Maple Competency Quiz I (Version A)

Objective To assess your ability to perform some of the fundamentalals of Maple, as introduced in the labs for the first half of this course.

Directions

- Prepare a Word document, or Maple worksheet, containing the answers to the following questions.
- Be sure to clearly label your work, and delete all extraneous work that is not relevant to your final answers.

Questions Let $f(x) = x^2 \sin(x)\cos(x) + x^{\sin x}$ and $h(x) = \dfrac{x^3 + x^2 - x + 2}{x^2 + 5x + 6}$.

(1) Define the function f as a mapping.
HINT: See the Introduction to Maple and Scaling the Graph of a Function Labs.

(2) Define the derivative of f, f', as a mapping.
HINT: See the Graphical Understanding of Limits

(3) What is the numerical value of $f(x)$ when $x = 3.11$
HINT: See the Introduction to Maple Lab.

(4) Find the smallest positive number x that satisfies $f(x) = 4$. (Give your answer as a floating-point number.)
HINT: See the Introduction to Maple Lab.

(5) Plot $y = f(x)$ and $y = f'(x)$ on the domain $[0, 10]$ with range $[-20, 20]$.
HINT: Be sure your plot distinguishes the appearance of the two curves.

(6) Define $m_1 = x^4 - \frac{1}{x}$ and $m_2 = x^3 - 17x + 2$ as Maple expressions. Define the equation `EQ` to be $m_1 = m_2$. Solve `EQ` for x.
HINT: See the Tangent Lines and Differentiation Rules Lab.

(7) Define the function h as a mapping.
   (a) Factor the numerator of $h(x)$, the denominator of $h(x)$, and the rational function $h(x)$.
   (b) Identify all removable singularities in h.
HINT: See the Introduction to Maple Lab; remember the `numer` and `denom` commands.