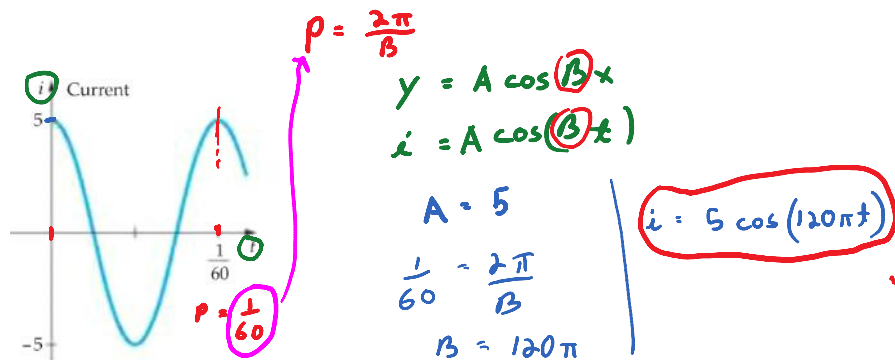


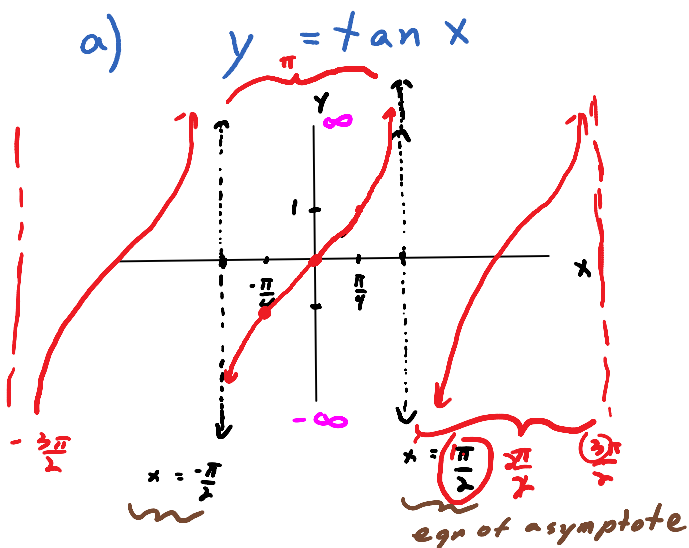
Section 5.6: Graphs of Tangent, Cotangent, Secant, and Cosecant.

Wednesday, September 10, 2014
2:03 PM

Warm-up: Find the equation of the curve below. It shows the AC current from household outlet.



(ex) Graph 1 period



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

x	y
$-\frac{\pi}{4}$	-1
0	0
$\frac{\pi}{4}$	1

$\tan\left(\frac{\pi}{4}\right) = -\tan\frac{\pi}{4}$

Domain: all reals except odd multiples of $\frac{\pi}{2}$

$$\left\{ x \mid x \text{ is real and } x \neq (2k-1)\frac{\pi}{2} \right\}$$

odd number

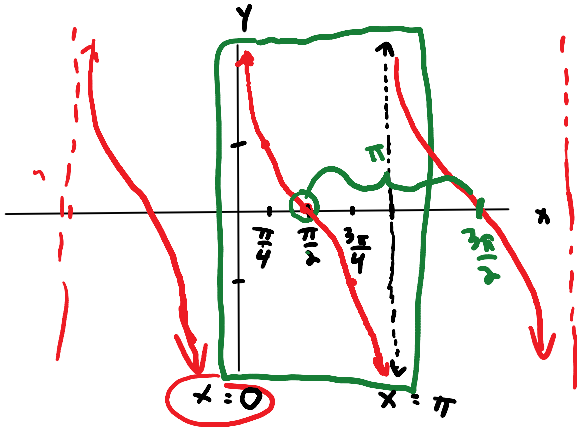
"such that"

"The set of all x such that"

