

MEMORIAL UNIVERSITY OF NEWFOUNDLAND
DEPARTMENT OF MATHEMATICS AND STATISTICS

TEST 2 **MATHEMATICS 1001-003** MARCH 25TH, 2026

Name	MUN Number
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[7] 1. (a) Use the definition of the definite integral as a limit of a sum to evaluate

$$\int_{-1}^1 (3x - 1)^2 \, dx.$$

[3] (b) Check your answer to part (a) using the Fundamental Theorem of Calculus.

[17] 2. Evaluate each of the following integrals.

(a) $\int_0^{\frac{\pi}{2}} \sin^2(x) \cos^3(x) dx$

(b) $\int_0^4 f(x) dx$ where $f(x) = \begin{cases} \sqrt{x^2 + 1}, & \text{for } x < 0 \\ \frac{1}{x^2 + 1}, & \text{for } 0 \leq x < 1 \\ \frac{1}{2\sqrt{x}}, & \text{for } x \geq 1 \end{cases}$

(c) $\int \frac{6x^2 + 9}{x^2(x - 3)} dx$

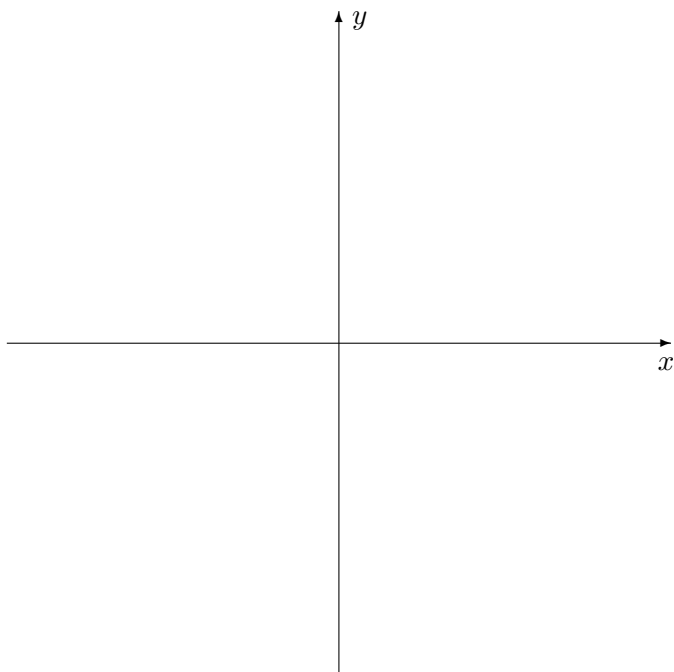
- [4] 3. Consider the function

$$g(x) = \int_{x^3}^5 \frac{\sin(t)}{t^2} dt.$$

Find and simplify $g'(x)$.

- [9] 4. Consider the region R bounded by the curves $y = 2x$, $y = 5 - 3x$ and the x -axis.

- (a) Sketch the graph of the region R on the axes provided.



- (b) Set up, but **DO NOT EVALUATE**, an integral (or a sum of integrals) with respect to x which represents the area of R .

- (c) Set up, but **DO NOT EVALUATE**, an integral (or a sum of integrals) with respect to y which represents the area of R .