Lab 1: Last part

Recall that we have had two previous assignments to do for the first lab. The first was a list of LaTeXcommands to look up (Third link under the first day's links), a short paper with some specific LaTeXthings to include (Second link under the second day's links), and today we will be solving some short problems using Maple.

Lab 1 is all three parts- Our previous two assignments, together with today's introduction to Maple questions. Here is what to turn in (DUE: by 12:30PM on our next meeting day). Email me the following (it would be fine to attach them using Webmail, my email address is `hundledr@whitman.edu`):

- The latex file answering the questions for our first assignment (the .tex file ONLY).
- The latex file for the Arc Length question.
- The Maple file that answers the questions on this sheet (ONLY turn in the answers to these questions, NOT the entire introduction). Remove all the Maple output before mailing: `Edit`⇒ `Remove Output`⇒ `From Worksheet`

Grading criteria: 8 points if LaTeXand Maple can be run without error, and 7 points for clarity, brevity and correct answers (total of 15 points)

Today's Maple Lab

Work through the Introduction to Maple before answering the following questions. Try using Maple's help features before asking your instructor for assistance.

On a new Maple document (different than the one used for the Introduction), answer the following "typical" Calculus questions:

1. Use the Maple help system to find out how to enter a vector and compute the following cross product:
$$\langle 1, 1, 1\rangle \times \langle 1, 2, 3\rangle$$

2. Let $f(x, y) = xe^{xy}$. Plot the graph of f, together with a plot of its tanget plane based at $x = 1, y = 1$. Find a good window size.

   Maple commands you should use:

   - `exp` for f and `diff` for the partial derivatives
   - `subs` to evaluate the partial derivatives
   - `plot3d` to plot the two functions (use a reasonable window size).

   Note: If $z = f(x, y)$, then the tangent plane at the point $(x, y) = (a, b)$ is given by:
$$z = f_x(a, b)(x - a) + f_y(a, b)(y - b)$$
   Where f_x is the partial derivative with respect to x, and this is then evaluated at (a, b).

3. Let $f(x) = e^{-(x-3)^2/6}$. Approximate: $\displaystyle\int_{-10}^{10} f(x)\,dx$

   HINT: What is the difference between `int` and `Int`?

4. Find the derivative of $f(x) = \frac{1}{x}$ by using Maple to step through the **definition** of the derivative, that is,
$$f'(x) = \lim_{h\to 0} \frac{f(x + h) - f(x)}{h}$$
   Hint: You might look at how to define a FUNCTION in Maple, then ask Maple to compute the difference quotient, then the limit.

   Once you have an answer for that function, copy and paste to do the same thing for $g(x) = \sqrt{x}$.