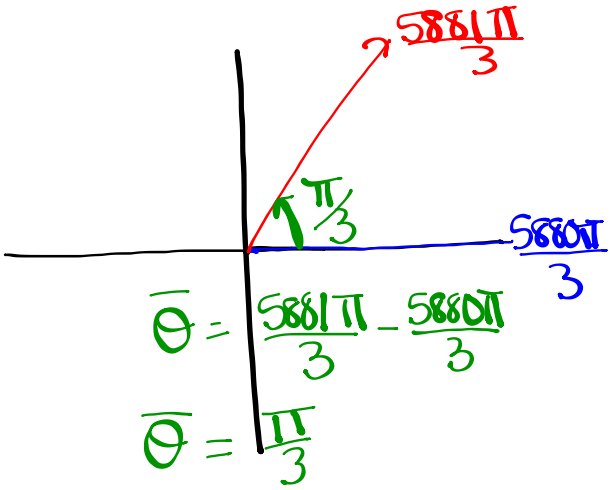
Sketch the following and determine a negative angle co-terminal with:

(i) $\frac{5881\pi}{3}$

$\frac{5880\pi}{3}, \frac{5881\pi}{3}, \frac{5882\pi}{3}$

1960π



Negative coterminal angle:

$\frac{5881\pi}{3} - \frac{1960\pi}{1}$

$\frac{5881\pi}{3} - \frac{5886\pi}{3}$

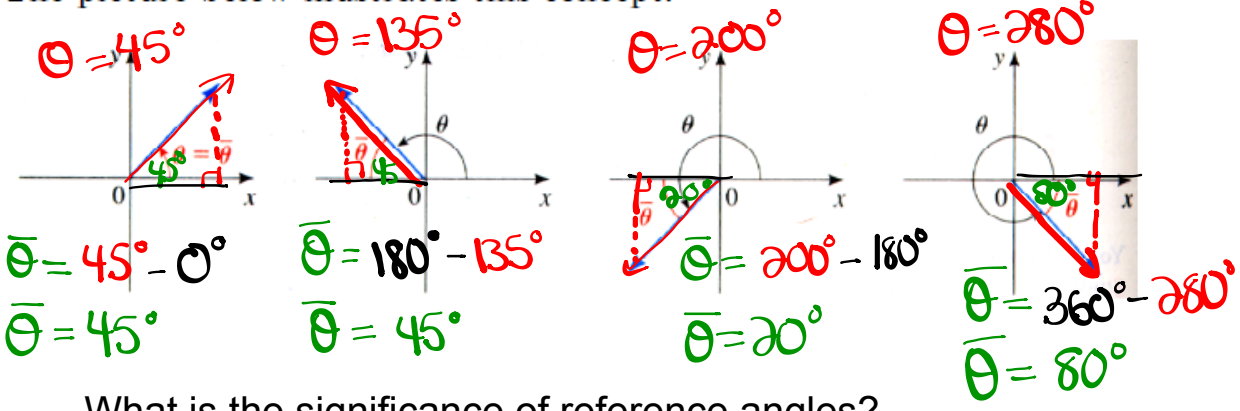
$\frac{-5\pi}{3}$

Reference Triangles:

Definition 17 *The reference angle $\bar{\theta}$ of an angle θ in standard position is the acute angle (between 0 and 90°) the terminal side makes with the x-axis.*

arm

The picture below illustrates this concept.

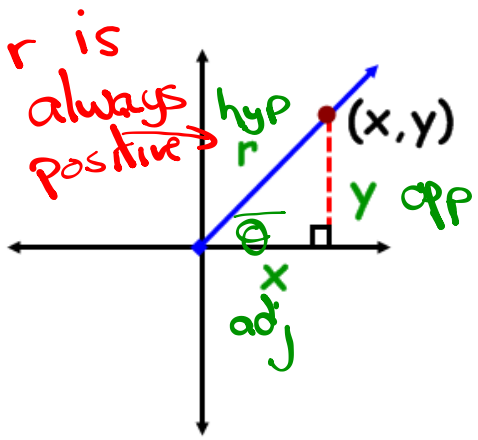


What is the significance of reference angles?

Angles on the Cartesian Plane

- **Reference Angle** - an acute angle formed between the terminal arm and the x-axis.

- **Reference Triangle** - a triangle formed by drawing a perpendicular line from a point on the terminal to the x-axis.



