Derivatives

Technical Mathematics for Geomatics, MATH 2511

(1) Find the tangent line for the following function at the given point.

$$f(x) = \frac{x^2 - 1}{x^2 + x + 1} \text{ at } (1, 0) \tag{1}$$

(2) Find the tangent line for the following curve at the given point.

$$y = -2\cos^2 x + 5\cos x \text{ at } x = \frac{\pi}{2} \tag{2}$$

(3) Find the tangent line for the following curve at the given point.

$$y = \sin(\sin x) \text{ at } (\pi, 0) \tag{3}$$

(4) Find the tangent line for the following function at the given point.

$$f(x) = xe^x \text{ at } x = 1 \tag{4}$$

(5) Find the tangent line for the following function at the given point.

$$g(z) = \ln\left(z^2 + 1\right) \text{ at } z = 0 \tag{5}$$

(6) Find

$$\frac{d}{dx}\sqrt{2x^2 - 1} \tag{6}$$

(7) Find

$$\frac{d}{dx}\cos\left(3x^2\right) \tag{7}$$

(8) Find

$$\frac{d}{dx}\sqrt{\log_2 3x} \tag{8}$$

(9) Use logarithmic differentiation to find the derivative of

$$f(x) = \frac{x^{\frac{3}{4}}\sqrt{x^2 + 1}}{(3x + 2)^5} \tag{9}$$

(10) Differentiate

$$f(x) = |4 - 3x| - |4x - 3|x \tag{10}$$

(11) Differentiate

$$f(x) = 5x - |x^2 - 2x - 8| \tag{11}$$