

Last Name: SOLUTIONS

First Name: _____

Student ID: _____

Quiz 6 (B)

Question 1. Find the derivatives of the following functions (do not simplify):

(a) (4 marks) $f(x) = \sqrt{(x+3)(x^2-1)}$

$$f'(x) = \frac{1}{2} [(x+3)(x^2-1)]^{-1/2} \cdot \frac{d}{dx} [(x+3)(x^2-1)]$$

$$= \frac{1}{2} [(x+3)(x^2-1)]^{-1/2} [(1)(x^2-1) + (x+3)(2x)]$$

(b) (4 marks) $f(x) = \frac{(3x^2+1)^3}{(x^2-1)^4}$

$$f'(x) = \frac{\frac{d}{dx} [(3x^2+1)^3] \cdot (x^2-1)^4 - (3x^2+1)^3 \frac{d}{dx} [(x^2-1)^4]}{[(x^2-1)^4]^2}$$

$$= \frac{[3(3x^2+1)^2 \cdot (6x)](x^2-1)^4 - (3x^2+1)^3 [4(x^2-1)^3 \cdot (2x)]}{(x^2-1)^8}$$

(c) (2 marks) $f(x) = \sqrt{x+1} - \sqrt{x-1}$

$$f'(x) = \frac{1}{2} (x+1)^{-1/2} (1) - \frac{1}{2} (x-1)^{-1/2} \cdot (1)$$