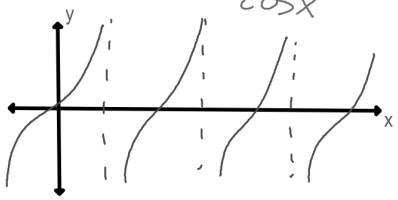
What is the Domain and Range of Tanx? $= \frac{Sinx}{Cosx}$

Tanx:

Domain:

All real #'s except when Cosx = 0.



Range:

All Real #'s

$(-\infty,\infty)$

Where are the x-int and VA of Tanx? $= \frac{Sinx}{Cosx}$

x-int: When Sinx=0

Tanx=0 when Sinx=0

VA: When Cosx = 0

Tanx is undefined when Cosx=0

On your calculator use the following window:

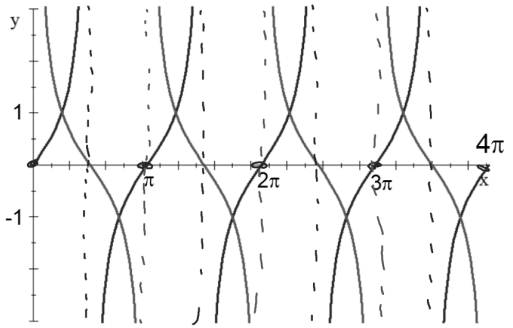
x:[0,4π] y:[-3,3]

Graph these functions:

Y_1 = Tanx

Y_2 = Cotx

y = Tanx y = Cotx $y = Cotx = \frac{Cosx}{Sinx}$



VA:

Where Sinx = 0

Where Tanx has x-int

Zeros:

Where Cosx = 0

Where Tanx has VA

Period of Cotx: π

What is the Domain and Range of Cotx?

Tanx:

Domain:

All real #'s except when Cosx = 0.

Range:

All Real #'s

$(-\infty, \infty)$

Cotx:

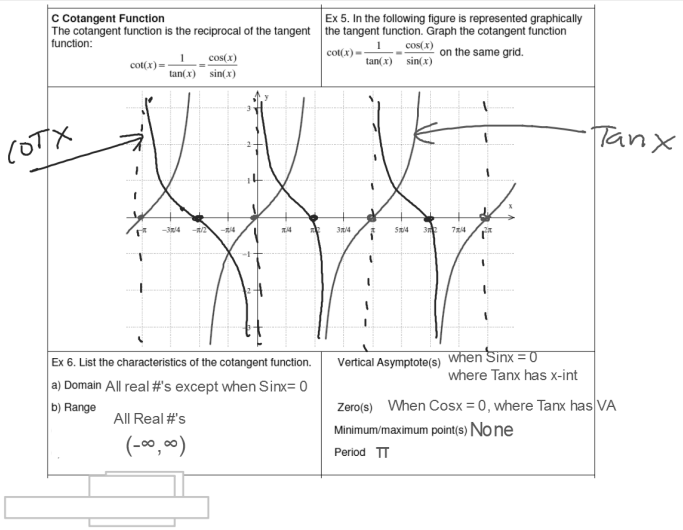
Domain:

All real #'s except when Sinx = 0.

Range:

All Real #'s

$(-\infty, \infty)$



Where are the x-int and VA of Cotx?

Tanx:

x-int: When Sinx=0

VA: When Cosx = 0

Cotx: $= \frac{\cos x}{\sin x}$

x-int:

- When Cosx = 0
- When Tanx has VA

VA:

- When Sinx = 0
- When Tanx has x-int

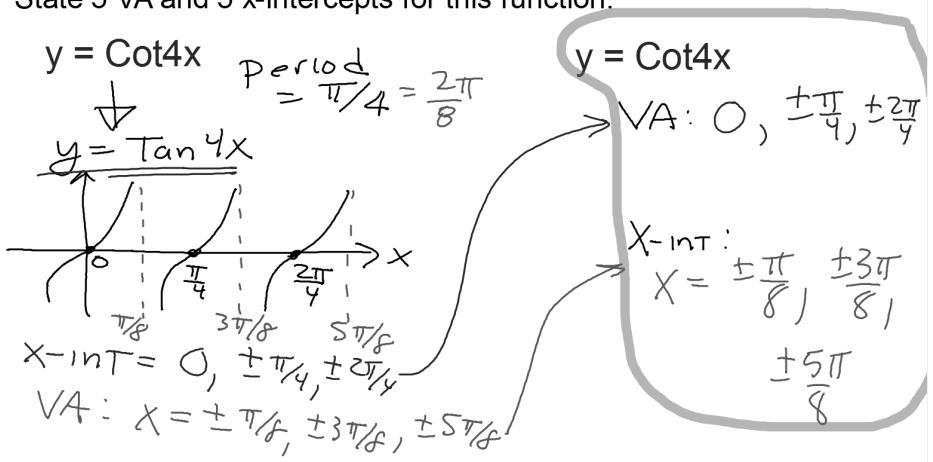
$y = \tan bx$

Period = $\frac{\pi}{b}$

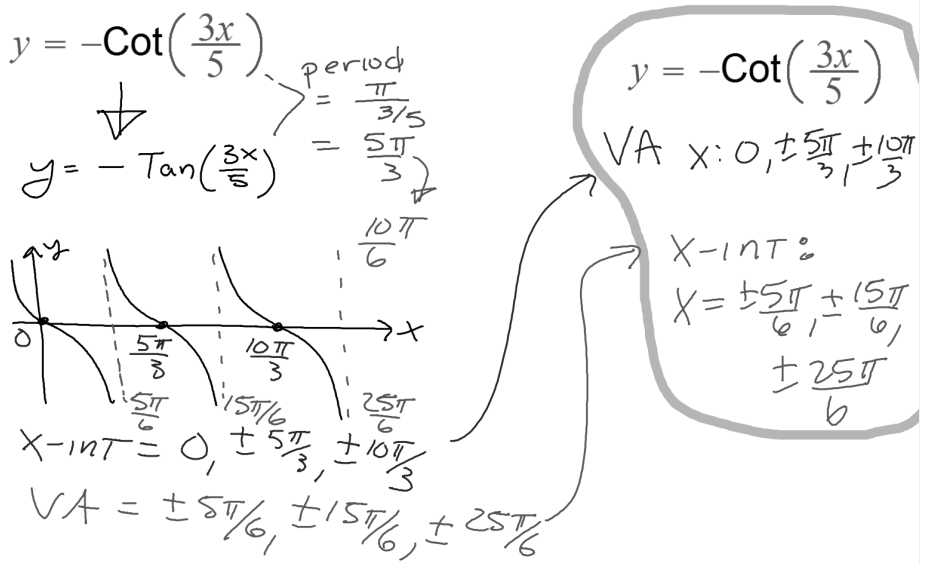
$y = \cot bx$

Period = $\frac{\pi}{b}$

State 5 VA and 5 x-intercepts for this function:



State 5 VA and 5 x-intercepts for this function:



You can now finish Hwk #23

Practice Sheet: Sec 13-8

Graphs of Reciprocal Trig Functions

Sec 14-1: Trigonometric Identities

A trigonometric identity is an equation that is true for all values of x that are in the domain of the functions.

An equation in which both sides are [The same]

Tools to use when simplifying Trigonometric Expressions:

Reciprocal identities

$$\csc\theta = \frac{1}{\sin\theta} \qquad \sec\theta = \frac{1}{\cos\theta}$$

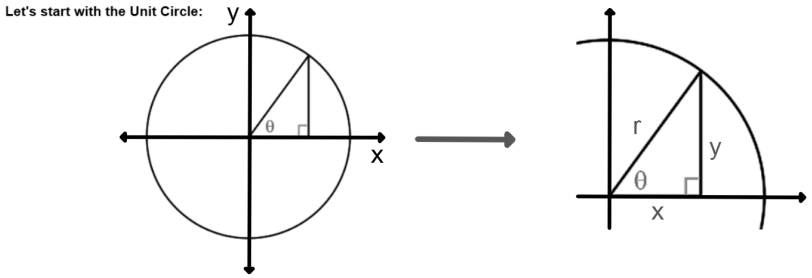
$$\cot\theta = \frac{1}{\tan\theta}$$

Tangent and cotangent identities

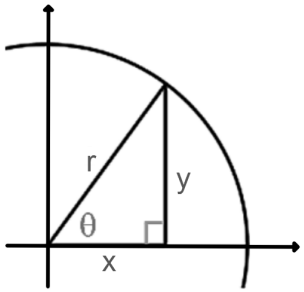
$$\tan\theta = \frac{\sin\theta}{\cos\theta} \qquad \cot\theta = \frac{\cos\theta}{\sin\theta}$$

The Pythagorean Identity:

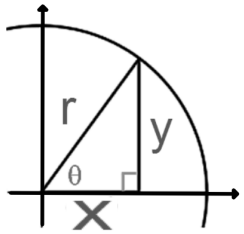
Let's start with the Unit Circle:



Using the Pythagorean Theorem we have:



$$x^2 + y^2 = r^2$$



$x^2 + y^2 = r^2$

$x = \cos\theta$
$y = \sin\theta$
$r = 1$

substituting for x, y, and r we get:

$(\cos\theta)^2 + (\sin\theta)^2 = 1$

this is usually written as:

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

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

By rearranging this Pythagorean Identity we can create the following two identities:

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

and

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

Pythagorean identities

The Original Pythagorean Identity: $\cos^2\theta + \sin^2\theta = 1$

this original Pythagorean Identity can be turned into two more identities:

$$\frac{\cos^2\theta}{\cos^2\theta} + \frac{\sin^2\theta}{\cos^2\theta} = \frac{1}{\cos^2\theta}$$

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

and

$$\frac{\cos^2\theta}{\sin^2\theta} + \frac{\sin^2\theta}{\sin^2\theta} = \frac{1}{\sin^2\theta}$$

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