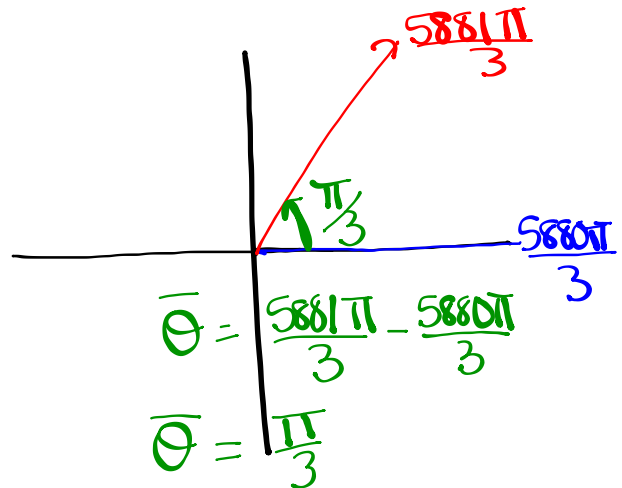


Sketch the following and determine a negative angle co-terminal with:

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

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

$$1960\pi$$



Negative coterminal angle:

$$\frac{5881\pi}{3} - \frac{1962\pi}{1}$$

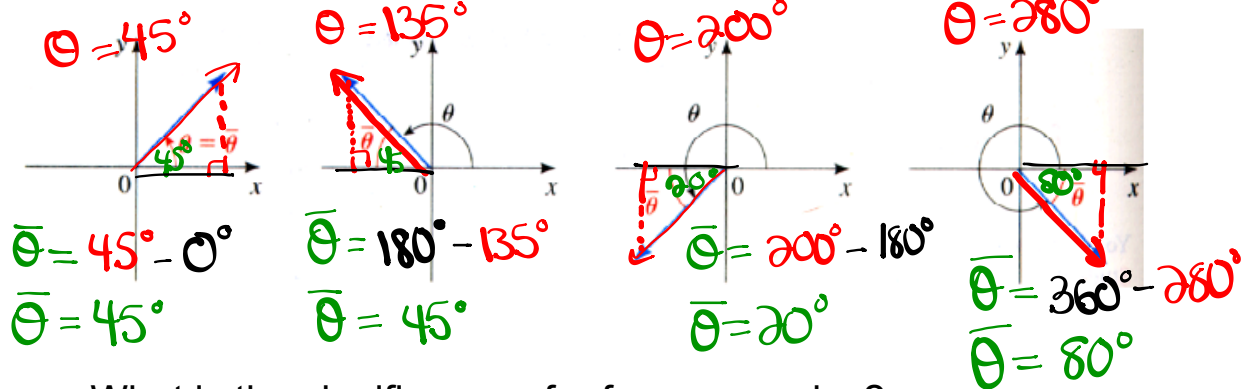
$$\frac{5881\pi}{3} - \frac{5886\pi}{3}$$

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

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.

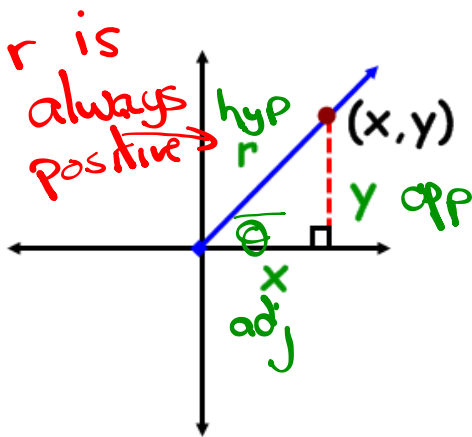
The picture below illustrates this concept.



