

Precalculus
Section 4.2b
Use period to evaluate sine and cosine functions

13, 1, 23
 $t = -\frac{5\pi}{3}$

$\sin -\frac{5\pi}{3} = \frac{\sqrt{3}}{2}$
 $\cos -\frac{5\pi}{3} = \frac{1}{2}$
 $\tan -\frac{5\pi}{3} = \sqrt{3}$
 $\frac{\sqrt{3}}{2} \div \frac{1}{2}$
 $\frac{\sqrt{3}}{2} \cdot \frac{2}{1} = \sqrt{3}$

Sep 13-4:17 PM

Aug 27-1:22 PM

WARM UP

Evaluate the following trigonometric functions using the unit circle.

$\sin(\frac{\pi}{6}) = \frac{1}{2}$	$\cos(\frac{\pi}{6}) = \frac{\sqrt{3}}{2}$	
$\sin(-\frac{\pi}{6}) = -\frac{1}{2}$	$\cos(-\frac{\pi}{6}) = \frac{\sqrt{3}}{2}$	
$\sin(\frac{2\pi}{3}) = \frac{\sqrt{3}}{2}$	$\cos(\frac{2\pi}{3}) = -\frac{1}{2}$	
$\sin(-\frac{2\pi}{3}) = -\frac{\sqrt{3}}{2}$	$\cos(-\frac{2\pi}{3}) = -\frac{1}{2}$	

What do you notice or wonder? Can you make any conclusions about the sine and cosine functions?

Even functions: **Cosine + Secant**

Odd functions: **Sin, csc, tan, + cot**

$\sin(-t) = -\sin(t)$
 $\tan(-t) = -\tan(t)$

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

*p. 273

Sep 13-4:31 PM

Sep 13-4:38 PM

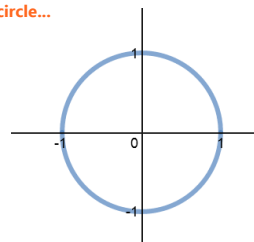
Try #45, p. 275

$$\sin t = \frac{1}{3} \quad \cos t = \frac{5}{6}$$

$$\sin(-t) = -\frac{1}{3} \quad \cos(-t) = \frac{5}{6}$$

$$\csc(-t) = -3$$

Back to the unit circle...



Pick any point on the circle. What do the coordinates represent? After how many positive radians will you return to this same point? How about negative radians?

Sep 13-4:40 PM

Sep 13-4:42 PM

In mathy words...

$$\sin(t + 2\pi k) = \sin(t)$$

$$\cos(t + 2\pi k) = \cos(t)$$

Definition

A function f is said to be **periodic** if there exists a positive real number c such that

$$f(t+c) = f(t)$$

for all t in the domain of f . The least number c for which f is periodic is called the **period** of f .

Example

$$\sin \frac{13\pi}{6} = \frac{13\pi}{6} - 2\pi = \frac{13\pi}{6} - \frac{12\pi}{6} = \frac{\pi}{6} \quad \boxed{\sin\left(\frac{\pi}{6}\right) = \frac{1}{2}}$$

$$\sin \frac{-13\pi}{6} = -\frac{13\pi}{6} + \frac{12\pi}{6} = -\frac{\pi}{6} + \frac{12\pi}{6} = \frac{11\pi}{6} \quad \sin\left(\frac{11\pi}{6}\right) = -\frac{1}{2}$$

$$\cos \frac{-11\pi}{3} = -\frac{11\pi}{3} + \frac{6\pi}{3} = -\frac{5\pi}{3} + \frac{6\pi}{3} = \frac{\pi}{3} \quad \cos\left(\frac{\pi}{3}\right) = \frac{1}{2}$$

Sep 13-4:46 PM

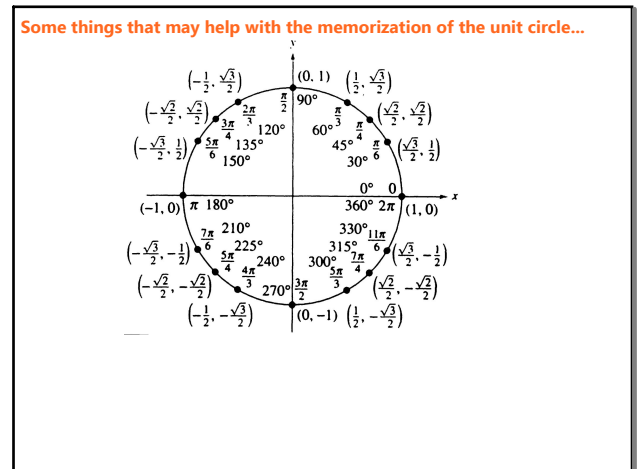
Sep 13-4:56 PM

Evaluating trig functions on the calculator...
Beware of MODE!

