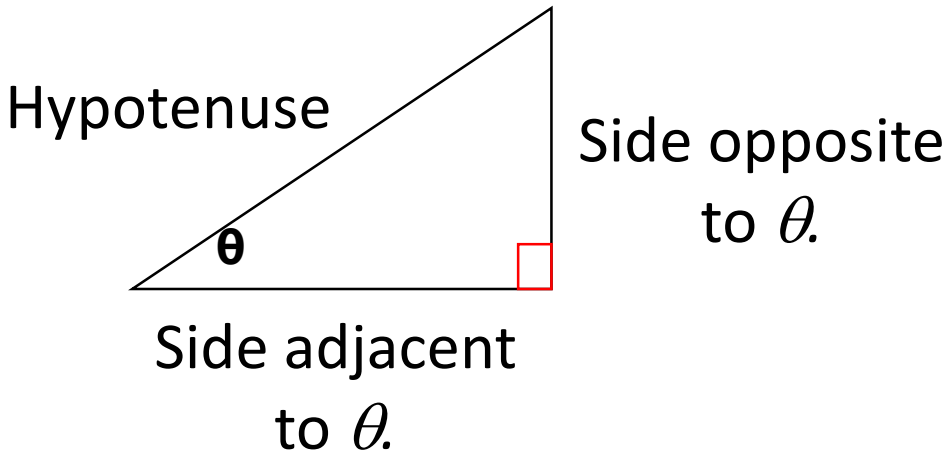
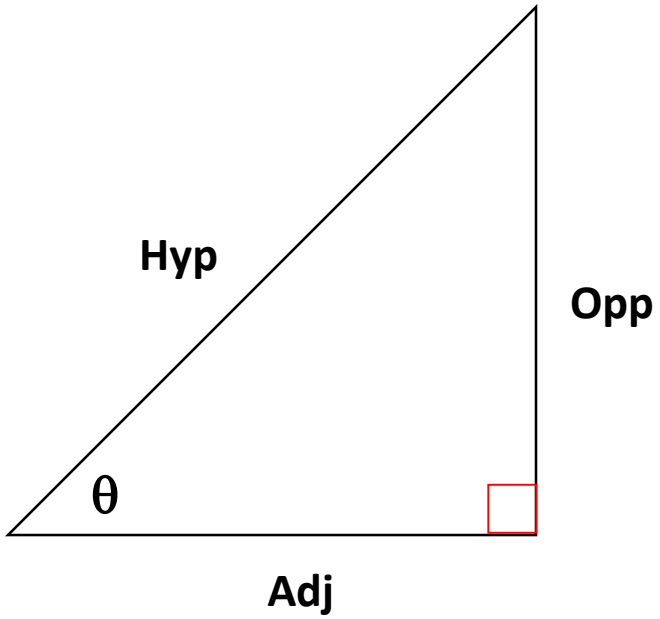
Pre-Calculus:
Sec. 4.2 Trig. Functions & The Unit Circle: Quadrant 1 and QA's

Trigonometry: measurement of triangles.



Right Triangle Definitions of Trigonometric Functions



$$\sin\theta = \frac{\text{Opp}}{\text{Hyp}} \qquad \csc\theta = \frac{\text{Hyp}}{\text{Opp}}$$

$$\cos\theta = \frac{\text{Adj}}{\text{Hyp}} \qquad \sec\theta = \frac{\text{Hyp}}{\text{Adj}}$$

$$\tan\theta = \frac{\text{Opp}}{\text{Adj}} \qquad \cot\theta = \frac{\text{Adj}}{\text{Opp}}$$

Opp = the length of the side *opposite* θ
Adj = the length of the side *adjacent* to θ
Hyp = the length of the *hypotenuse*

Evaluate Trigonometric functions of Special Angles

There are 3 special acute angles:

(degrees) (radians)

