Maple Lab: Learning the Program

The following are some short Calculus problems. I want you to work through them using Maple. When you are finished, clean up the worksheet, and clear label the sections by adding TEXT comments. Remove all extraneous commands and prompts, and print one copy per group.

1. Plot the functions $\sin(x)$ and $\cos(x)$ on the same graph. Be sure to label the axes, and give the graph a title. Use the `solve` command to find the smallest positive intersection point for f and g.

2. Compute the derivative of $f(x) = 5x^2 - 4x + 3$ in two ways:

   (a) Use the definition of the derivative. Hint: First define $G(x, h) = \dfrac{f(x+h) - f(x)}{h}$, then take the limit using Maple.

   (b) Use the "D" command.

3. Let $f(t) = t^2 \mathrm{e}^{-t}$. Use Maple to define a function $F(t)$ as follows:

$$F(t) = \int_0^t f(x)\,dx$$

   Compute $\displaystyle\int_0^\infty f(x)\,dx$ in two ways:

   (a) Integrate directly, using `infinity` in the integration bounds.

   (b) Use the limit command, without directly integrating.

4. Use Maple's online help to figure out how to plot the curve defined by $x^2 + y^2 = 4$, and plot it. Hint: Look up the command `implicitplot`. When you're ready to use it, remember to add the `with(plots):` command.