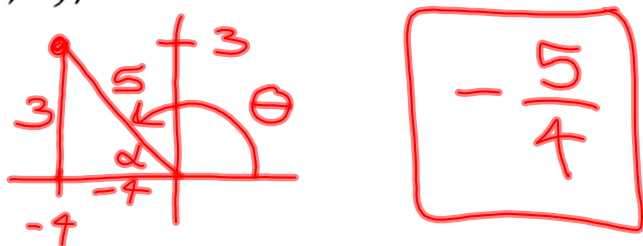


Review:

For the angle θ whose terminal side passes through the point $(-4, 3)$, find $\sec \theta$.

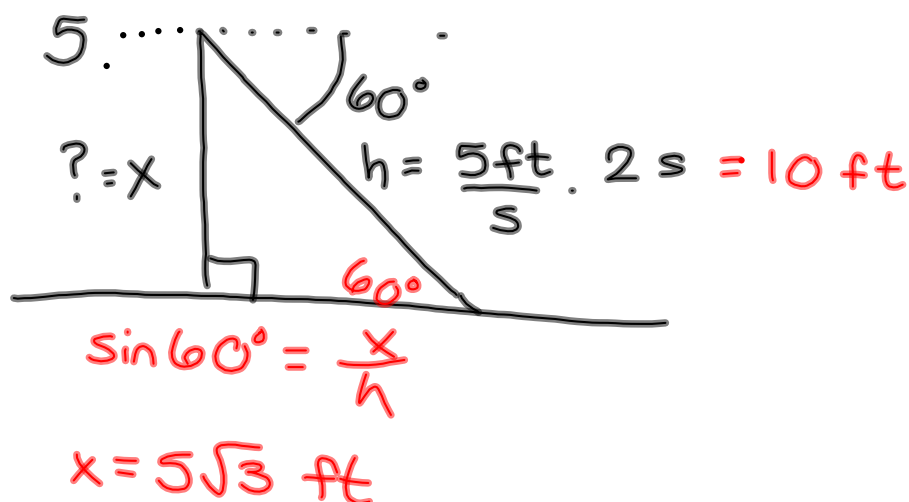


A reference angle is the positive acute angle between terminal side and x-axis

In which quadrant(s) is the cosine function positive?

I & IV

Homework questions?



79. $s = r\theta$, $v = \frac{s}{t}$, $\omega = \frac{\theta}{t}$, $v = r\omega$

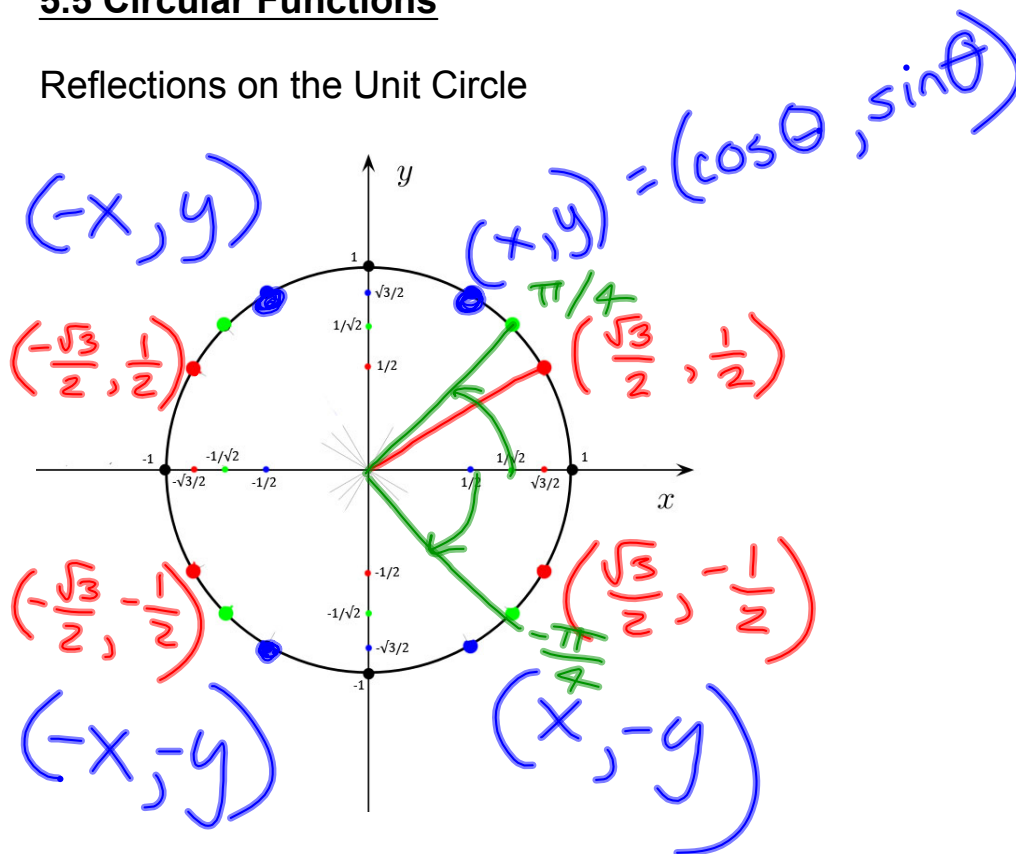
$\frac{t}{r} \cdot v = \frac{r\theta}{t} \cdot \frac{t}{r}$ $\theta = \frac{tv}{r}$

