Derivatives of Trigonometric Functions

$\frac{d}{dx}\sin x = \cos x$ $\quad$ $\frac{d}{dx}\sec x = \sec x \tan x$

$\frac{d}{dx}\cos x = -\sin x$ $\quad$ $\frac{d}{dx}\csc x = -\csc x \cot x$

$\frac{d}{dx}\tan x = \sec^2 x$ $\quad$ $\frac{d}{dx}\cot x = -\csc^2 x$

Product Rule

$P'(x) = f'(x) \bullet g(x) + f(x) \bullet g'(x)$

Quotient Rule

$Q'(x) = \frac{f'(x) \bullet g(x) - f(x) \bullet g'(x)}{[g(x)]^2}$

Directions: Find the derivative of each.

1) $y = x^2 - \sin x$

2) $y = x^2 \sin x$

3) $y = \frac{\sin x}{x}$

4) $y = \sin x \bullet \cos x$

5) $y = \frac{\cos x}{1 - \sin x}$

6) $y = \frac{2}{\sin x}$

Directions: Find y''.

7) $y = \sec x$

8) Find the lines that are tangent and normal to the curve

$y = \tan x$ at $\left(\frac{\pi}{4}, 1\right)$ in slope-intercept form.

Directions: Find the derivative of each using the chain rule.

9) $y = \sin 2x$

10) $y = \cos\left(3x^2\right)$

11) $y = \cos^2\left(3x\right)$

12) $y = \sin^3\left(4t\right)$

13) Find the derivative of the trigonometric equation using implicit differentiation.

$x \cdot \sin y = y \cdot \cos x$