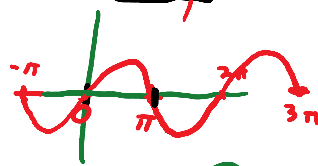
Range: $\{y \mid y \text{ is real}\}$

\mathbb{R}

b) $y = \cot x$



$$\cot x = \frac{\cos x}{\sin x} \cdot \frac{0}{1}$$



$$x \neq k\pi$$

x	y
$\frac{\pi}{4}$	1
$\frac{\pi}{2}$	0
$\frac{3\pi}{4}$	-1

$$\cot\left(\frac{3\pi}{4}\right) = -\cot\frac{\pi}{4} = -1$$

Domain: All reals except multiples of π

$$\{x \mid x \text{ is real and } x \neq k\pi\}$$

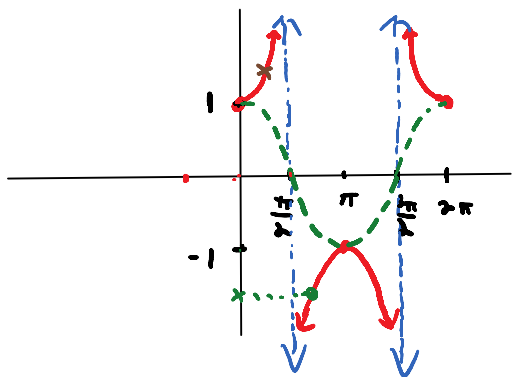
Range: All reals

$$\{y \mid y \text{ is real}\}$$

interval
 $(-\infty, \infty)$

c) $y = \sec x = \frac{1}{\cos x}$

helper: $y = \cos x$



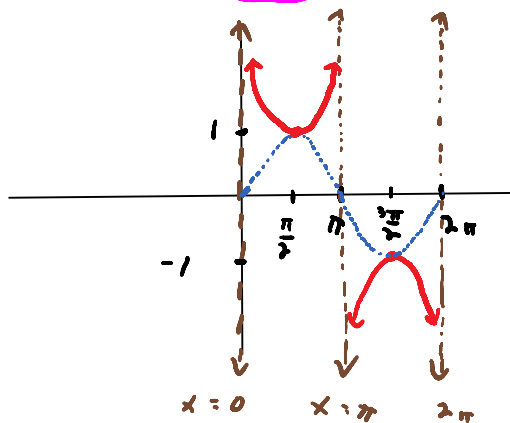
$$\frac{y}{x} = \frac{1}{\frac{1}{y}}$$

Domain: same as $y = \tan x$

Range: $\{y \mid y \leq -1 \text{ or } y \geq 1\}$

d) $y = \csc x = \frac{1}{\sin x}$

helper $y = |\sin x|$

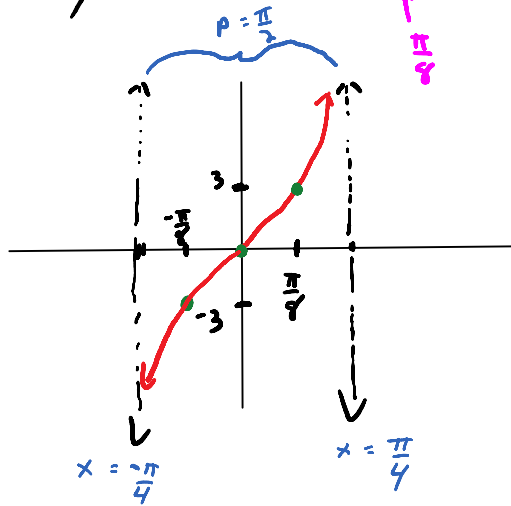


Domain: same as $y = \cot x = \frac{\cos x}{\sin x}$

Range: same as $y = \sec x$

(ex) Graph 1 full period

a) $y = 3 \tan(2x)$



$$y = \tan x$$

$$P = \pi$$

$$y = \tan(Bx)$$

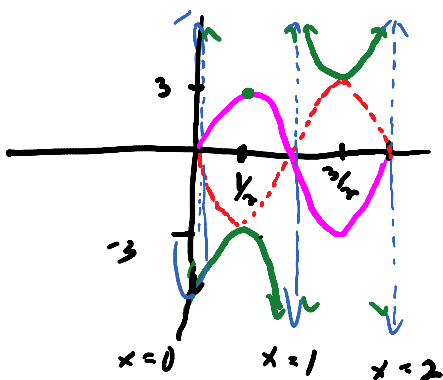
$$P = \frac{\pi}{B}$$

$$P = \frac{\pi}{2}$$

b) $y = -3 \csc(\pi x)$

$$P = \frac{2\pi}{\pi} = 2$$

use $y = 3 \sin(\pi x)$ as helper and then invert it.



Green graph is $y = -3 \csc(\pi x)$