$r = 39 \text{ in}$, $\theta = ? \text{ rad}$, $t = 12 \text{ s}$, $v = 22 \frac{\text{mi}}{\text{h}}$

$\theta = \frac{12 \cancel{\text{s}}}{39 \cancel{\text{in}}} \cdot \frac{22 \cancel{\text{mi}}}{\cancel{\text{h}}} \cdot \frac{1 \cancel{\text{h}}}{3600 \cancel{\text{s}}} \cdot \frac{12 \cancel{\text{in}}}{1 \cancel{\text{ft}}} \cdot \frac{5280 \cancel{\text{ft}}}{1 \cancel{\text{mi}}}$
 ≈ 119

5.5 Circular Functions

Reflections on the Unit Circle



Even/Odd Functions

A function f is even if $f(-x) = f(x)$

even fn's are symmetric w.r.t. the y -axis

A function f is odd if $f(-x) = -f(x)$

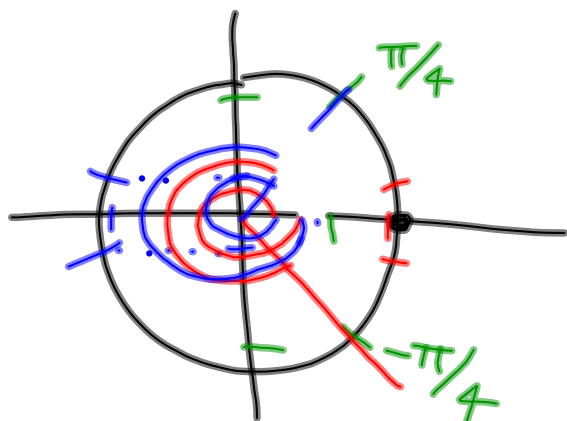
odd fn's are symmetric w.r.t. the origin

Odd-Even Identities

$$\cos(-x) = \cos x, \quad \sin(-x) = -\sin x, \quad \tan(-x) = -\tan x$$

$$\sec(-x) = \sec x, \quad \csc(-x) = -\csc x, \quad \cot(-x) = -\cot x$$

Why is $\cos x$ even / $\sin x$ odd?



