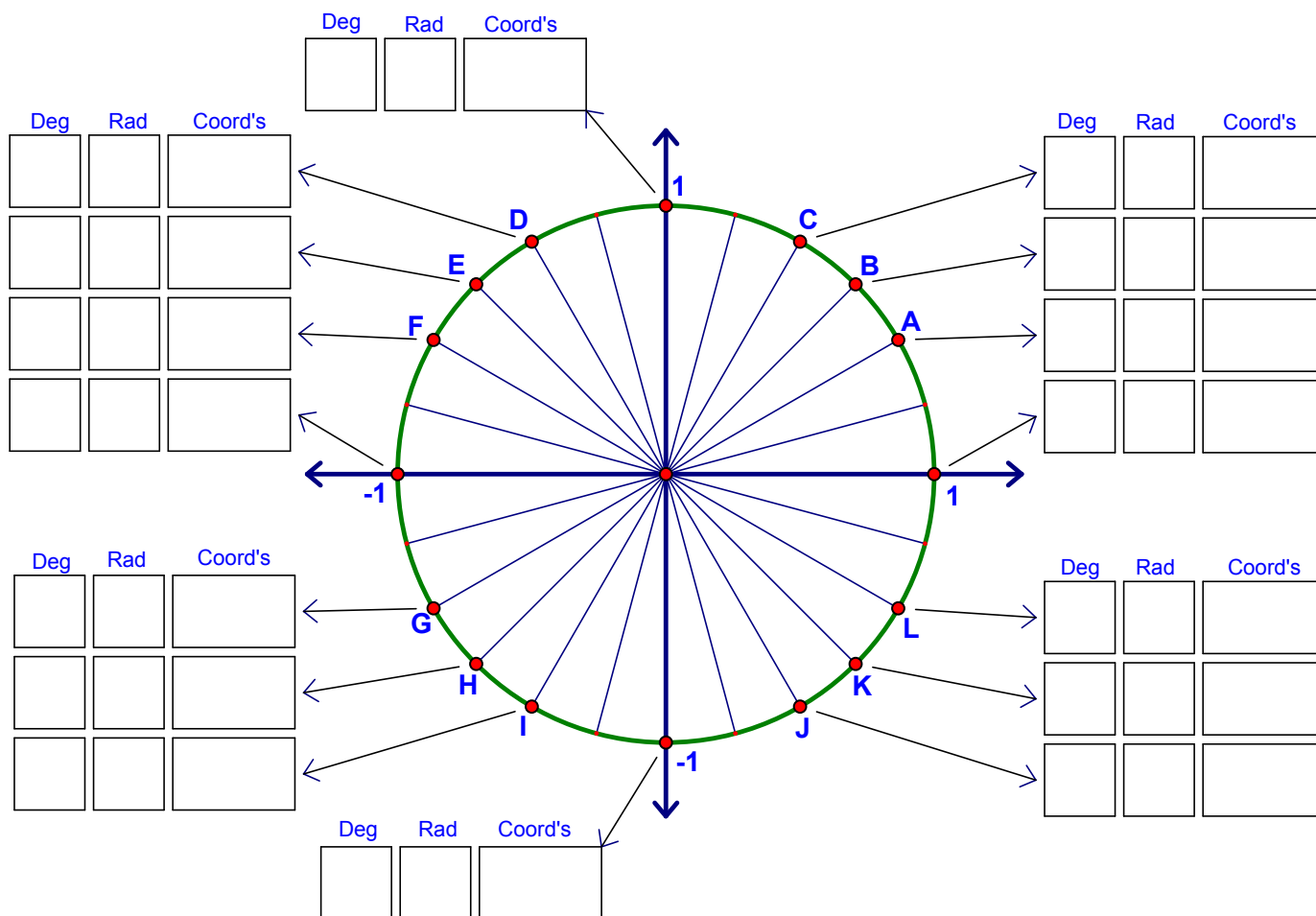


Sections 4.2 & 4.4 – Trig Functions of Any Angle

Using your calculator, find the sine and cosine of the following angles:

θ	0	$\frac{\pi}{2}$	π	$\frac{3\pi}{2}$
$\sin\theta$				
$\cos\theta$				

Now, fill in the coordinates of these quadrantal angles in the chart below.

