

Last Name: SOLUTIONS.

First Name: _____

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Quiz 5

Question 1. Find the derivatives of the following functions:

(a) (5 marks)

$$f(t) = \frac{t^2 - 2t}{(t+1)(t^2+1)}$$

$$f'(t) = \frac{\frac{d}{dt} [t^2 - 2t] \cdot (t+1)(t^2+1) - (t^2 - 2t) \cdot \frac{d}{dt} [(t+1)(t^2+1)]}{[(t+1)(t^2+1)]^2}$$

$$= \frac{(2t - 2)(t+1)(t^2+1) - (t^2 - 2t) \left[\frac{d}{dt} [(t+1)] \cdot (t^2+1) + (t+1) \frac{d}{dt} [t^2+1] \right]}{(t+1)^2 (t^2+1)^2}$$

$$= \frac{(2t - 2)(t+1)(t^2+1) - (t^2 - 2t) [(1)(t^2+1) + (t+1)(2t)]}{(t+1)^2 (t^2+1)^2}$$

(b) (5 marks)

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

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

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