

Turn in homework #2:

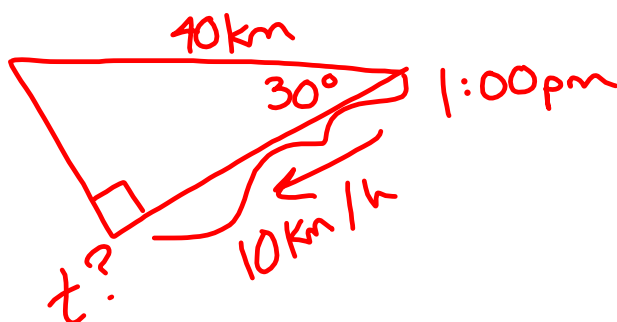
Please make sure each section is neatly labeled; all sections are stapled together in order, and your full name is written neatly on the first page.

- 5.2 #35-41odd; 59-75odd
- 5.3 #1-35odd; 37-48all; 61-68all
- 5.4 #1-22 all;
- 5.4 #33-39odd

Homework questions?

5.2

63.



$$\cos 30^\circ = \frac{x}{40}$$

$$x = 40 \cdot \frac{\sqrt{3}}{2} = 20\sqrt{3}$$

5.1

$$37. \quad s(x) = \frac{\sin x}{x}, \quad x \neq 0$$

f is even if  $f(-x) = f(x)$   
 odd if  $f(-x) = -f(x)$

$$s(-x) = \frac{\sin(-x)}{-x} = \frac{-\sin x}{-x} = \frac{\sin x}{x} = s(x)$$

$\Rightarrow s$  is even

**Reciprocal Identities**

$$\begin{aligned} \csc x &= \frac{1}{\sin x}, & \sin x &= \frac{1}{\csc x} \\ \sec x &= \frac{1}{\cos x}, & \cos x &= \frac{1}{\sec x} \\ \cot x &= \frac{1}{\tan x}, & \tan x &= \frac{1}{\cot x} \end{aligned}$$

**Ratio Identities**

$$\tan x = \frac{\sin x}{\cos x}, \quad \cot x = \frac{\cos x}{\sin x}$$

**Odd-Even Identities**

$$\begin{aligned} \cos(-x) &= \cos x, & \sin(-x) &= -\sin x, & \tan(-x) &= -\tan x \\ \sec(-x) &= \sec x, & \csc(-x) &= -\csc x, & \cot(-x) &= -\cot x \end{aligned}$$

**Pythagorean Identities**

$$\begin{aligned} \sin^2 x + \cos^2 x &= 1 \\ 1 + \cot^2 x &= \csc^2 x \\ \tan^2 x + 1 &= \sec^2 x \end{aligned}$$

Use the trigonometric identities to write each expression in terms of a single trigonometric function or constant.

$$50. \cot t \sin t = \frac{\cancel{\cos t} \cdot \cancel{\sin t}}{\cancel{\sin t}} = \boxed{\cos t}$$

$$54. 1 - \csc^2 t = \boxed{-\cot^2 t}$$

$$1 + \cot^2 x = \csc^2 x$$

$$1 - \csc^2 x = -\cot^2 x$$

$$56. \frac{\csc^2 t}{\cot t} - \frac{\cot t}{\cot t} \cdot \frac{\cot t}{\cot t}$$

$$= \frac{\csc^2 t - \cot^2 t}{\cot t} = \frac{1 + \cot^2 t - \cot^2 t}{\cot t} =$$

$$= \frac{1}{\cot t} = \boxed{\tan t}$$

Use the trigonometric identities to write each expression in terms of a single trigonometric function or constant.

$$\sin^2 x + \cos^2 x = 1$$

$$\cos^2 x = 1 - \sin^2 x$$

$$\tan^2 x + 1 = \sec^2 x$$

$$60. \frac{1}{1 - \sin t} + \frac{1}{1 + \sin t} = \frac{1}{1 - \sin t} \cdot \frac{1 + \sin t}{1 + \sin t} + \frac{1}{1 + \sin t} \cdot \frac{1 - \sin t}{1 - \sin t}$$

$$= \frac{1 + \sin t + 1 - \sin t}{1 - \sin^2 t} = \frac{2}{\cos^2 t} = \boxed{2 \sec^2 t}$$

$$64. \cos^2 t (1 + \tan^2 t) = \cos^2 t \cdot \sec^2 t =$$

$$= \frac{\cos^2 t}{1} \cdot \frac{1}{\cos^2 t} = \boxed{1}$$

Perform the indicated operation and simplify.

$$(a+b)^2 = a^2 + 2ab + b^2$$

78.  $(\sin t + \cos t)^2$

$$\begin{aligned} &= \sin^2 t + 2\sin t \cos t + \cos^2 t \\ &= \underbrace{\sin^2 t + \cos^2 t} + 2\sin t \cos t \\ &= \boxed{1 + 2\sin t \cos t} \end{aligned}$$

Factor the expression.