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

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

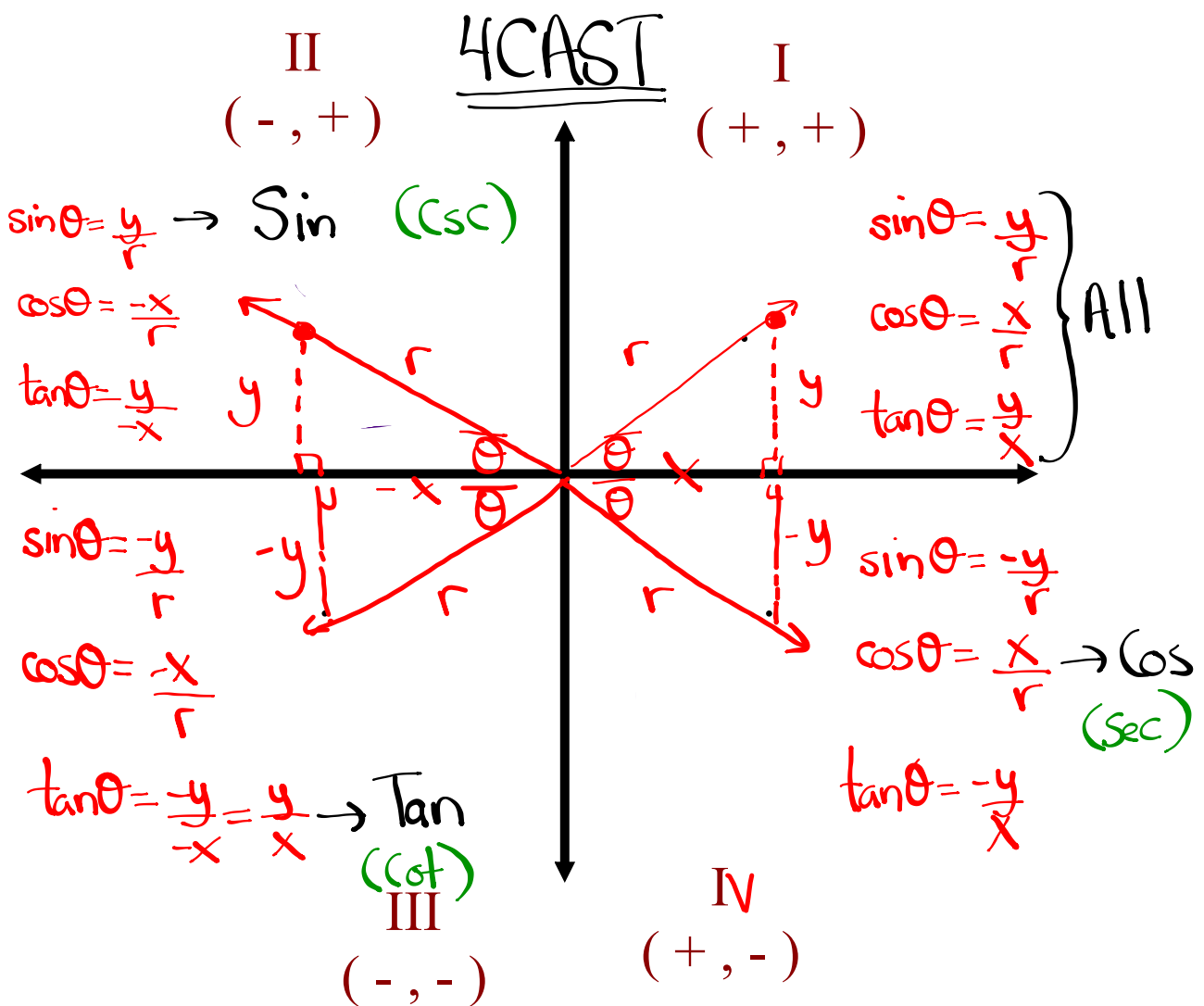
$$\cos \theta = \frac{x}{r} = \frac{a}{h} \quad \sec \theta = \frac{r}{x} = \frac{h}{a}$$

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

} }
"Primary" "Reciprocal"

TRIG RATIOS IN ALL 4 QUADRANTS

What primary trig ratios are **POSITIVE** in...