$$\frac{-15\pi}{4} \quad \vee \quad \frac{15\pi}{4}$$

$$\tan(-x) = \frac{\sin(-x)}{\cos(-x)} = \frac{-\sin x}{\cos x} = -\tan x$$

$\Rightarrow \tan x$ is odd

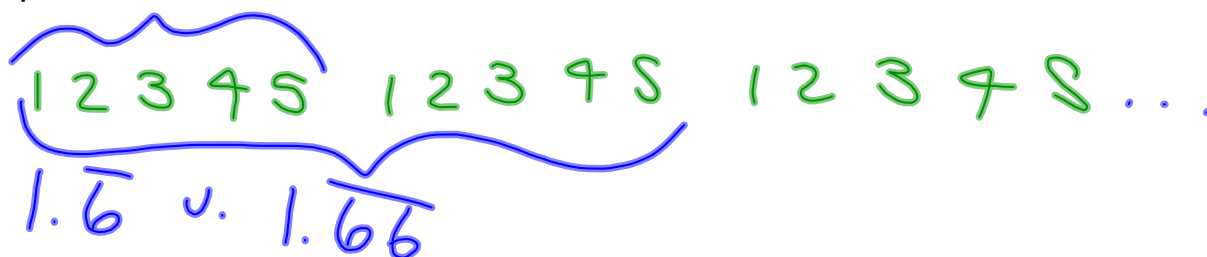
Domain/Range

The **domain** of a function is the set of all input values for which the function is defined (all the x-values that "make sense" when plugged into the function)

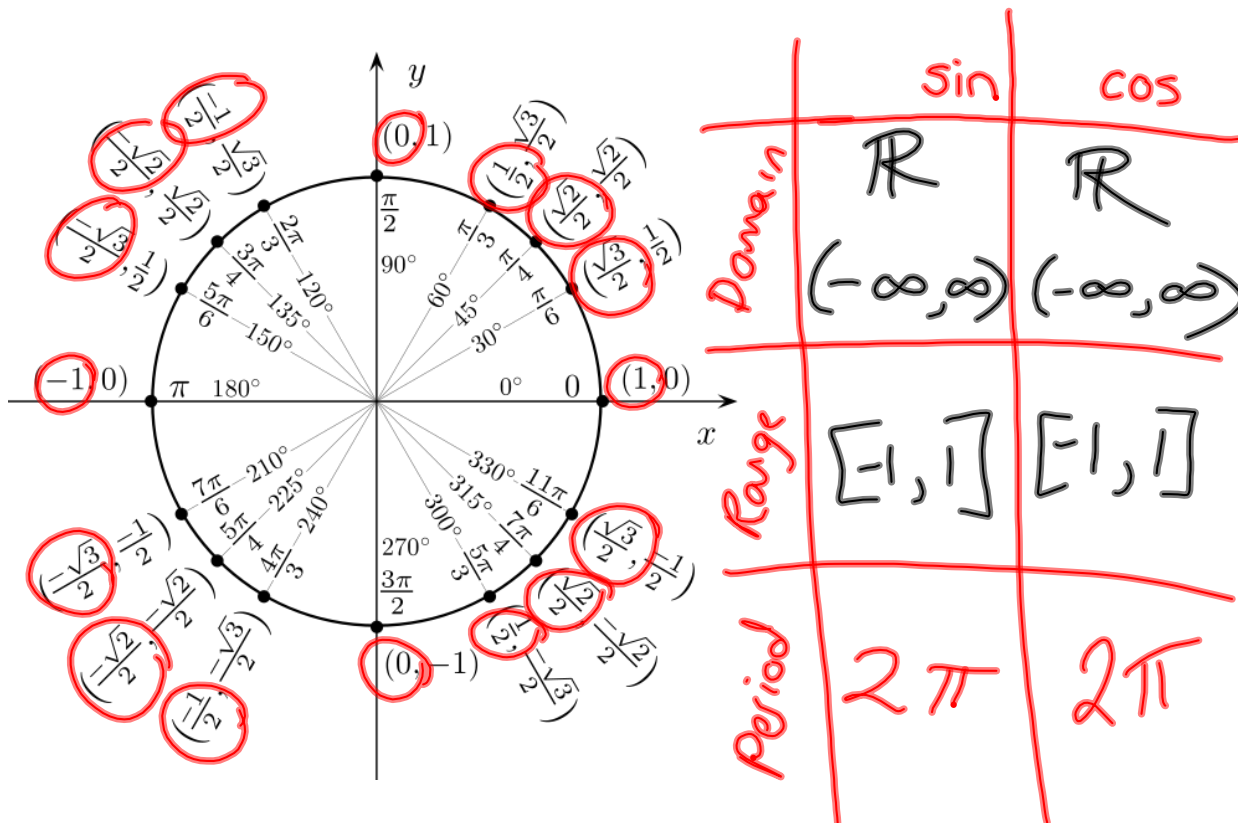
The **range** of a function is the output of the domain (all the y-values that the function takes on)

