

## Derivatives

*Technical Mathematics for Geomatics, MATH 2511*

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

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

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

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

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

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

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

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

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

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

(6) Find

$$\frac{d}{dx} \sqrt{2x^2 - 1} \quad (6)$$

(7) Find

$$\frac{d}{dx} \cos(3x^2) \quad (7)$$

(8) Find

$$\frac{d}{dx} \sqrt{\log_2 3x} \quad (8)$$

(9) Use logarithmic differentiation to find the derivative of

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