Homework

 $\sec \theta$ is negative $\sin \theta$ is positive

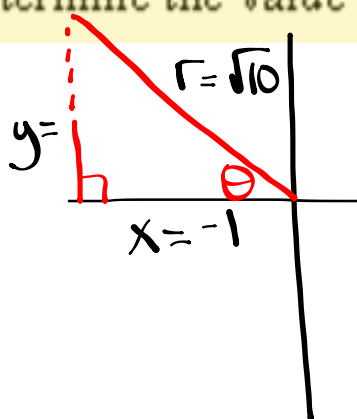
\checkmark S	A
\checkmark T	C

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

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

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

$$x = -1$$

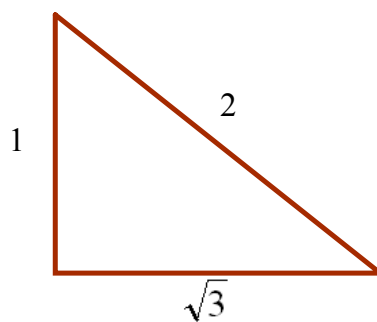
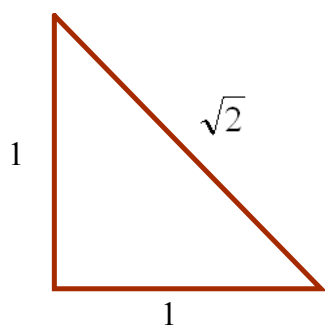


Determine the measure (in radians) of an angle whose terminal arm passes through the ordered pair $(-2\sqrt{3}, -4)$

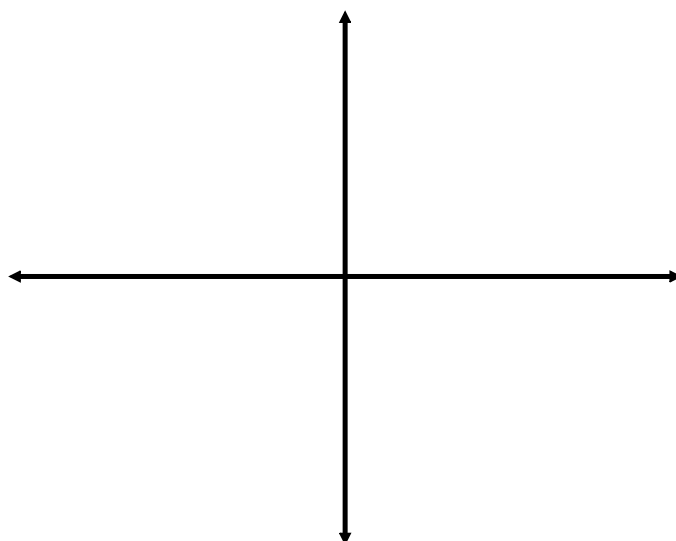
$$x = -2\sqrt{3}$$

$$y = -4$$

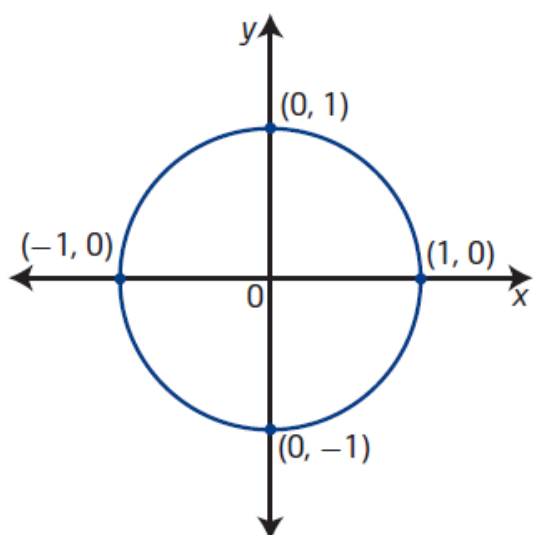
Special Angles (in radians)