Notice what will happen if the rotation moves into other quadrants?

TRIG RATIOS on the CARTESIAN PLANE

$$\sin\theta = \frac{y}{r} = \frac{o}{h} \qquad \csc\theta = \frac{r}{y} = \frac{h}{o}$$

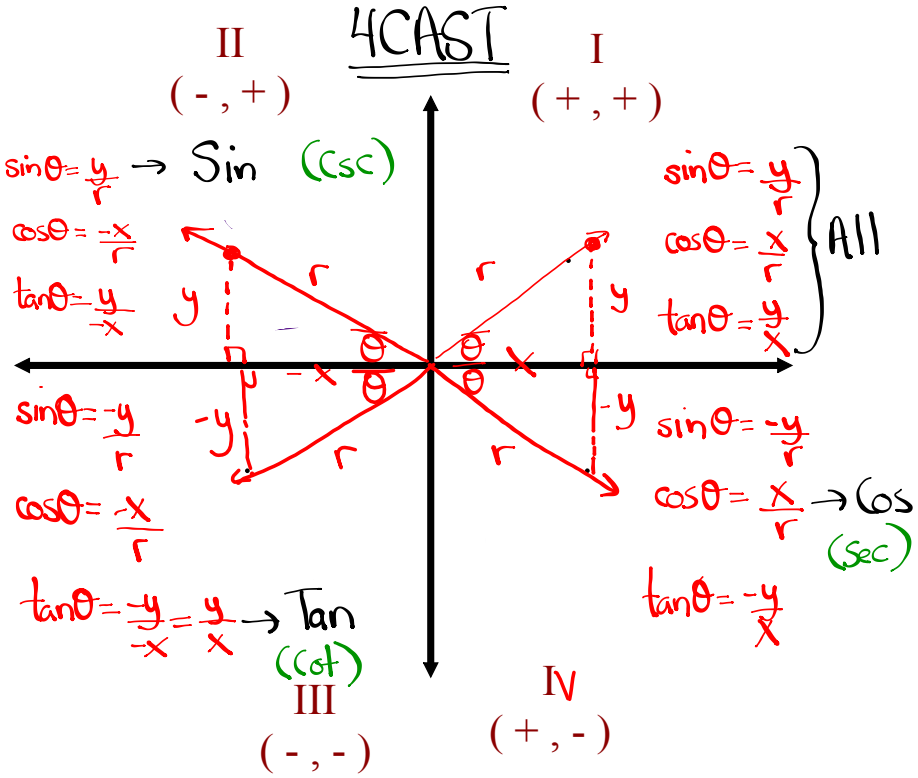
$$\cos\theta = \frac{x}{r} = \frac{a}{h} \qquad \sec\theta = \frac{r}{x} = \frac{h}{a}$$

$$\tan\theta = \frac{y}{x} = \frac{o}{a} \qquad \cot\theta = \frac{x}{y} = \frac{a}{o}$$

"Primary" "Reciprocal"

TRIG RATIOS IN ALL 4 QUADRANTS

What primary trig ratios are POSITIVE in...



Where is θ if...

cscθ<0

S	A
T ✓	C ✓

Quad 3 + 4

sinθ<0 & tanθ<0

S	A
T ✓	C ✓✓

Quad 4

cscθ>0 & cotθ<0

S ✓	A
T	C ✓

Quad 2

Homework

If $\sec\theta = -\sqrt{10}$ *and* $\sin\theta > 0$, determine the value of $\csc\theta$

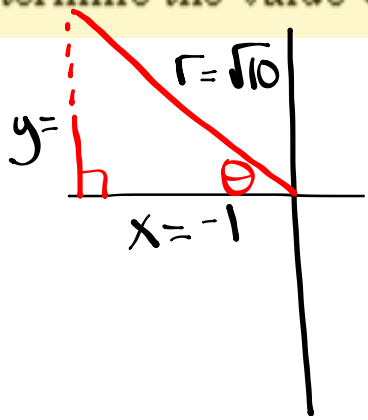
$\sec\theta$ is negative

$\sin\theta$ is positive

$\sec\theta = -\frac{\sqrt{10}}{1} = \frac{hyp}{adj} = \frac{r}{x}$

$r = \sqrt{10}$ (always +)