30^o

45^o

60^o

Evaluate Sine, Cosine, and Tangent of 30°, 45°, or 60°

$\sin 45^\circ =$

$\cos 45^\circ =$

$\tan 45^\circ =$

$\sin 30^\circ =$

$\sin 60^\circ =$

$\cos 30^\circ =$

$\cos 60^\circ =$

$\tan 30^\circ =$

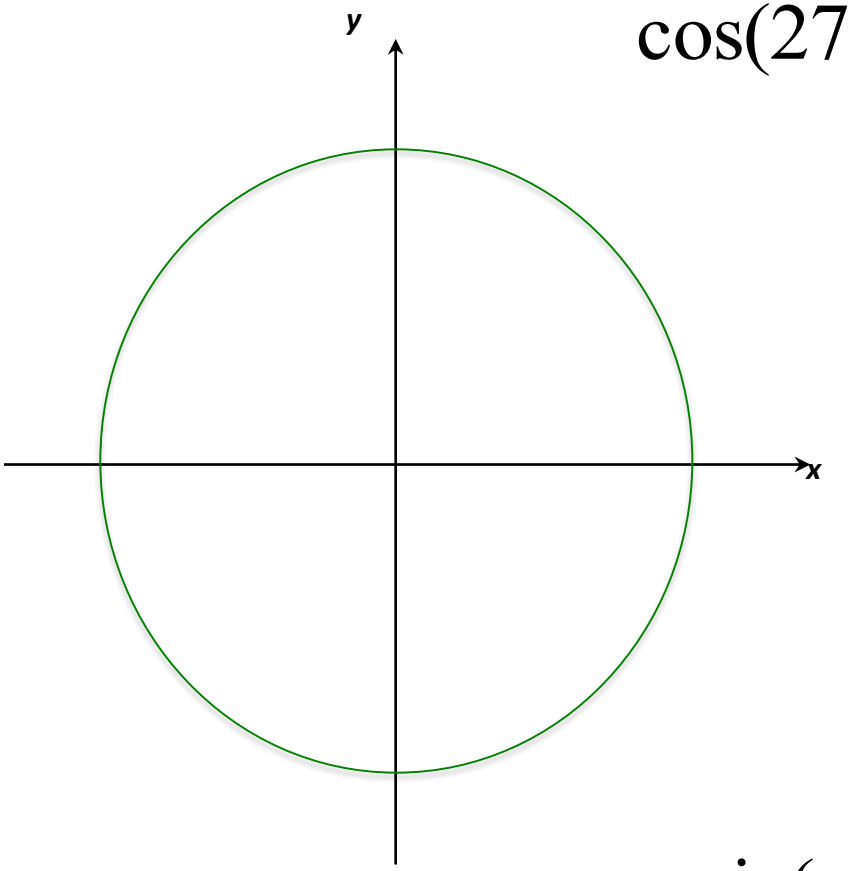
$\tan 60^\circ =$

Q1 and QA's

θ^o	0^o	30^o	45^o	60^o	90^o	180^o	270^o
θ^R							
sin θ							
cos θ							
tan θ							

$$\tan\theta = \frac{\sin\theta}{\cos\theta}$$

Quadrantal Angles (QA's)



