MEMORIAL UNIVERSITY OF NEWFOUNDLAND DEPARTMENT OF MATHEMATICS AND STATISTICS

TEST 3 MATHEMATICS 1000-003 NOVEMBER 16TH, 2022

Name	MUN Number

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

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

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

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

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

[5] (f)
$$f(x) = \frac{e^{3x} - 1}{e^{3x} + 1}$$

[5] 2. Find $\frac{dy}{dx}$ given that $x^2 \cos(y) = \sec(6x) - 8y$.

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

 $[k \cdot f(x)]' = k \cdot f'(x)$

for any constant k.