$x = -1$

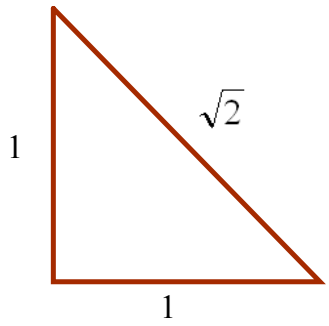


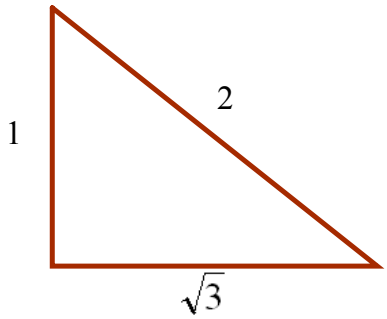
Determine the measure (in radians) of an angle whose terminal arm passes through the ordered pair $(-2\sqrt{3}, -4)$

$x = -2\sqrt{3}$

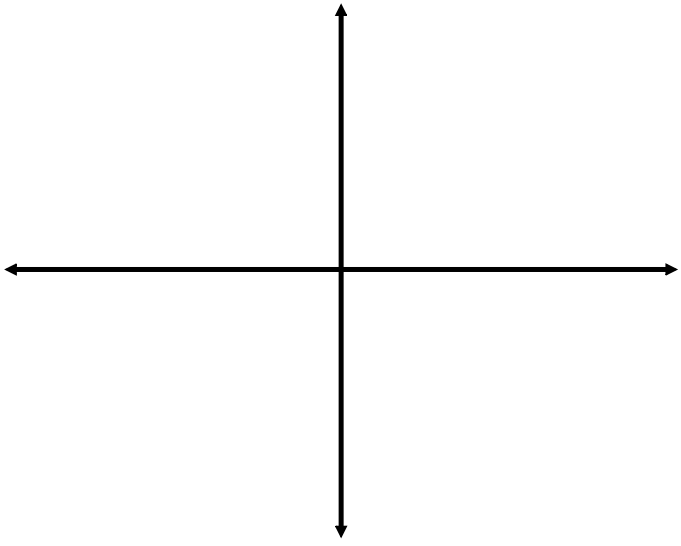
$y = -4$

Special Angles (in radians)

