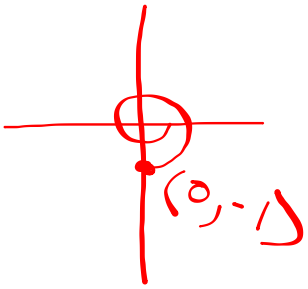
Warm-up 1/20/17
Find sin θ, cos θ, and tan θ.

$-450°$



$\frac{-1}{0}$

$\sin -450 = -1$

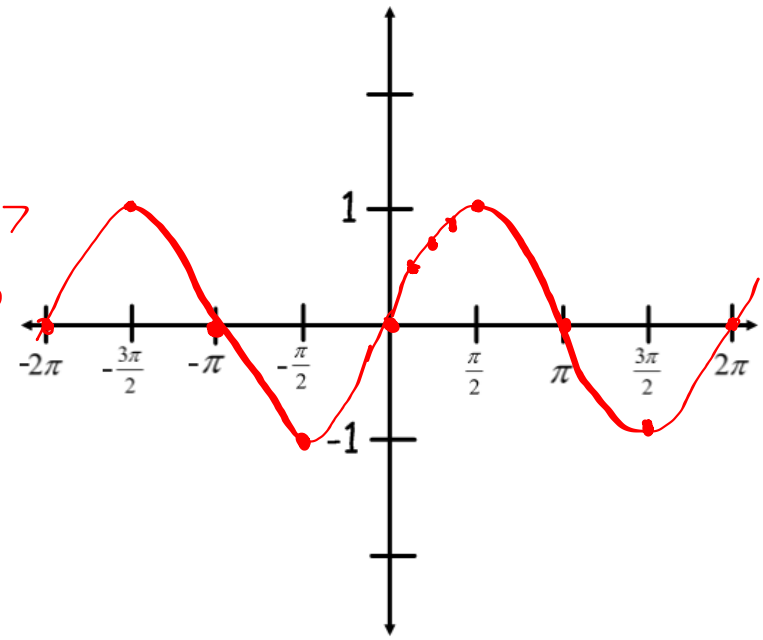
$\cos -450 = 0$

$\tan -450 = \text{undefined}$

4.4: Graphs of Sine and Cosine: Sinusoids

Graph y = sin x.

x	y
0	0
π/6	1/2
π/4	$\sqrt{2}/2 \approx .707$
π/3	$\sqrt{3}/2 \approx .866$
π/2	1
π	0
3π/2	-1
2π	0



DEFINITION: Sinusoid

A function is a sinusoid if it can be written in the form

$f(x) = a \sin(bx + c) + d$

where a, b, c and d are constants and neither a nor b is zero.

DEFINITION: Amplitude of a Sinusoid

The amplitude of the sinusoid $f(x) = a \sin(bx + c) + d$ is $|a|$.
Similarly, the amplitude of $f(x) = a \cos(bx + c) + d$ is $|a|$.

Graphically, the amplitude is half the height of the wave.

Find the amplitude of each function.

1) $y = \sin x$ $|1| = 1$

2) $y = \frac{1}{2}\sin x$ $\left|\frac{1}{2}\right| = \frac{1}{2}$

3) $y = -3\sin x$ $|-3| = 3$

Graphing Calculator

Period of a Sinusoid

The period of the sinusoid f(x) = a sin (bx + c) + d is 2π/|b|.
Similarly, the period of f(x) = a cos (bx + c) + d is 2π/|b|.

Graphically, the period is the length of one full cycle of the wave.

Find the period of each function.

1) $y = \sin x$ $\frac{2\pi}{|1|} = 2\pi$

2) $y = -2\sin\left(\frac{x}{3}\right)$ $\frac{2\pi}{|1/3|} = 6\pi$

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

Frequency of a Sinusoid

The frequency of the sinusoid f(x) = a sin (bx + c) + d is |b|/2π.
Similarly, the frequency of f(x) = a cos (bx + c) + d is |b|/2π.

Graphically, the frequency is the number of complete cycles the wave completes in a unit interval.

Find the frequency of each function.

1) $y = \sin x$ $\frac{|1|}{2\pi} = \frac{1}{2\pi}$

2) $y = -2\sin\left(\frac{x}{3}\right)$ $\frac{|1/3|}{2\pi} = \frac{1/3}{2\pi} = \frac{1}{6\pi}$

3) $y = 3\sin(-2x)$ $\frac{|-2|}{2\pi} = \frac{1}{\pi}$

Assignment: pp. 357 - 359
1 - 6, 15 - 18, 29