§1.5 solutions will be up later.

§1.6 Today

#s 1-8, 15-37, 45*, 57-64 ALL, 69, 70, 85

*I don't think a grapher is needed

Today, 1.6, Graphs of secant, tangent, cosecant, cotangent

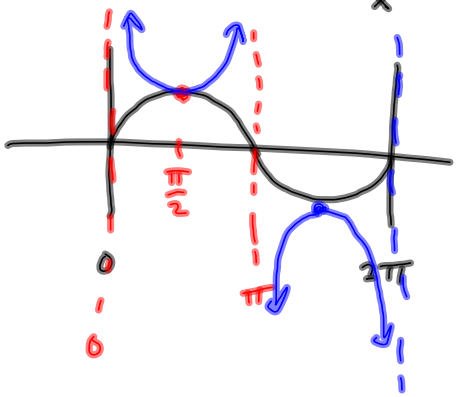
To graph csc(x), graph sine

Fun facts about reciprocals:

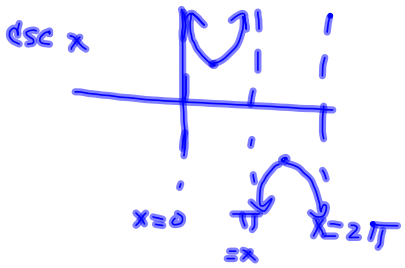
$x > 1 \Rightarrow 0 < \frac{1}{x} < 1$

$0 < x < 1 \Rightarrow \frac{1}{x} > 1$

$\frac{1}{\frac{1}{2}} = 1 \div \frac{1}{2} = \frac{2}{1} = 2$



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



$T = 2\pi$

A = Amplitude only applies to sine & cosine.

Vertical Asymptotes $x = n\pi$, $n \in \mathbb{Z}$

$0, \pm\pi, \pm 2\pi, \pm 3\pi, \ldots$

* $\mathbb{Z} = \{\ldots, -3, -2, -1, 0, 1, 2, 3, \ldots\}$ = Integers. *

$\mathbb{Q} = \left\{ \frac{a}{b} \mid a, b \in \mathbb{Z}, b \neq 0 \right\}$ = Rationals (fractions)

$\mathbb{Z} \subsetneq \mathbb{Q}$

$7 = \frac{7}{1}$

$\frac{2}{3} \in \mathbb{Q}$

Graph of tangent

Is tangent odd, even, or neither?

Formally:

$$f(-x) = \tan(-x) = \frac{\sin(-x)}{\cos(-x)} = \frac{-\sin(x)}{+\cos(x)} = -\tan(x)$$