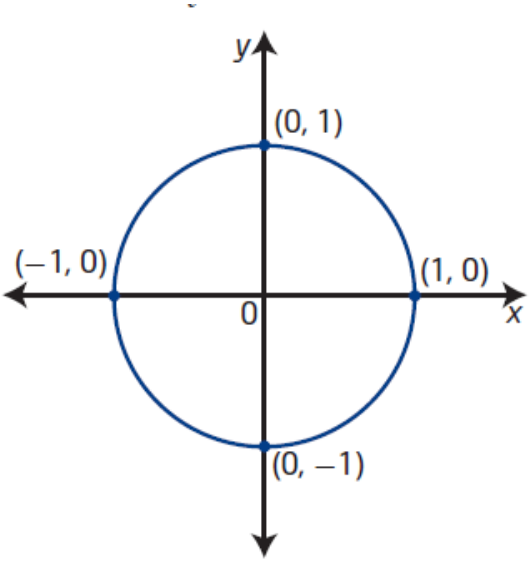




Quadrantal Angles

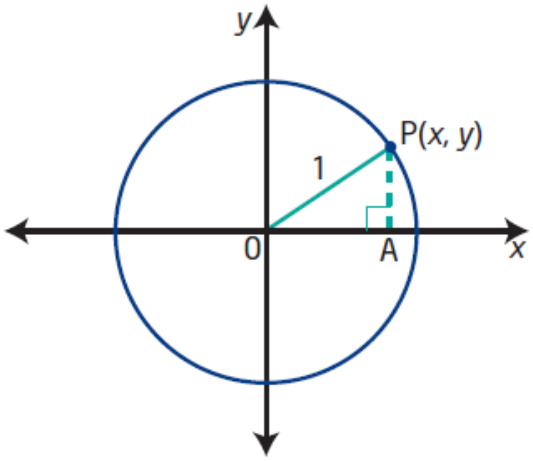


Unit Circle



unit circle

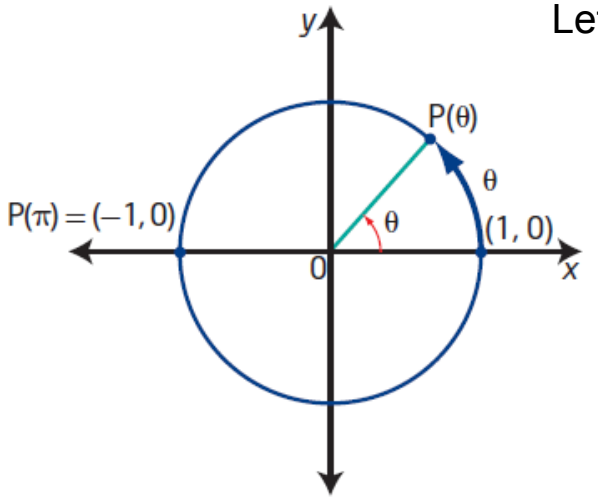
- a circle with radius 1 unit
- a circle of radius 1 unit with centre at the origin on the Cartesian plane is known as *the* unit circle



The equation of the unit circle is $x^2 + y^2 = 1$.

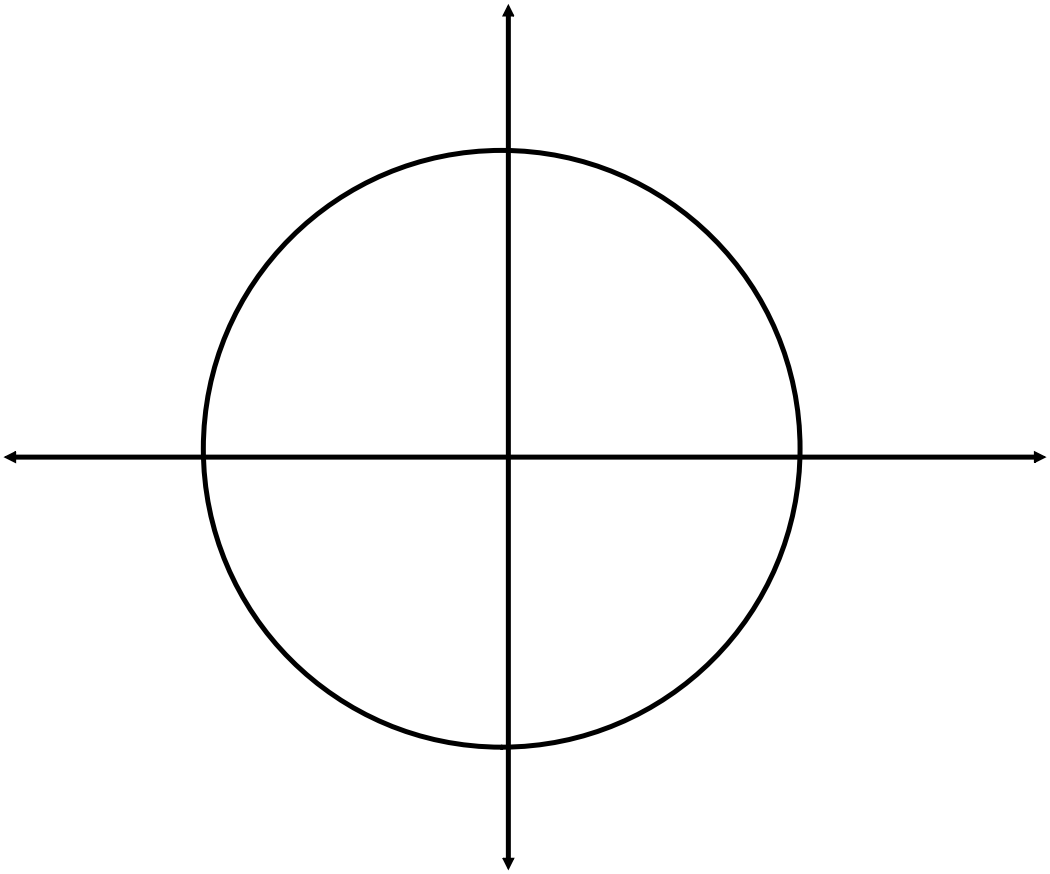
Determine the equation of a circle with centre at the origin and radius 6.

