

UNIVERSITY OF MANITOBA

MATH 1700 D01

Assignment 1

This assignment is based on units 1 and 2. **SHOW ALL WORK** to get full marks. Leave answers as exact answers. For example, leave it as $1/7$ as opposed to 0.142857.

1.

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

$$\int_0^1 (4x^3 + 3x^2) dx.$$

Do not use the Fundamental Theorem of Calculus.

2.

Let

$$f(x) = \begin{cases} 3 & \text{for } -2 \leq x \leq 1 \\ 4 - x & \text{for } 1 < x < 4 \\ 2x - 8 & \text{for } 4 \leq x \leq 6. \end{cases}$$

Sketch the graph of f on the interval $[-2, 6]$ and evaluate $\int_{-2}^6 f(x) dx$.

3.

Find the derivative $\frac{d}{dx} \int_{1/x}^{x^4} (t^3 + 2t + 2)^{2015} dt$, using the Fundamental Theorem of Calculus, Part 1.

4.

Evaluate

(a) $\int \frac{x^2 + 2}{\sqrt{x - 5}} dx$

(b) $\int \frac{x^2}{(x^3 + 2)^{5/2}} dx$

(c) $\int_0^\pi \left(2 + \sin \frac{x}{2}\right)^2 \cos \frac{x}{2} dx$

(d) $\int_{\pi^2/16}^{\pi^2/9} \frac{2^{\sin \sqrt{x}} \cos \sqrt{x}}{\sqrt{x}} dx.$