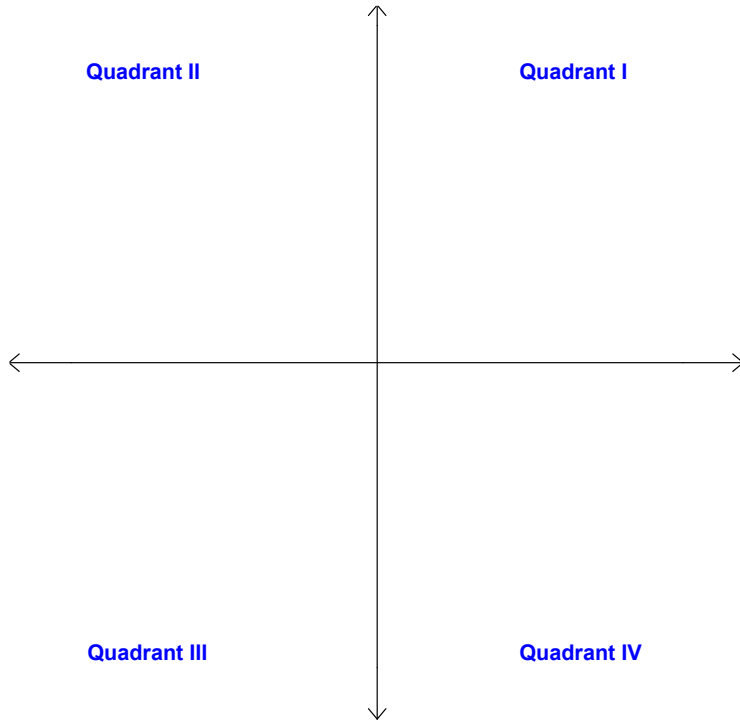


Is there some sort of relationship between sine and cosine and the x and y coordinates of these four angles?

$$(x, y) = (\quad , \quad)$$

Sections 4.2 & 4.4 – Trig Functions of Any Angle

Signs of Trig Functions



Remember it by.....

Examples:

1) State the quadrant in which θ lies:

a. $\sin \theta > 0$ and $\tan \theta < 0$

b. $\sec \theta > 0$ and $\cot \theta < 0$

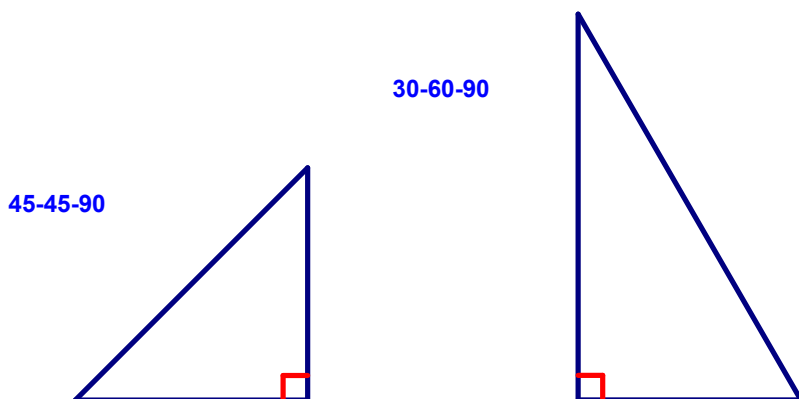
2) If $\sin \theta = 0.5358$, find two values for θ ($0^\circ \leq \theta < 360^\circ$). Round to the nearest tenth of a degree.

3) If $\cos \theta = 0.8164$, find two values for θ ($0^\circ \leq \theta < 360^\circ$). Round to the nearest tenth of a degree.

Sections 4.2 & 4.4 – Trig Functions of Any Angle

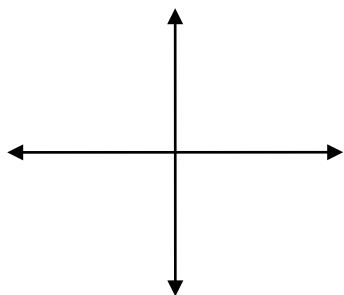
Reference Angles

RECALL: Special Right Triangles:

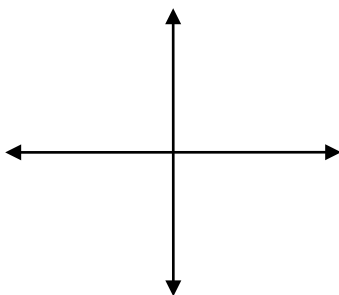


Reference Angle – θ' - an angle made with the x-axis that is used to create an acute right triangle we can use to analyze trig functions

