MEMORIAL UNIVERSITY OF NEWFOUNDLAND DEPARTMENT OF MATHEMATICS AND STATISTICS

TEST 2	MATHEMATICS 1001-003	March 26th, 2025

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

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

[3](b) Check your answer to part (a) using the Fundamental Theorem of Calculus. [15] 2. Evaluate each of the following definite integrals.

(a)
$$\int_0^{\sqrt{2}} \frac{x}{\sqrt{4-x^4}} \, dx$$

(b)
$$\int_1^2 \frac{\ln(x)}{x^3} \, dx$$

(c)
$$\int_{-3}^{3} |2 - x| \, dx$$

[5] 3. Consider the function

$$g(x) = \int_{x}^{\sin(x)} t\sqrt{t^3 + 1} \, dt.$$

Find and simplify g'(x).

[10] 4. Consider the region R bounded by the curves $y = \frac{1}{2}x^2$ and $y = 4\sqrt{x}$.

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



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

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