

3.3 Derivatives of Trig Functions

1 What to Memorize

Derivatives of Trig Functions:

$$\frac{d}{dx}(\sin x) =$$

$$\frac{d}{dx}(\csc x) =$$

$$\frac{d}{dx}(\cos x) =$$

$$\frac{d}{dx}(\sec x) =$$

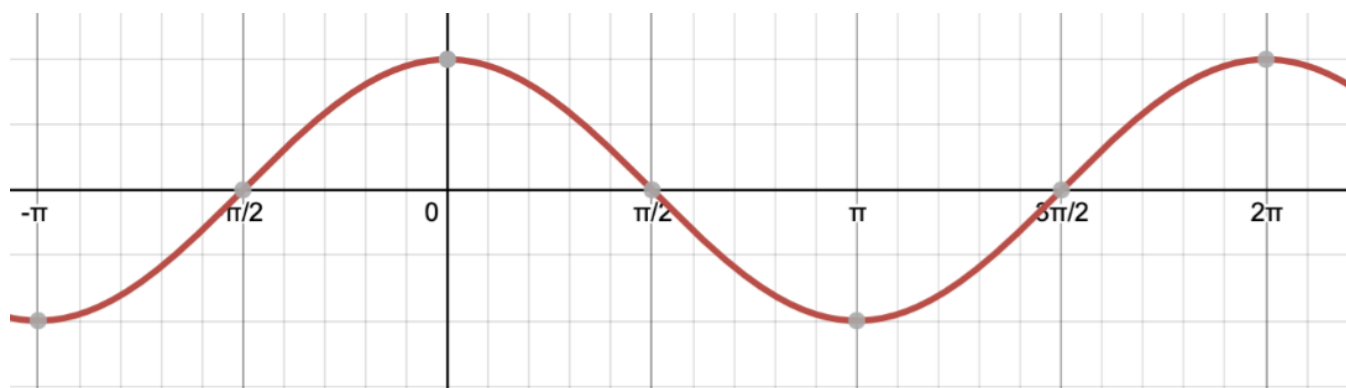
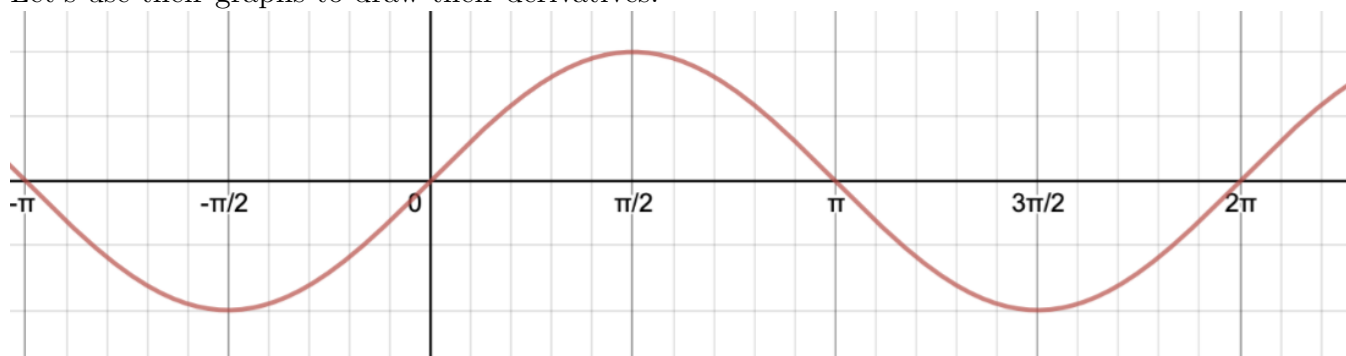
$$\frac{d}{dx}(\tan x) =$$

$$\frac{d}{dx}(\cot x) =$$

1.1 Where these formulas come from.

1.1.1 Derivatives of sine and cosine

Let's use their graphs to draw their derivatives.



1.1.2 Derivatives of the rest of them

The other derivative formulas can be generated by using the quotient rule and a few trig identities.

1.1.3 Derivative of tangent

1.1.4 Derivative of secant

2 Example Problems

2.0.1 Example:

Find the equation of the line tangent to the curve $y = e^x \cos x$ at the point $(0, 1)$

2.0.2 Example:

Find the derivative of $f(t) = \sin(t) \cos(t)$

2.0.3 Example:

Find all values of x for which $g(x) = \sin x$ has a slope of $\frac{1}{2}$.

2.1 Example:

A frictionless mass on a spring is moving back and forth. The position of the mass is given by the function $f(t) = 2 \sin t$. Find functions for the velocity and acceleration of the mass.