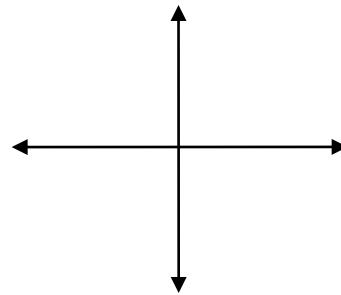
If $\theta = 100^\circ$



If $\theta = 220^\circ$



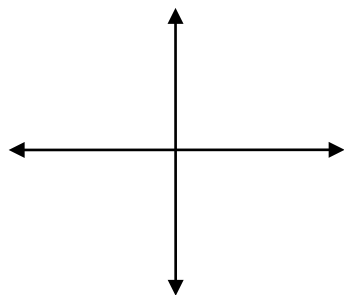
If $\theta = 350^\circ$



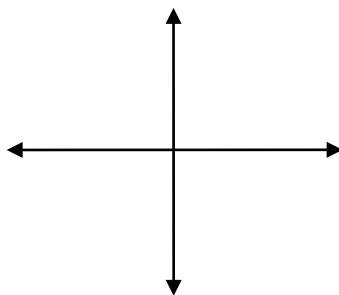
Examples:

Find the reference angle θ' . Draw a diagram to help you.

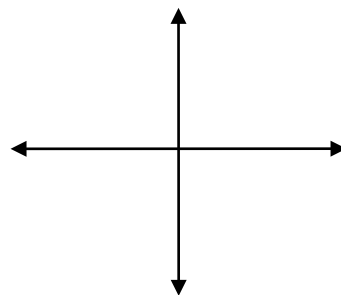
a) $\theta = 300^\circ$



b) $\theta = \frac{5\pi}{6}$



c) $\theta = -135^\circ$



Reference angles are useful because they enable us to evaluate the trig functions of many different "special" angles.

Sections 4.2 & 4.4 – Trig Functions of Any Angle

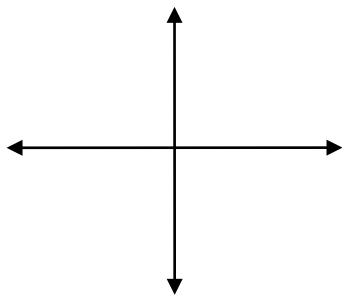
Trig Functions of Real Numbers

To find the value of a trig function of any “special” angle follow the following steps:

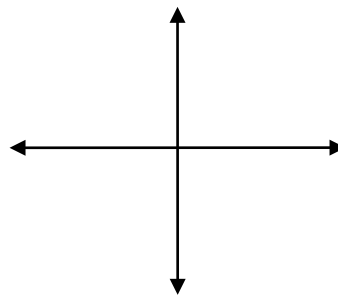
1. Draw the angle in standard position
2. Determine the reference angle θ' (always made with the x-axis)
3. Find the function value based on the sides of the appropriate special right triangle
4. Depending on the Quadrant in which θ lies, affix the appropriate sign (positive or negative) to the function value

Examples:

Evaluate $\cos \frac{2\pi}{3}$



Evaluate $\tan \frac{7\pi}{4}$



More Examples:

1) If θ is in Quadrant II and $\cos \theta = \frac{-7}{25}$, what is $\sin \theta$?

2) If $\cos \theta = \frac{-\sqrt{3}}{2}$ and θ is in Quadrant III, what is $\sin \theta$?

Sections 4.2 & 4.4 – Trig Functions of Any Angle

3) If θ is in standard position and the point $(-3, -6)$ is on the terminal side, find the six trigonometric functions of θ .

4) If θ is in standard position and the point $\left(\frac{-8}{17}, \frac{15}{17}\right)$ is on the terminal side, find the six trigonometric functions of θ .

5) Evaluate the following trig functions:

a) $\sin 5\pi$

b) $\cos\left(\frac{-9\pi}{4}\right)$

Sections 4.2 & 4.4 – Trig Functions of Any Angle

6) If θ is in quadrant III and $\cos\theta = -\frac{1}{2}$, find:

a) $\sin \theta$

b) $\tan \theta$

c) $\csc \theta$

Homework:

4.4 day 1: p. 318 #11-14, 30, 33, 39, 42, 45, 48, 51, 54

4.4 day 2: p. 318 #1, 6, 7, 17, 21, 59, 61, 81, 83, 92, 93