

Last Name: SOLUTIONS

First Name: _____

Student ID: _____

Quiz 7 (B)

Question 1. Find the derivatives of the following function:

(a) (3 marks) $f(x) = \sqrt{\arctan x}$

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

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

(b) (3 marks) $f(x) = x \cos \frac{1}{x}$

$$f'(x) = (1) \cos \frac{1}{x} + x \cdot \frac{d}{dx} \left[\cos \frac{1}{x} \right]$$

$$= \cos \frac{1}{x} + x \cdot \left(-\sin \frac{1}{x} \right) \cdot \left(-\frac{1}{x^2} \right)$$

(c) (4 marks) $f(x) = \sin \sqrt{x^2 - 1}$

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

$$= \cos \sqrt{x^2 - 1} \cdot \frac{1}{2} (x^2 - 1)^{-1/2} \cdot (2x)$$