Quadrantal Angles

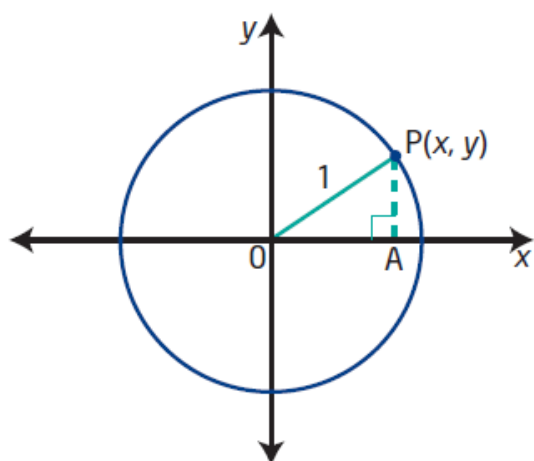


Unit Circle



unit circle

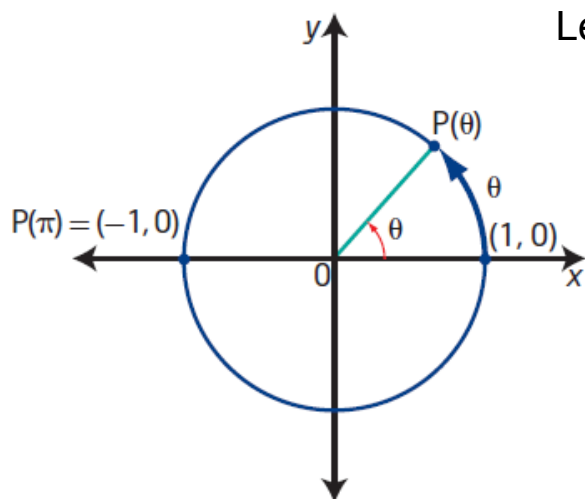
- a circle with radius 1 unit
- a circle of radius 1 unit with centre at the origin on the Cartesian plane is known as *the* unit circle



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

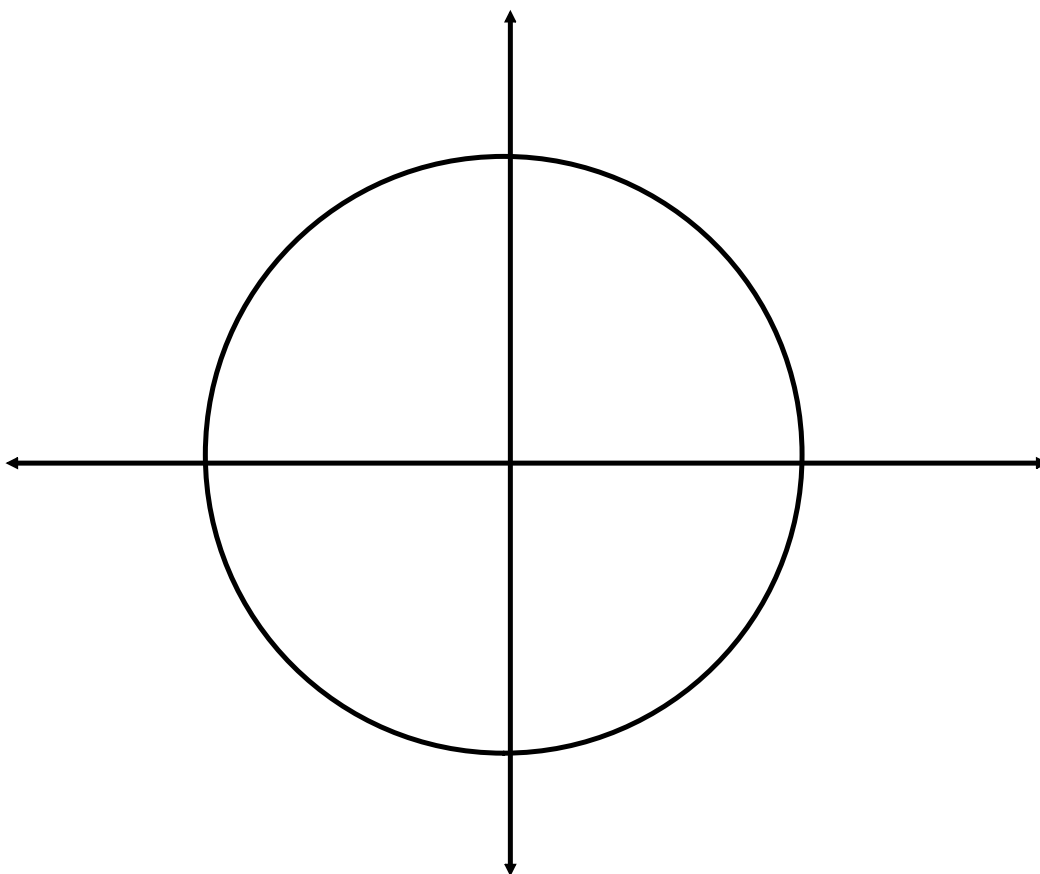
Determine the equation of a circle with centre at the origin and radius 6.