86.  $\cos^2 t + 3\cos t - 4$

Let  $u = \cos t$

$$\begin{aligned} &= u^2 + 3u - 4 \\ &= (u+4)(u-1) = \boxed{(\cos t + 4)(\cos t - 1)} \end{aligned}$$

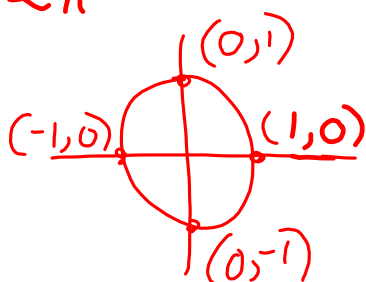
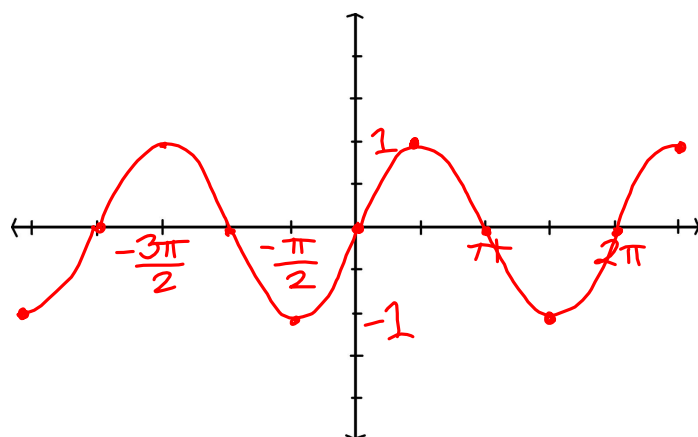
### Graphs of the sine and cosine functions

$y = \sin x$

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

range:  
 $[-1, 1]$

period:  
 $2\pi$



$y = \cos x$

domain:

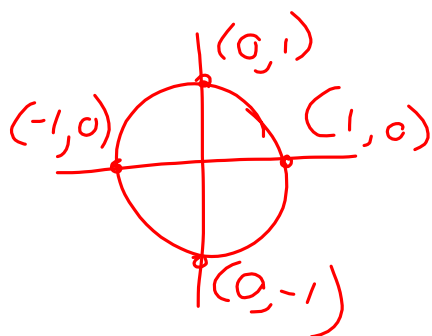
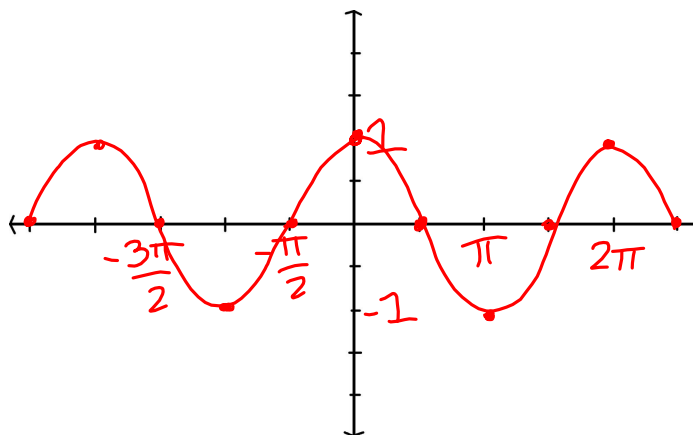
$(-\infty, \infty)$

range:

$[-1, 1]$

period:

$2\pi$



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

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

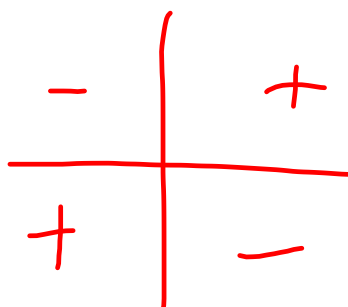
Why?

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

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

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

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



**Homework for Test #1:**

HW #1: Submitted 11/08:

- 5.1 #1, 2, 7 18 all, 31 74 all
- 4 problems on handout
- 5.2 #1 33odd

HW #2: Submitted Friday 11/15:

- 5.2 #35-41odd; 59-75odd
- 5.3 #1-35odd; 37-48all; 61-68all
- 5.4 #1-22 all;
- 5.4 #33-39odd

HW #3: Due Monday 11/19:

- **5.4 #41-67odd; 71-97odd**
- **Test #1 Practice Problems (handout)**

**Test #1 - Wednesday, 11/20**

**Quiz #3 - Now!**