## UNIVERSITY OF MANITOBA

## MATH 1700 D01

## Assignment 1

**This assignment is based on units 1 and 2.**

**1.**
Use the form of the integral given in Theorem 4 section 5.2 to evaluate

$$\int_0^1 (3x^2 + 2x + 1)\, dx.$$

**2.**
Let

$$f(x) = \begin{cases} 5 & \text{for} & -3 \le x \le -1 \\ 4 - x & \text{for} & -1 < x < 2 \\ 2x - 2 & \text{for} & 2 \le x \le 5. \end{cases}$$

Sketch the graph of $f$ on the interval $[-3, 5]$ and evaluate $\displaystyle\int_{-3}^{5} f(x)\, dx$.

**3.**
Find the derivative $\displaystyle\frac{d}{dx} \int_{1/x}^{\sqrt{x}} \sqrt{t^4 + t^2 + 4}\, dt$.

**4.**
Evaluate

**(a)** $\displaystyle\int x(4x - 5)^3\, dx$

**(b)** $\displaystyle\int \frac{e^{\sqrt{x}} dx}{\sqrt{x}(e^{\sqrt{x}} + 1)}$

**(c)** $\displaystyle\int_0^{\pi/4} (1 + \sin 2x)^3 \cos 2x\, dx$

**(d)** $\displaystyle\int_0^1 x^2 (x^3 + 9)^{1/2}\, dx.$