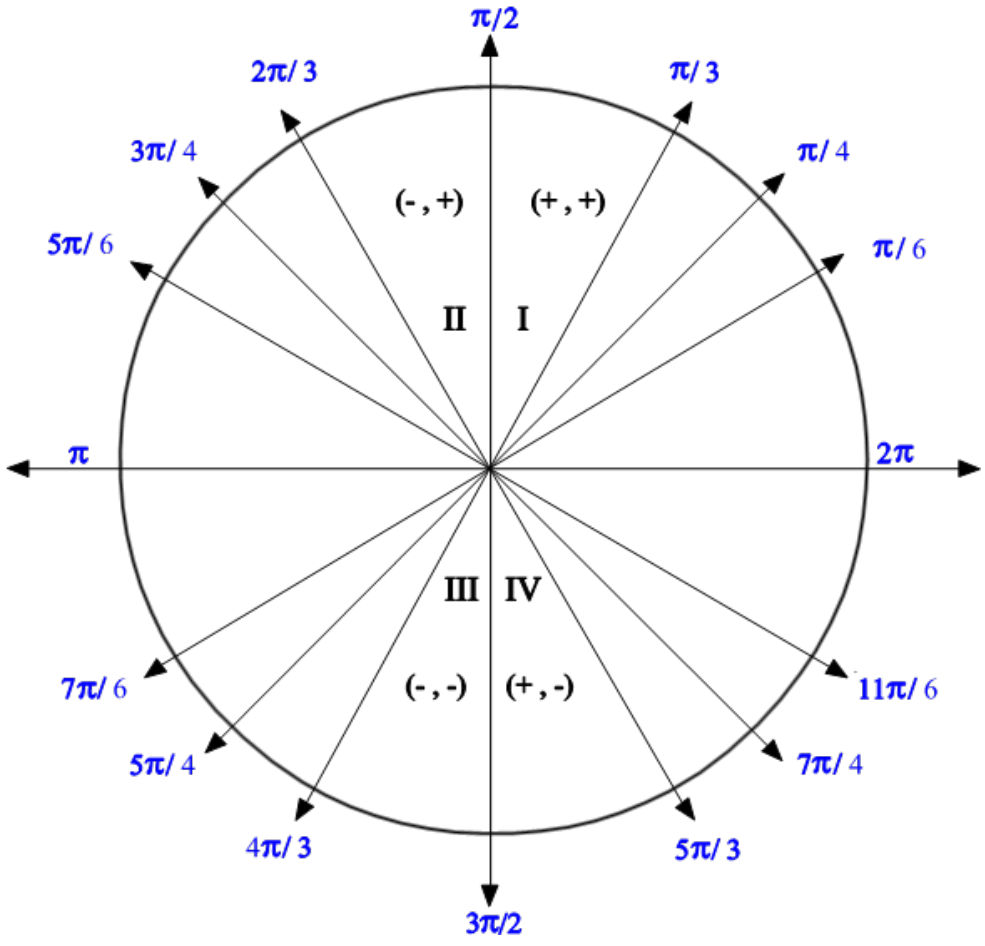
$$\theta = \frac{s}{r}$$

$$\frac{\text{arc length}}{\text{radius}}$$

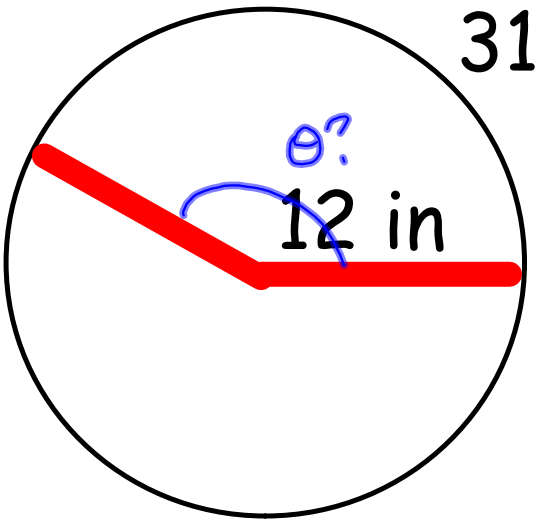
r=1



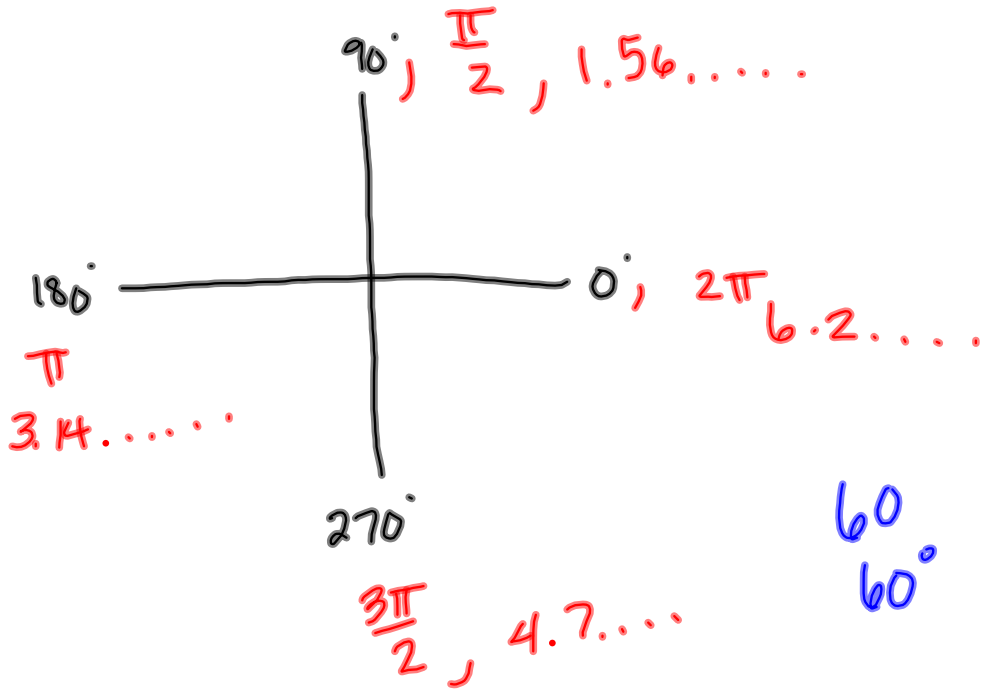
2π


π/2
2π/ 3
π/ 3
3π/ 4
π/ 4
5π/ 6
π/ 6
(- , +)
(+ , +)
II
I
π
2π
III
IV
(- , -)
(+ , -)
7π/ 6
11π/ 6
5π/ 4
7π/ 4
4π/ 3
5π/ 3
3π/2

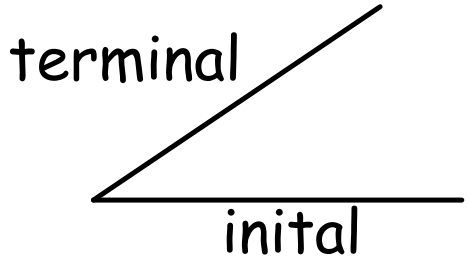
Unit Circle

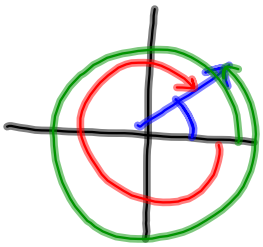


$\theta = \frac{31}{12}$


90°, π/2, 1.56.....
180°
π
3.14.....
0°, 2π 6.2....
270°
3π/2, 4.7...
60
60°

Coterminal Angles: angles that share the same initial and terminal sides.



