Section 9.2

We need to define two new functions, sine and cosine

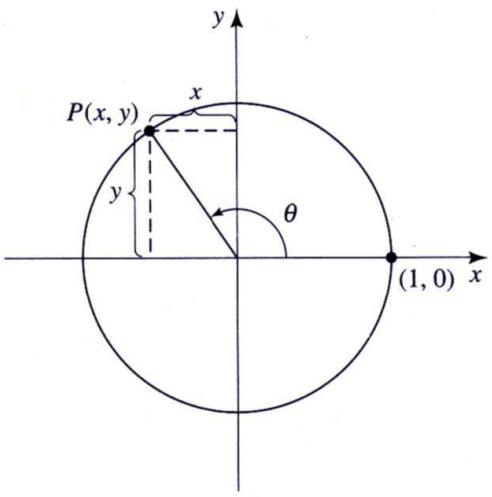


Figure 9.16
We define sin $\theta = y$ and cos $\theta = x$.

This defines the functions for all real numbers. That is, the domain of each function is all real numbers. The range (y values) is -1 to +1, inclusive

Pythagorean Identity

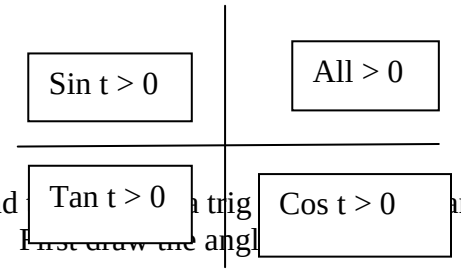
Equation of the unit circle is $x^2 + y^2 = 1$
$(\cos \theta)^2 + (\sin \theta)^2 = 1$
$\cos^2 \theta + \sin^2 \theta = 1$

Trig values of different angles

	0	π/2	π	3 π/2	2 π
sin θ	0	1	0	-1	0
cos θ	1	0	-1	0	1

θ	0	π/6	π/4	π/3	π/2
sin θ	$\frac{\sqrt{0}}{2}=0$	$\frac{\sqrt{1}}{2}=\frac{1}{2}$	$\frac{\sqrt{2}}{2}$	$\frac{\sqrt{3}}{2}$	$\frac{\sqrt{4}}{2}=1$
cos θ	$\frac{\sqrt{4}}{2}=1$	$\frac{\sqrt{3}}{2}$	$\frac{\sqrt{2}}{2}$	$\frac{\sqrt{1}}{2}=\frac{1}{2}$	$\frac{\sqrt{0}}{2}=0$

Signs of sine and cosine in the various quadrants



To find [illegible] a trig [illegible] and cosine) whose terminal side is in a quadrant other than the first:
First draw the angl[illegible]

Next find the reference angle, which is the smallest positive angle between the x-axis and the terminal side of the angle.

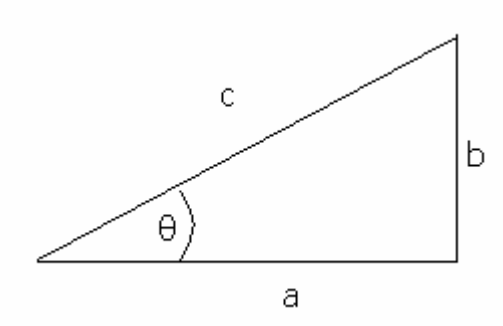
The angle of interest has sine and cosine of the same magnitude as the reference angle.

Example:

$t = 4\pi/3$, $\sin 4\pi/3 = -\sin \pi/3 = -\frac{\sqrt{3}}{2}$

$\cos 4\pi/3 = -\cos \pi/3 = -1/2$

Right triangle definitions:



$$\sin\theta = \frac{opp}{hyp} = \frac{b}{c}$$

$$\cos\theta = \frac{adj}{hyp} = \frac{a}{c}$$

$$\tan\theta = \frac{\sin\theta}{\cos\theta} = \frac{opp}{adj} = \frac{b}{a}$$