

# MEMORIAL UNIVERSITY OF NEWFOUNDLAND

DEPARTMENT OF MATHEMATICS AND STATISTICS

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ASSIGNMENT 4

MATHEMATICS 1001

WINTER 2023

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**Due: Monday, March 13th, 2023 at 11:59pm.** See the Gradescope Handout for submission information.

**Note:** You should complete Worksheet 2.1 and Worksheet 2.2 before you work on this assignment.

- Use the limit of a Riemann sum to determine the area  $A$  of each of the following regions. (In each case, use a regular partition and let the sample point  $x_i^* = x_i$ , that is, the right endpoint of the  $i$ th subinterval.)
  - The region under the curve  $f(x) = x^3 + 5$  on the interval  $[-1, 2]$ .
  - The region under the curve  $f(x) = (3x - 1)^2$  on the interval  $[0, 5]$ .
- Consider the region  $R$  which lies under the curve  $f(x) = x^2$  and between the  $y$ -axis and the line  $x = b$ . Use the limit of a Riemann sum to show that the area of  $R$  is given by  $A = \frac{b^3}{3}$  for any  $b > 0$ .
- Evaluate  $\int_2^3 x^2(4x + 3) dx$  by computing the limit of a Riemann sum.