MEMORIAL UNIVERSITY OF NEWFOUNDLAND

DEPARTMENT OF MATHEMATICS AND STATISTICS

TEST 3

MATHEMATICS 1000-003 NOVEMBER 14TH, 2023

Name MUN Number

- 1. Differentiate each of the following functions. Make any obvious simplifications.
- [5] (a) $y = \tan^4(e^x)$

[5] (b) $y = x^4 \tan(e^x)$

[5] (c) $y = \tan(x^4 e^x)$

[5] (d)
$$f(x) = x^{-7}7^x \sec(x)$$

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

[5]
$$(f) y = \frac{x \cos(x)}{x^2 - 4}$$

[5] 2. Find $\frac{dy}{dx}$ given that $x^3y^3 = 6x + 2y$.

[5] 3. Use the <u>limit definition</u> of the derivative and the identity

$$\sin(a+b) = \sin(a)\cos(b) + \cos(a)\sin(b)$$

to prove that

$$[\sin(x)]' = \cos(x).$$