Periodicity

The **period** of a function is the smallest interval over which the function repeats itself



Determining domain, range and period for the Sine & Cosine functions



Graphs of the sine and cosine functions

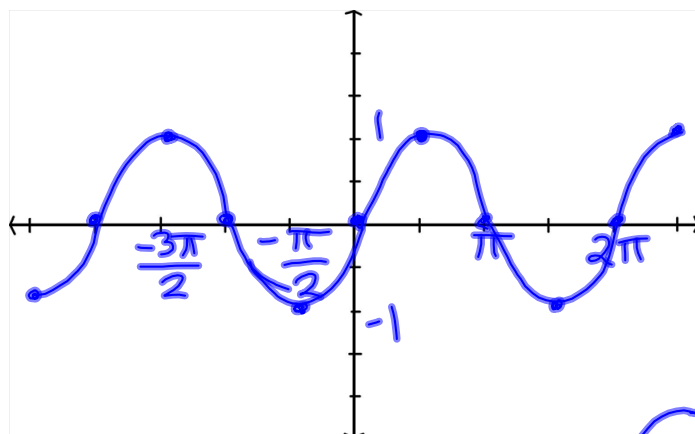
$$y = \sin x$$

domain:
 $(-\infty, \infty)$

range:
 $[-1, 1]$

period:
 2π

odd



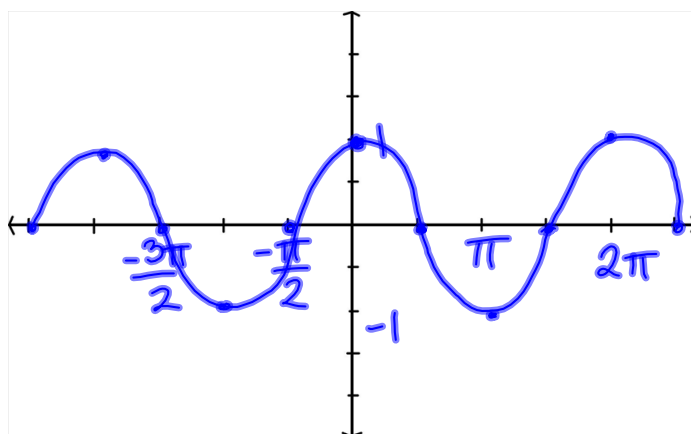
$$y = \cos x$$

domain:
 $(-\infty, \infty)$

range:
 $[-1, 1]$

period:
 2π

even



Domain/Range/Period/Graphs of the other 4 Trig functions?

Function	Domain	Range	Period
$y = \sin x$	$(-\infty, \infty)$	$[-1, 1]$	2π
$y = \cos x$	$(-\infty, \infty)$	$[-1, 1]$	2π
$y = \csc x$	$\{x \mid x \text{ is not an integer multiple of } \pi\}$	$(-\infty, -1] \cup [1, \infty)$	2π
$y = \sec x$	$\{x \mid x \text{ is not an odd multiple of } \frac{\pi}{2}\}$	$(-\infty, -1] \cup [1, \infty)$	2π
$y = \tan x$	$\{x \mid x \text{ is not an odd multiple of } \frac{\pi}{2}\}$	$(-\infty, \infty)$	π
$y = \cot x$	$\{x \mid x \text{ is not an integer multiple of } \pi\}$	$(-\infty, \infty)$	π

Why?

$$\sec x = \frac{1}{\cos x}$$

$$\csc x = \frac{1}{\sin x}$$

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

$$\cot x = \frac{\cos x}{\sin x}$$

Homework:

5.5 #1-6; 43-44; 49-54

and

Test #1 Practice Problems (handout)

Tomorrow (Tuesday) - Review

Wednesday - **Test #1**

Friday - Graphing