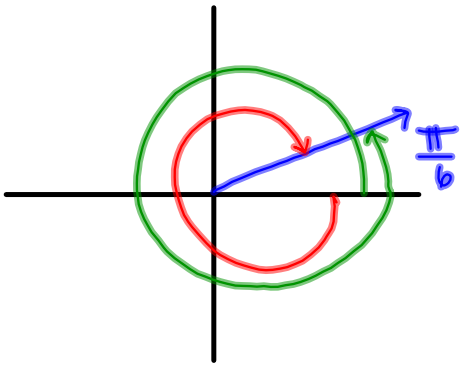


$\theta \pm 360^\circ n$

$\theta \pm 2\pi n$ ← integer

Determine two coterminal angles

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



$-\frac{11\pi}{6}$

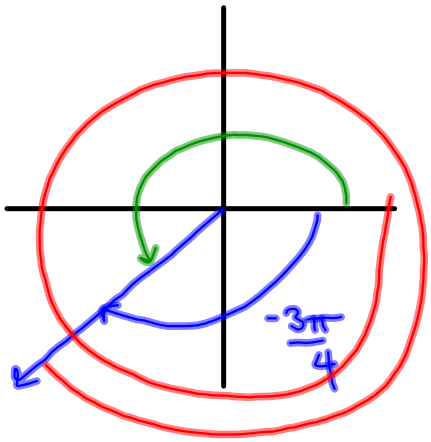
$\frac{13\pi}{6}$

Determine two coterminal angles

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

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

$-\frac{11\pi}{4}$

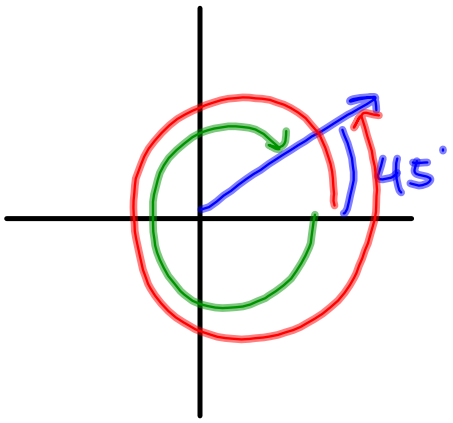


Determine two coterminal angles

$45°$

$-315°$

$405°$



Complementary angles: two angles are complementary if their sum is $\frac{\pi}{2}$ or 90°

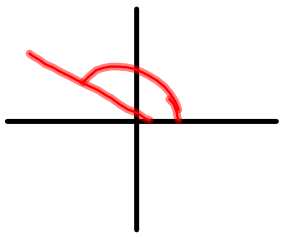
95° ∅

Supplementary angles: two angles are supplementary if their sum is π or 180°

210°? ∅

Find the complement and supplement:

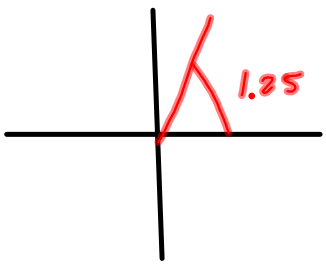
a) $\frac{11\pi}{12}$



no comp

$\frac{\pi}{12}$ = supplement

b) 1.25



compl = .32

Sup = 1.89

Conversion of radians and degrees:

$360^\circ = 2\pi$ radians

Radians $\Rightarrow$ Degrees

multiply radians by

$$\frac{180^\circ}{\pi}$$

Degrees $\Rightarrow$ Radians

multiply degrees by

$$\frac{\pi}{180^\circ}$$

Rewrite each angle in radian measure:

a) -270°

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

b) 144°

$144^{\circ} \cdot \frac{\pi}{180^{\circ}} = \frac{4\pi}{5}$

Rewrite each angle in degree measure:

a) -4π $\quad -4\pi \cdot \frac{180}{\pi} = -720^\circ$

b) $\frac{3\pi}{2}$ $\quad 270^\circ$