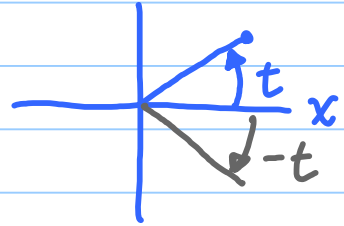


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# 4.2 (part 2) Trig Functions: The Unit Circle

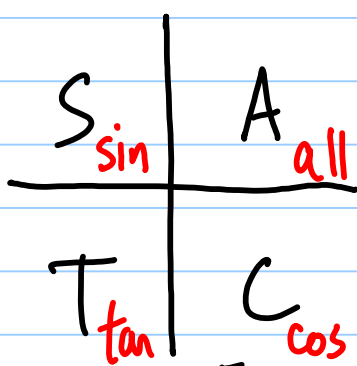
## Even & Odd Trig Functions

$\cos(-t) = \cos t$  ← "even"  
 "negativize the angle..."  
 ex)  $\cos(-\frac{\pi}{6}) = \cos \frac{\pi}{6}$   
 also for  $\sec(-t) = \sec(t)$



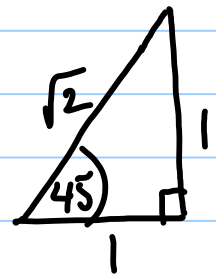
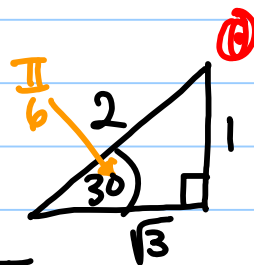
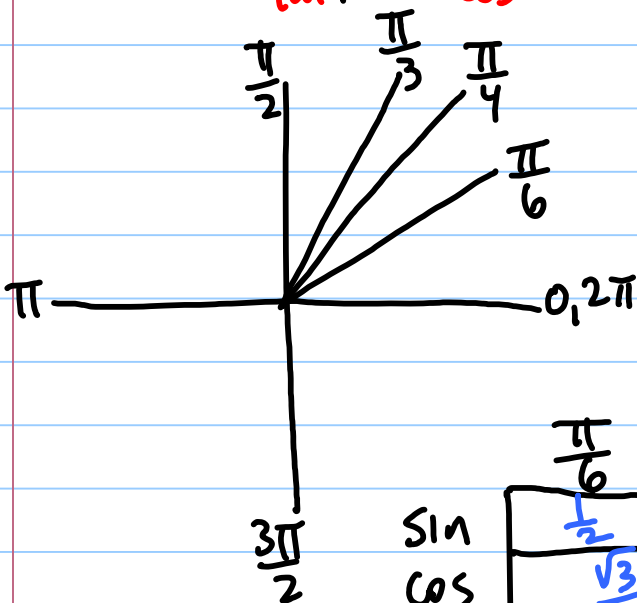
$\sin(-t) = -\sin t$  ← "odd"  
 ex)  $\sin(-\frac{7\pi}{6}) = -\sin(\frac{7\pi}{6})$   
 also for  $\csc(-t) = -\csc(t)$

$\tan(-t) = -\tan t$  ← "odd"  
 also for  $\cot(-t) = -\cot(t)$



"Add Sugar To Coffee"  
 "A Smart Trig Class"

→ quadrants in which the trig ratios are positive



	$\frac{\pi}{6}$	$\frac{\pi}{3}$
sin	$\frac{1}{2}$	$\frac{\sqrt{3}}{2}$
cos	$\frac{\sqrt{3}}{2}$	$\frac{1}{2}$
tan	$\frac{\sqrt{3}}{3}$	$\sqrt{3}$

← Flash Cards

ex 1) a)  $\cos(-\frac{\pi}{6}) = \text{aka } \cos \frac{\pi}{6} \rightarrow \left(\frac{\sqrt{3}}{2}\right)$

even  $\cos(-t) = \cos(t)$

b)  $\sin \frac{5\pi}{4} = \sin \left(1 + \frac{1}{4}\right)\pi \rightarrow \text{aka } \sin \frac{\pi}{4}, \text{ Q III}$

\* Draw a vertical to x-axis

\* reference L  
 $0 \rightarrow 90^\circ$   
 $0 \rightarrow \frac{\pi}{2}$

S/A  
T/C

sin is neg

$-\frac{\sqrt{2}}{2}$

c)  $\tan \frac{5\pi}{3} \rightarrow \text{aka } \tan \frac{\pi}{3}, \text{ Q IV}$

$1 \frac{2}{3}$

S/A  
T/C

$\frac{\pi}{3}$  ref L

tan is neg in Q IV

$-\sqrt{3}$

d)  $\cos \frac{16\pi}{6} = \cos \left(2 \frac{4}{6}\right)\pi = \cos \frac{2}{3}\pi$

aka  $\cos \frac{\pi}{3}$  Q II

1 rot.

S/A  
T/C

$-\frac{1}{2}$

tan is neg in Q IV

e)  $\csc \frac{19\pi}{4} = \frac{1}{\sin \frac{19\pi}{4}} = \frac{1}{\sin \left(4 \frac{3}{4}\right)\pi}$

2 rot

aka  $\frac{1}{\sin \frac{\pi}{4}}$  Q II (sin is pos)

$\frac{1}{\frac{\sqrt{2}}{2}} \rightarrow \frac{2}{\sqrt{2} \sqrt{2}} = \sqrt{2}$

## Reciprocals Identities

SOH CAH TOA

$$\sin t = \frac{1}{\csc t} \quad \csc t = \frac{1}{\sin t}$$

$$\cos t = \frac{1}{\sec t} \quad \sec t = \frac{1}{\cos t}$$

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

## Quotient Identities

$$\tan t = \frac{\sin t}{\cos t} \quad \cot t = \frac{\cos t}{\sin t}$$

ex)  $\sin t = \frac{8}{17}$

opp  
hyp



15 adj

pythag

Find the other trig values.  $\rightarrow$  QI

$$\cos t = \frac{15}{17} \quad \tan t = \frac{8}{15} \quad \csc t = \frac{17}{8}$$

$$\sec t = \frac{17}{15}$$

$$\cot t = \frac{15}{8}$$

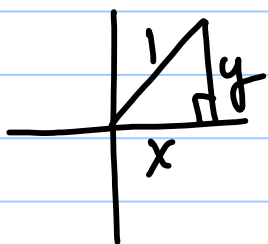
$$a^2 + 8^2 = 17^2$$

$$a^2 + 64 = 289$$

$$a^2 = 225$$

$$a = (15)$$

## Pythagorean Identities



$$x^2 + y^2 = 1$$

$$y^2 + x^2 = 1$$

$$\begin{aligned} & * \sin^2 t + \cos^2 t = 1 \\ & \div \sin^2 t \quad | \quad + \cot^2 t = \csc^2 t \\ & \div \cos^2 t \quad \tan^2 t + | = \sec^2 t \end{aligned}$$

HW: p 487 #20-60 even