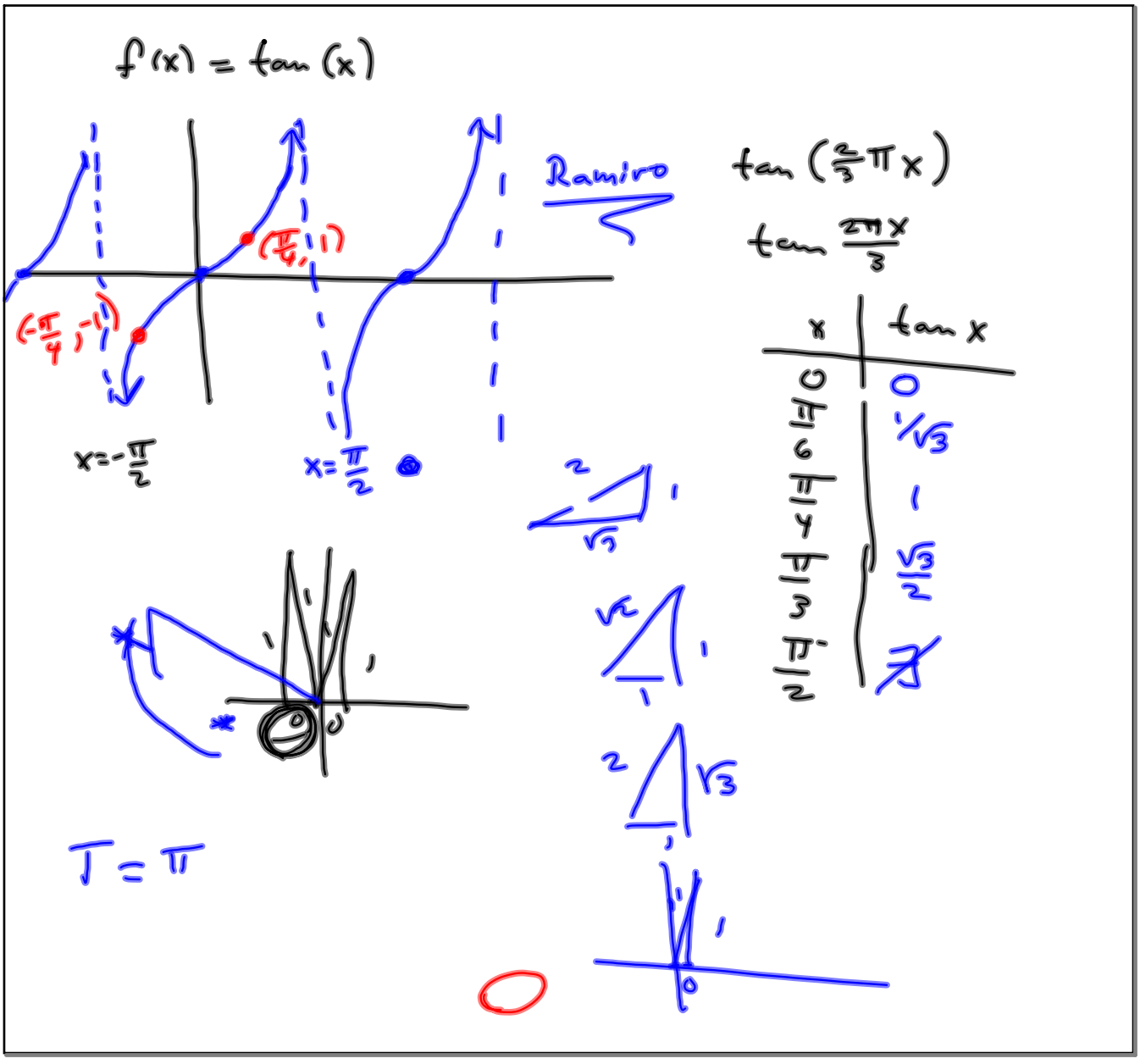
$$= -f(x)$$

ODD.

$$\frac{\sin x \cos x \cos(5x)}{\tan x \sin(2x) \csc(7x)}$$

$$\frac{(-)(+)(+)}{(-)(-)(-)} = + \quad \text{even}$$

$$\frac{(x^2 - 4x^4)\cos(x)}{\sin(x)} \qquad \frac{(+)(+)}{(-)} \quad \text{odd}$$


f(x) = tan(x)
Ramiro
tan(2/3 π x)
tan 2πx/3
x
tan x
0
1/√3
1
√3/2
∄
0 π/6 π/4 π/3 π/2
(π/4, 1)
(-π/4, -1)
x=-π/2
x=π/2
2
√3
1
√2
1
1
2
√3
1
1
1
T = π
0

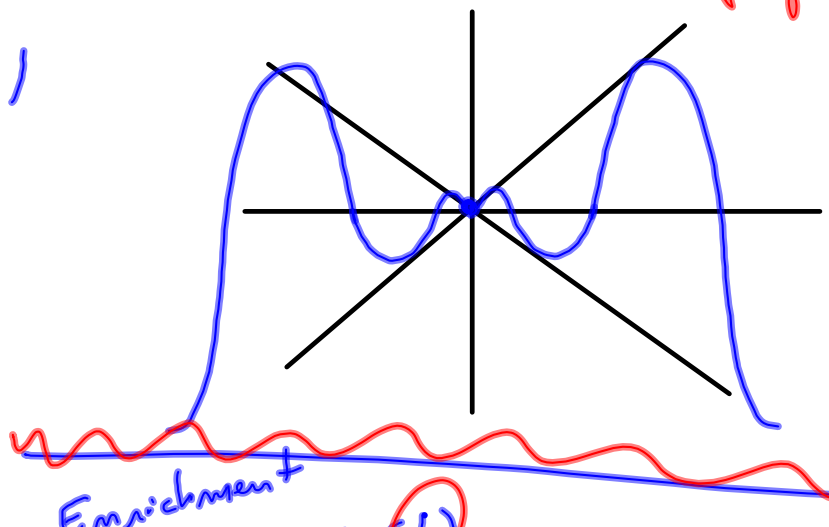
Damped sine & cosine functions

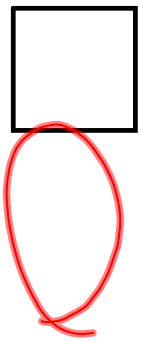
$x \sin(x)$

If $\sin(x) = \pm 1$ then $x \sin(x) = \pm x$

$x^2 \sin(x)$

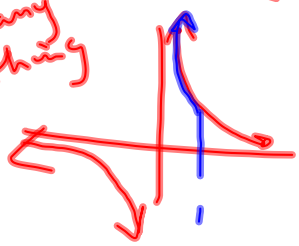
Required

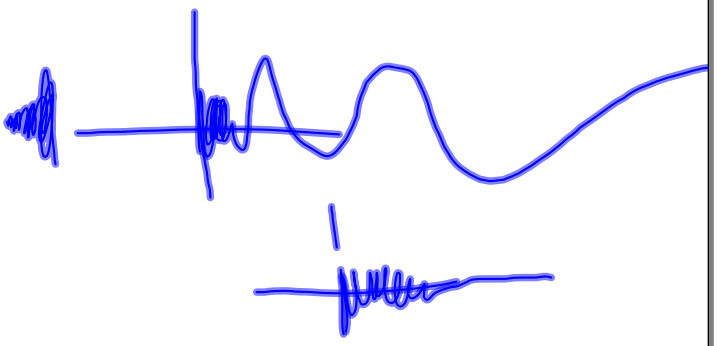




Enrichment BONUS - if any thing

$\sin\left(\frac{1}{x}\right)$



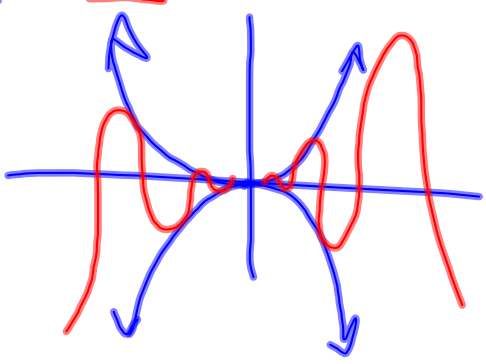


$x \sin\left(\frac{1}{x}\right)$ dampens the nonsense at $x=0$

BIG EXAMPLE FOR CALCULUS

What's $x^2 \sin(x)$ look like?

x^2



Required