

Lesson 10: Section 3.5

Derivatives of Trig Functions

- $\frac{d}{dx}(\sin(x)) = \cos(x)$
- $\frac{d}{dx}(\cos(x)) = -\sin(x)$
- $\frac{d}{dx}(\tan(x)) = \sec^2(x)$
- $\frac{d}{dx}(\sec(x)) = \sec(x) \cdot \tan(x)$
- $\frac{d}{dx}(\csc(x)) = -\csc(x) \cdot \cot(x)$
- $\frac{d}{dx}(\cot(x)) = -\csc^2(x)$

Important Limits

- $\lim_{x \rightarrow 0} \frac{\sin(x)}{x} = 1$
- $\lim_{x \rightarrow 0} \frac{x}{\sin(x)} = 1$
- $\lim_{x \rightarrow 0} \frac{\cos(x) - 1}{x} = 0$

Practice Problems

1. Find $\frac{dy}{dx}$ for

$$y = \frac{2 \sin(x)}{1 - 3 \sin(x)}$$

2. Find

$$\lim_{x \rightarrow 4} \frac{x^2 - 16}{\sin(x^2 - 9x + 20)}$$