a) $\sin \frac{5\pi}{7}$ b) $\csc 2$ $\frac{1}{\sin 2} \approx 1.0998$

ALPHA Y= Enter

$\approx .7818$



Sep 13-5:07 PM

Sep 12-3:21 PM

Evaluate the 6 trig. functions for $t = -\frac{2\pi}{3}$

X |

$\sin(-\frac{2\pi}{3}) = -\frac{\sqrt{3}}{2}$ $\csc(-\frac{2\pi}{3}) = -\frac{2\sqrt{3}}{3}$

$\cos(-\frac{2\pi}{3}) = -\frac{1}{2}$ $\sec(-\frac{2\pi}{3}) = -2$

$\tan(-\frac{2\pi}{3}) = \sqrt{3}$ $\cot(-\frac{2\pi}{3}) = \frac{\sqrt{3}}{3}$

$\frac{\sqrt{3}}{2} \div \frac{1}{2}$

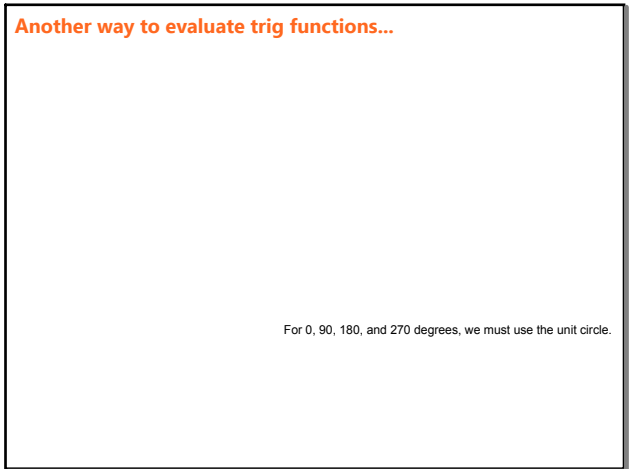
HOMWORK

...How's the learning of that unit circle coming?

4.2b (p. 274): 37-69 odds

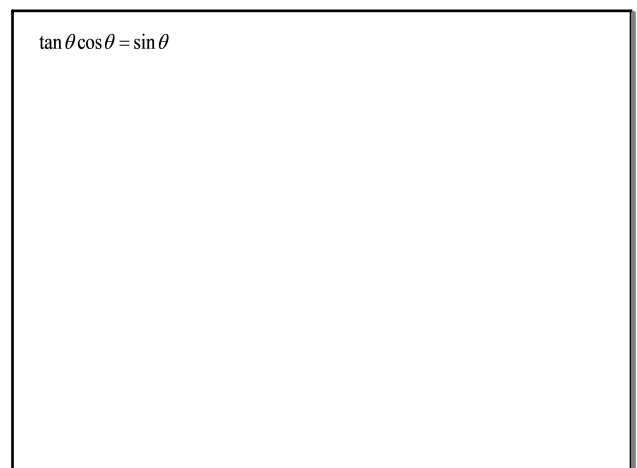
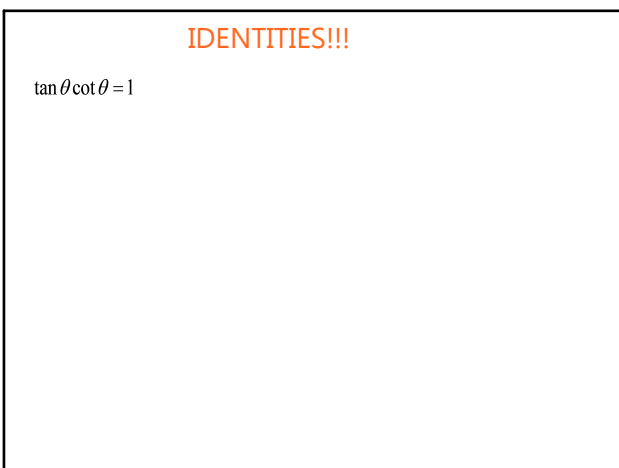
Aug 24-4:50 PM

Sep 13-5:08 PM



Sep 13-5:08 PM

Sep 14-2:55 AM



Sep 13-5:11 PM

Sep 13-5:12 PM

$$\frac{\sin \theta}{\cos \theta} + \frac{\cos \theta}{\sin \theta} = \csc \theta \sec \theta$$

Sep 13-5:13 PM