Special Angles on the Unit Circle:

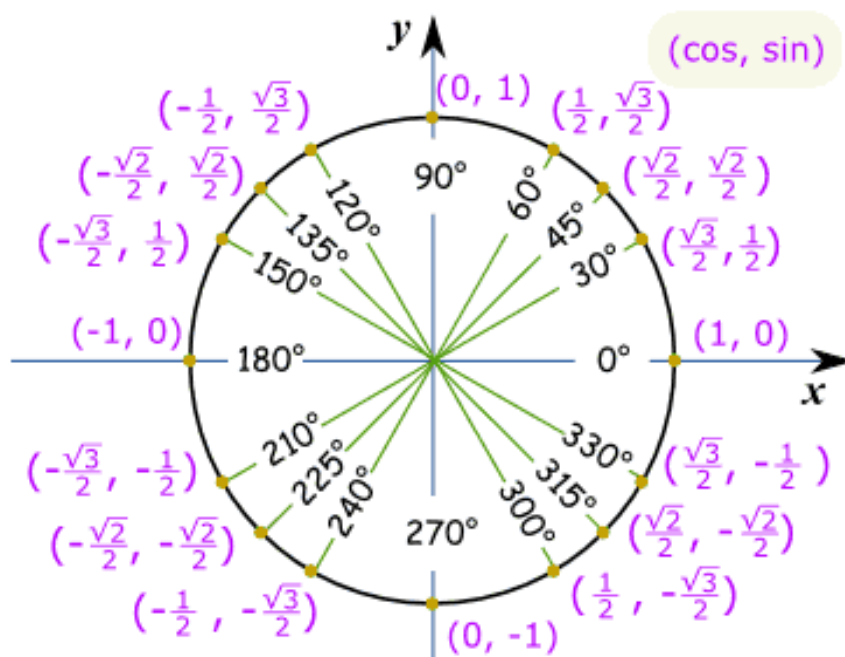


Let's use $\frac{\pi}{4}$ as our reference angle

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

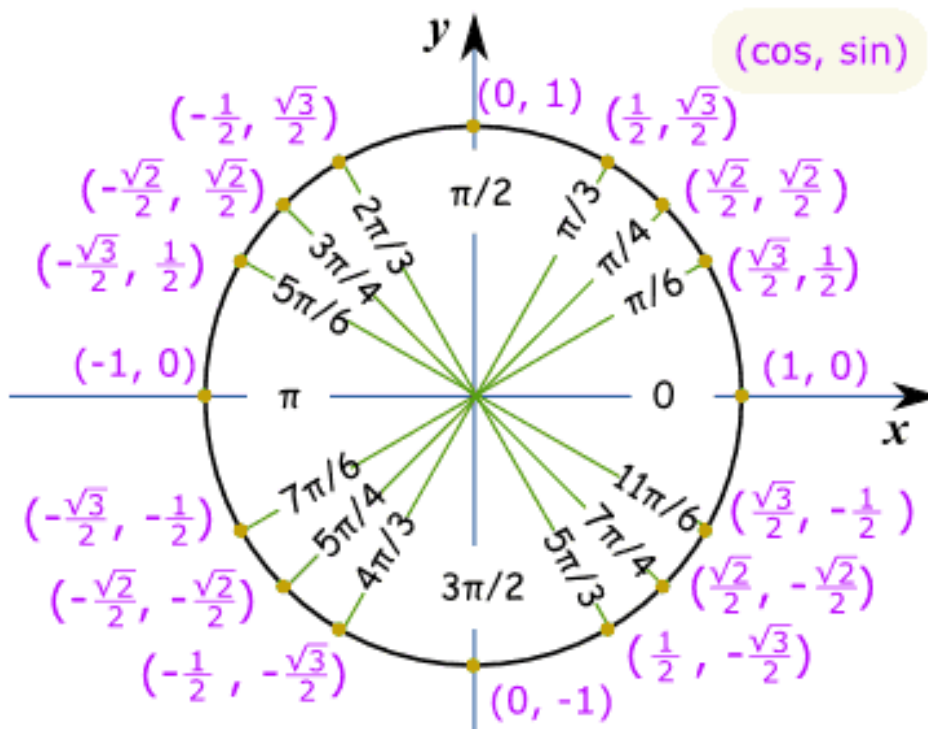


Unit Circle of Special Angles in Degrees



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

Unit Circle of Special Angles in Radians



Attachments

Worksheet - Sketching Angles in Radians.doc