Maple Competency Quiz I (Version B)

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
- Answer any five (5) of the following seven (7) questions.
- You cannot talk to or ask questions of anyone — me, other students in this class, or any other animate object.
- You may refer to the text or lab materials.
- Be sure to include Maple code when requested.
- Prepare your answers as a Word document or Maple worksheet. (If you use a Maple worksheet, be sure to delete all extraneous work.) You may either submit a hardcopy of your work or upload the file containing your work via Blackboard.

Questions

(1) Correct the following two lines of Maple code.

```
> f := t -> sin(x)+cos*(3x^3);        # 3 errors on this line
> plot( f(x) );                       # 1 error on this line
```

(2) Let $g(x) = x^2 - 1$. Solve for x when $g(x) = 0$.
Show the Maple code that leads to your answer.

(3) Define $f(x) = \frac{1}{x}$ and its first derivative as mappings. Produce a nice plot of f and f' that clearly shows the discontinuities. Include a legend and use different colors or styles for the two functions.

(4) Consider the following sequence of Maple commands:

```
> with( plots );
> f := x -> x^2;
> g := x -> x^3;
> graph1 := plot( f(x), x=-5..5, y=-10..10, color=blue );
> graph2 := plot( g(x), x=-5..5, y=-10..10, color=green );
> display( [graph1, graph2] );
```

What is the purpose of the `with( plots );` command?

(5) Define $m_1 = x^4 - \frac{1}{x}$ and $m_2 = x^3 - 17x + 2$ as Maple expressions. Then, define an equation `EQ` that represents $m_1 = m_2$. Find all solutions to `EQ` as floating-point numbers.

(6) Define the function $h(x) = \frac{x^3 + x^2 - x + 2}{x^2 + 5x + 6}$.
   (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.

(7) Let $j(x) = \sin(x^2)$. What is the slope of the tangent line at $x = \sqrt{\pi}$?
Show the Maple code that leads to your answer.