$\cos(270^\circ) =$

$\cos(-180^\circ) =$

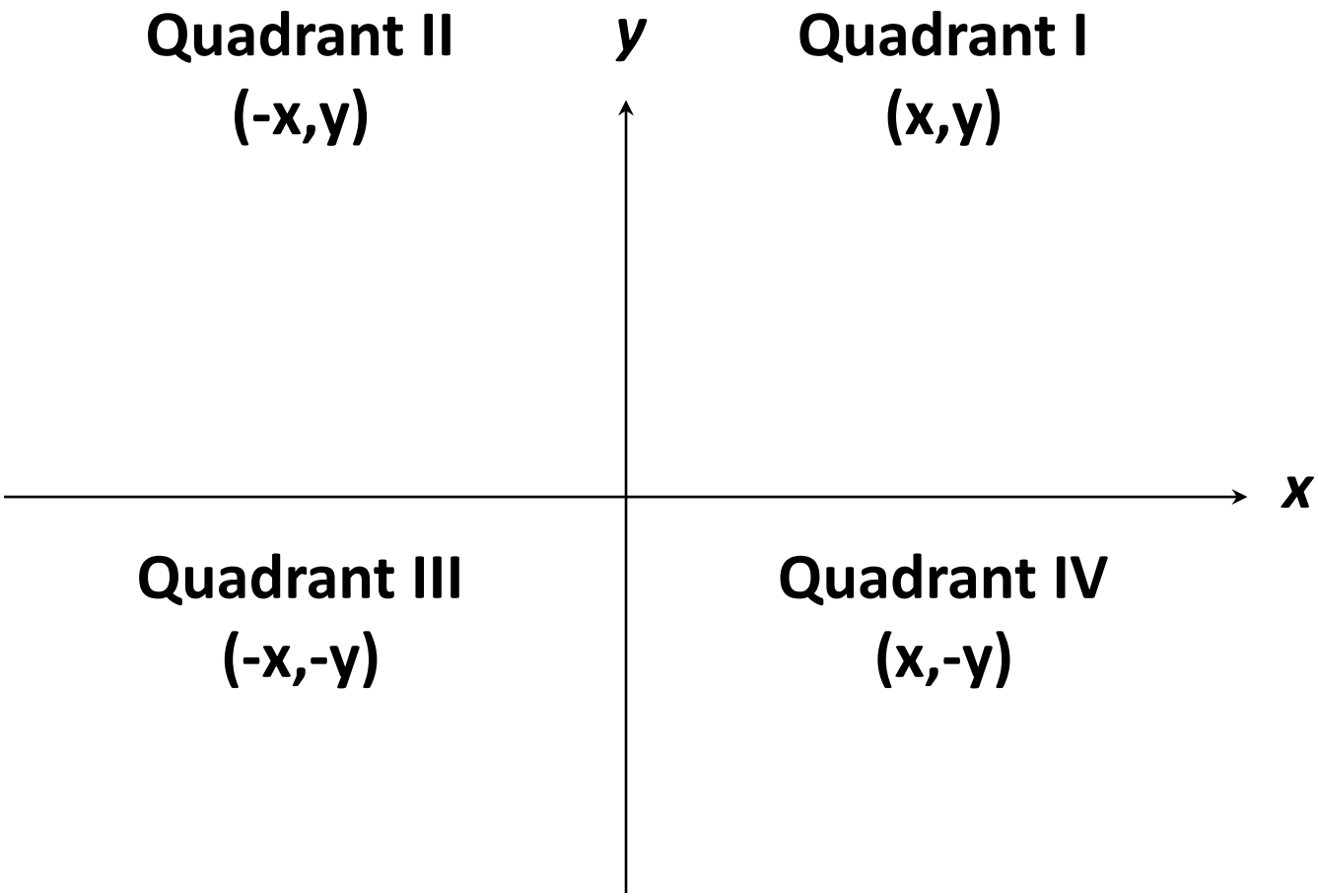
$\sin 180^\circ =$

$\tan 2\pi =$

$\sin(-\frac{3\pi}{2}) =$

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

Signs of All Functions



Even-Odd Identities:

$$\cos(-\theta) = \cos\theta$$

$$\sec(-\theta) = \sec\theta$$

Even…$f(-x) = f(x)$

$$\sin(-\theta) = -\sin\theta$$

$$\csc(-\theta) = -\csc\theta$$

$$\tan(-\theta) = -\tan\theta$$

$$\cot(-\theta) = -\cot\theta$$

Odd…$f(-x) = -f(x)$

Ex1: The even/odd formulas can be used to rewrite a function with a negative angle as a function with a positive angle.

$$If\ \sin(-t) = \frac{3}{8}$$

$$Find:$$

$$a)\ \sin t$$

$$b)\ \csc t$$

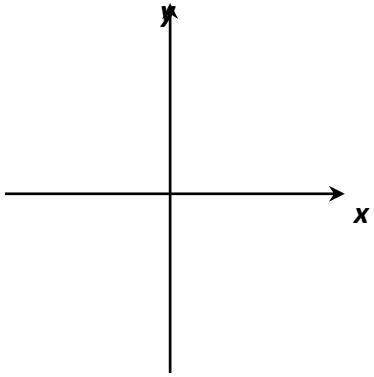
Definition of a Reference Angle

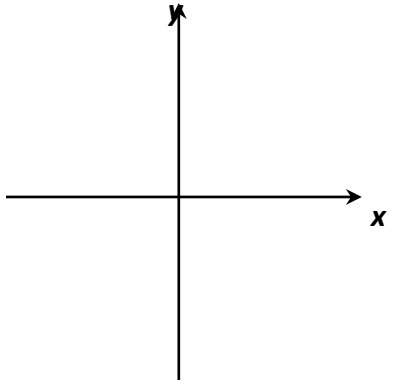
Reference angle is a **positive acute angle** formed by the terminal side of θ and the closest side of the x-axis.

