

2.3 – Derivatives of Trigonometric Functions

1. Find $\frac{d}{dx}[\sin x]$ using the limit definition of the derivative.

2. Fill in the table of derivatives below.

$$\frac{d}{dx}[\sin x] =$$

$$\frac{d}{dx}[\csc x] =$$

$$\frac{d}{dx}[\cos x] =$$

$$\frac{d}{dx}[\sec x] =$$

$$\frac{d}{dx}[\tan x] =$$

$$\frac{d}{dx}[\cot x] =$$

3. Use the derivatives of sine and cosine to prove the derivative of $y = \tan x$, as given above.

4. Find an equation of the line tangent to $f(x) = e^x \cos x$ at $x = \pi$.

5. Evaluate $\frac{d^2 y}{d\theta^2}$ given $y = 3\sec\theta$.

6. Find the derivative of the function $h(x) = \frac{e^x}{2x + \cot x}$.

7. Find the 118th derivative of $r(x) = \sin x - 83x^{94} - 6e^x + 4$.

8. For what value(s) of θ on $[0, 3\pi]$ does the graph of the function $h(\theta) = \sqrt{3}\theta + 2\cos\theta$ have a horizontal tangent?