## MEMORIAL UNIVERSITY OF NEWFOUNDLAND

DEPARTMENT OF MATHEMATICS AND STATISTICS

TEST 3

MATHEMATICS 1000-001 NOVEMBER 16TH, 2022

Name	MUN Number

- 1. Differentiate each of the following functions. Make any obvious simplifications.
- [5] (a)  $y = x^3 \sin(\cot(x))$

[5] (b)  $y = \sin^3(\cot(x))$ 

[5] (c)  $y = \sin(x^3 \cot(x))$ 

[5] (d) 
$$f(x) = x^2 \ln(x) \tan(x)$$

[5] (e) 
$$f(x) = \frac{e^{5x} - 1}{e^{5x} + 1}$$

$$[5] (f) y = x^{\sqrt{x}}$$

[5] 2. Find  $\frac{dy}{dx}$  given that  $x^4 \cos(y) = \sec(2x) - 8y$ .

[5] 3. Use the <u>limit definition</u> of the derivative to prove the Difference Rule:

$$[f(x) - g(x)]' = f'(x) - g'(x).$$