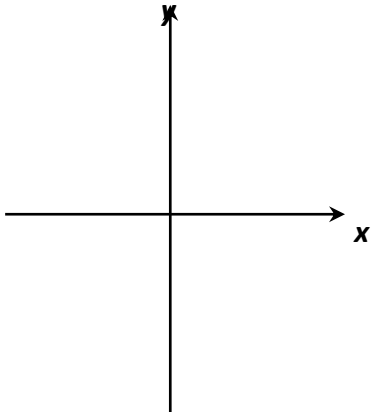
We often label the **reference angle** as α or θ′.

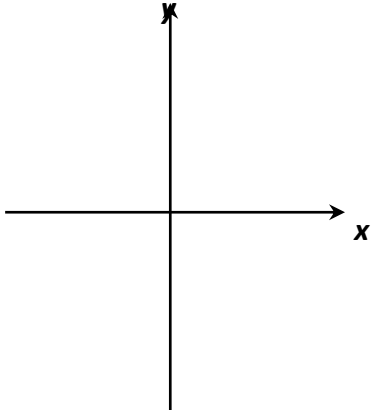
Ex.2: Find the measure of its reference angle.

a. 125^o b. -145^o c. $\frac{8\pi}{5}$ d. 30^o









Ex. 3: Evaluate:

***a*) sin** 240°

***b*) cos(**$-\frac{5\pi}{6}$**)**

***c*) sin** $\frac{3\pi}{4}$

$d)\tan 630^\circ$

Ex. 4: Evaluate:

a) Sec 60^{o}

b) $\csc \pi$

c) $\cot \frac{\pi}{6}$

Evaluate.

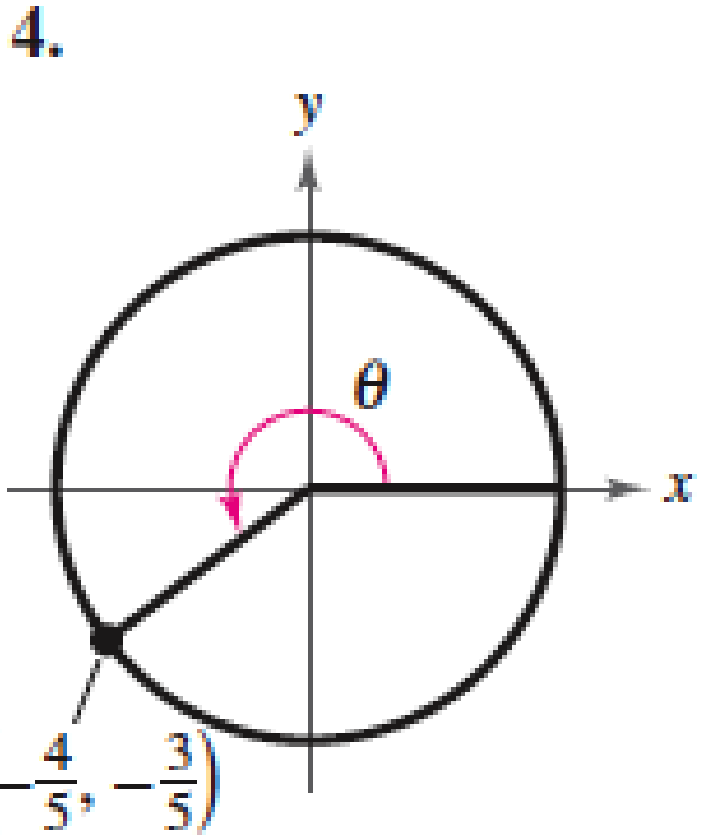
d) $\sec 210^{\circ}$

e) $\csc(-\frac{2\pi}{3})$

f) $\cot\frac{17\pi}{4}$

g) $\cot 7\pi$

Ex.5: Determine the exact values of the six trigonometric functions of the angle Θ on the unit circle.



Ex.6: Find the point (x,y) on the unit circle that corresponds to the real number *t*.

$a)\quad t=-\frac{4\pi}{3}$

$b)\quad t=\frac{5\pi}{4}$