MEMORIAL UNIVERSITY OF NEWFOUNDLAND

DEPARTMENT OF MATHEMATICS AND STATISTICS

SECTION 1.10 **Math 2000 Worksheet** WINTER 2020

For practice only. Not to be submitted.

1. Use the tabular method to determine the Taylor series (centered at $x = p$) for each of the given functions.

   (a) $f(x) = xe^x$, $p = 0$

   (b) $f(x) = \sqrt{x}$, $p = 1$

   (c) $f(x) = \sin(2x)$, $p = \frac{\pi}{4}$

   (d) $f(x) = x^{-4}$, $p = -2$

2. Suppose $f(x) = xe^x$ is approximated by the second Taylor polynomial centred at $x = 0$. Use your results from Question 1 (a) to determine the accuracy of this approximation on the interval $-1 \leq x \leq 1$. What would the accuracy be if we used the tenth Taylor polynomial instead?

3. Use a known Maclaurin series to derive a Maclaurin series for the indicated function.

   (a) $f(x) = e^{-\frac{x}{4}}$

   (b) $f(x) = \sin(x^6)$

   (c) $f(x) = x\cos(x)$

   (d) $f(x) = \ln\left(\dfrac{1-2x}{1+2x}\right)$