Derivative Solutions for Chapter 3

Differentiate the following functions

(1)

$$f'(x) = 6x + \sin(x) + 2e^{2x}$$

(2)

$$g'(x) = -3(\csc^2(3x))(\cos(3x)) - \frac{12}{x^5}$$

(3)

$$h'(x) = \frac{1}{x} + \frac{1}{x\ln(2)}$$

(4)

$$f'(x) = \frac{\tan(x^2) - 2x^2(\ln(5x)(\sec^2(x^2))}{x\tan^2(x^2)}$$

(5)

$$g'(x) = (20e^{4x})(\sqrt{x^5}) + \frac{25}{2}(e^{4x})(\sqrt{x^3})$$

(6)

$$f'(x) = 16x^7 - \frac{1}{\sqrt{x^3}}$$

(7)

$$g'(x) = -(\csc^2(x))(\cos(x)) - \frac{2}{x^3} + \pi x^{\pi-1}$$

(8)

$$f'(x) = \frac{2x-3}{(x^2-3x)^2+1} + e^{\sin(x)}\cos(x)$$

(9)

$$f'(x) = (\cos(\sin(\sin(x))))(\cos(\sin(x)))(\cos(x))$$

(10)

$$f'(x) = 12x^3 + \frac{1}{\sqrt{x}}$$

(11)

$$g'(x) = (\tan(x))(\sec(x)) - \frac{15x^2}{(x^3+1)^2}$$

(12)

$$g'(x) = \frac{2\tan(x)\sec^2(x)\ln(\cos(x)) - \tan^3(x)}{(\ln(\cos(x)))(\ln(\ln(\cos(x))))^2}$$

(13)

$$h'(x) = (x^{5x^2+3x})((10x+3)(\ln(x)) + 5x + 3)$$

Find $\frac{dy}{dx}$ for the following expressions

(1)

$$x\cos(y) + y\sin(x) = 4073.8^{32}$$

$$\frac{dy}{dx} = \frac{-\cos(y) - y\cos(x)}{\sin(x) - x\sin(y)}$$

(2)

$$\tan(2y) - \ln(x^5) = 6y + x$$

$$\frac{dy}{dx} = \frac{1 + \frac{5}{x}}{2\sec^2(2y) - 6}$$

(3)

$$\arctan(3y) - \ln(x^5) = 6y$$

$$\frac{dy}{dx} = \frac{\frac{5}{x}}{\frac{3}{9y^2+1} - 6}$$

Find the equation of the tangent line to the curve $y = \sin(5\ln(x^3))$ at the point $(1, 0)$

Solution:

$$y = 15(x-1)$$