Special Angles on the Unit Circle:

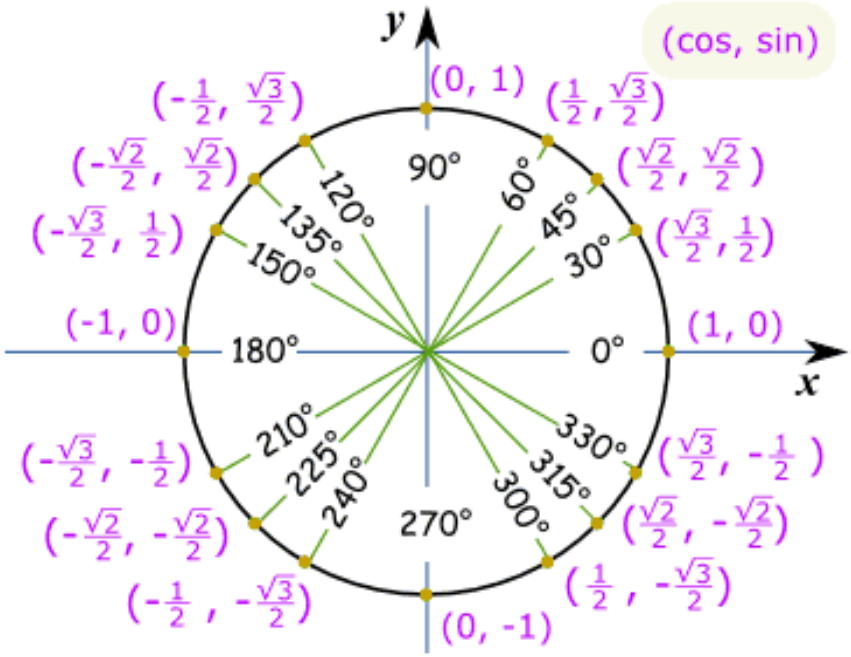


Let's use $\frac{\pi}{4}$ as our reference angle

Construct reference triangles for all multiples of $\pi/4$ between 0 and 2π

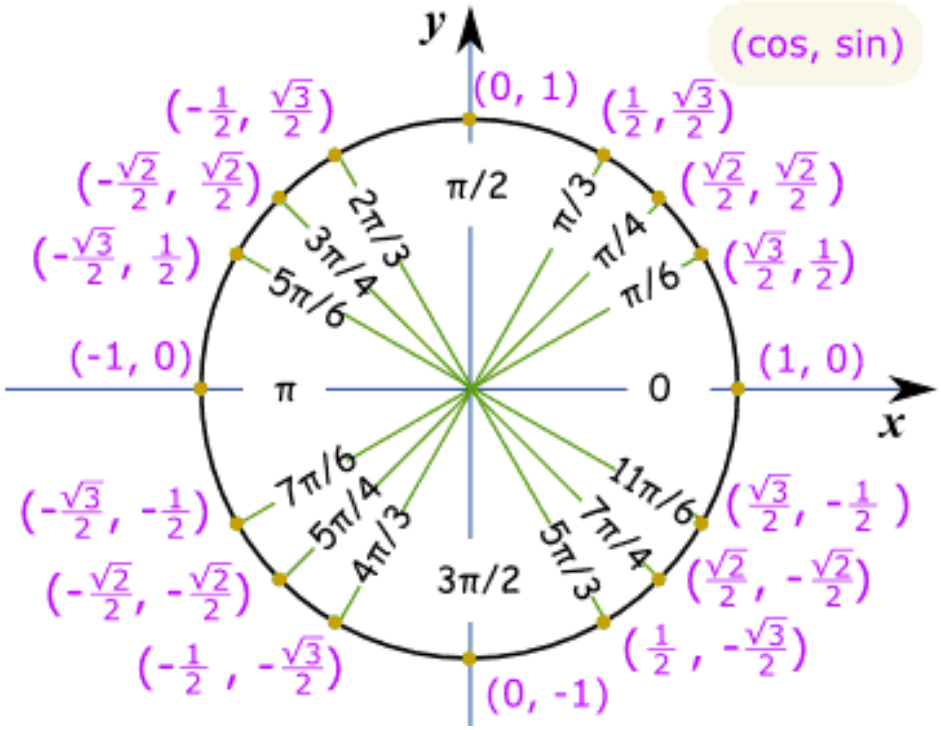


Unit Circle of Special Angles in Degrees



This is lovely...so what is it used for????

Unit Circle of Special Angles in Radians



Attachments

Worksheet - Sketching Angles in Radians.doc