

Last Name: SOLUTIONS

First Name: _____

Student ID: _____

Quiz 1

Question 1. (5 marks) Find the following derivatives:

$$(a) \frac{d}{dx} \csc x = -\csc x \cot x$$

$$(b) \frac{d}{dx} 7^x = 7^x \ln 7$$

$$(c) \frac{d}{dt} \arcsin t = \frac{1}{\sqrt{1-t^2}}$$

$$(e) \frac{d}{dx} (\sin x \cdot \ln(5x)) = \cos x \ln(5x) + \sin x \cdot \frac{1}{5x} \cdot 5$$

$$= \cos x \ln(5x) + \frac{\sin x}{x}$$

Question 2. (2 marks) Find the following antiderivatives:

$$(a) \int \csc^2 x dx = -\cot x + C$$

$$(b) \int \tan x dx = -\ln |\cos x| + C$$

Question 3. (3 marks) Find $f(\theta)$ given $f''(\theta) = \sin \theta + \cos \theta$ and $f(0) = 3$, $f'(0) = 4$.

$$\Rightarrow f'(\theta) = -\cos \theta + \sin \theta + C_1$$

$$\therefore 4 = f'(0) = -\cos(0) + \sin(0) + C_1$$

$$4 = -1 + 0 + C_1$$

$$5 = C_1$$

$$f'(\theta) = -\cos \theta + \sin \theta + 5$$

$$\Rightarrow f(\theta) = -\sin \theta - \cos \theta + 5\theta + C_2$$

$$3 = f(0) = -\sin(0) - \cos(0) + 5(0) + C_2$$

$$3 = -0 - 1 + C_2$$

$$4 = C_2$$

$$\Rightarrow f(\theta) = -\sin \theta - \cos \theta + 5\theta + 4$$