

UNIVERSITY OF MANITOBA

MATH 1700 D01

Assignment 3

This assignment is based on units 5 and 6. **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.

Evaluate the following integrals.

(a)  $\int \frac{\sqrt{x^2 - 9}}{x} dx$

(b)  $\int \frac{1}{\sqrt{x^2 + 8x + 25}} dx$

(c)  $\int \frac{3x^3 - 18x^2 + 29x - 4}{(x + 1)(x - 2)^3} dx$

(d)  $\int \frac{5x^3 - 3x^2 + 7x - 3}{(x^2 + 1)^2} dx$

2.

Use l'Hôpital's rule to find the limit, if it exists.

(a)  $\lim_{x \rightarrow +\infty} [x - \ln(x^3 - 1)]$       *Hint:  $\ln e^x = x$*

(b)  $\lim_{x \rightarrow +\infty} \left(1 + \frac{1}{x}\right)^{5x}$

(c)  $\lim_{x \rightarrow 0^+} (e^x - 1)^x$