MEMORIAL UNIVERSITY OF NEWFOUNDLAND

DEPARTMENT OF MATHEMATICS AND STATISTICS

Assignment 6 **MATHEMATICS 1001** Fall 2025

Due: Wednesday, November 12th, 2025 at 6:00pm. Show all work. See the Gradescope Handout for submission information.

> **Note:** You should complete the WebAssign problem sets "Integrals by Partial Fractions" and "Trigonometric Integrals", as well as Worksheets 2.4, 3.1 and 3.2, before you work on this assignment.

1. Express the area of the indicated region as a single integral, then evaluate the integral.

   (a) The region bounded by $y = x^3 - x$ and $y = x + 2$ on the interval $[-1, 1]$.

   (b) The region bounded by $y = \ln(x)$, the line $y = 3$, the x-axis and the y-axis.

2. Use a partial fraction decomposition to evaluate $\displaystyle\int \frac{x^3 + x + 30}{x^4 - 3x^2 - 4}\,dx$.

3. Use a trigonometric integral strategy to evaluate $\displaystyle\int_0^{\frac{\pi}{2}} \sqrt{\sin(x)}\cos^5(x)\,dx$.

4. Use a trigonometric integral strategy to evaluate $\displaystyle\int e^x \sin^2(e^x)\cos^2(e^x)\,dx$.