Mathematics 1110H – Calculus I: Limits, Derivatives, and Integrals
TRENT UNIVERSITY, Fall 2018

Assignment #1
Plotting with `Maple`[†]
Due on Friday, 21 September.

Before tackling this assignment you should at least skim through the handout *A very quick start with Maple* and check out the parts of *Getting started with Maple 10*, by Gilberto E. Urroz, dealing with 2-dimensional graphs. Attending your lab is also recommended! As noted in *A very quick start with Maple*, you may use other software with similar capabilities instead of `Maple`, such as `Mathematica` or `SageMath`, but it will be entirely your responsibility to learn how to use them if you choose to do so.

1. Use `Maple` to plot the graphs (separately!) of each of the following functions: $y = \dfrac{1}{x}$, $y = \sqrt{x}$, $y = \sin(x)$, and $y = \cos(x)$, all for $-5 \leq x \leq 5$. *[2]*
2. Use `Maple` to plot the graphs of each of the following functions, all together in one picture: $y = \sin(x)$, $y = \cos(x)$, $y = \sin\left(x + \frac{\pi}{4}\right)$, and $y = \cos\left(x + \frac{\pi}{4}\right)$, all for $-5 \leq x \leq 5$. *[2]*
3. Use `Maple` to plot the graphs of $y = \sin(2x)$ and $y = 2\sin(x)\cos(x)$ over a suitable range of xs. Explain why you think this range is suitable. Does your output support the formula $\sin(2x) = 2\sin(x)\cos(x)$ or not? *[2]*
4. Use `Maple` to plot the graphs of each of the following functions, all together in one picture: $y = x$, $y = x - \dfrac{x^3}{3!}$, $y = x - \dfrac{x^3}{3!} + \dfrac{x^5}{5!}$, $y = x - \dfrac{x^3}{3!} + \dfrac{x^5}{5!} - \dfrac{x^7}{7!}$, and $y = \sin(x)$, all for $-5 \leq x \leq 5$. What pattern(s) can you discern from looking at these graphs? How could these patterns be used? *[4]*

[†] ... even as `Maple` plots against you!