APPM 2450 Calculus 3 Computer Lab
Lab Exercise 2

Create a Mathematica notebook that does all of the following. Feel free to ask your neighbor or your lab instructor for help if you get stuck. Items with a ➠ are required, items with a ☆ are optional.

- ➠ Define the functions $f(x) = x^3 + x^2 + x + 1$ and $g(x) = x^3 + x^2 + x + 1 - \sin(x)$. Remember sin needs a capital S, and square brackets.
- ➠ Get help for the command `Plot`.
- ➠ Plot $f(x)$ with x running from -3 to 3.
- ➠ Plot $f(x)$ with x running from -3 to 3 and y from -4 to 4. Use the `PlotRange` option, `PlotRange->{-4,4}`.
- ➠ Plot $f(x)$ as above, but add the option `PlotStyle->RGBColor[1,0,0]` to color it red.
- ➠ Store the above plot as a p1, by either doing `p1=%`, or `p1=Plot[.....]`
- ➠ Plot $g(x)$ for the same values of x and y as you did for $f(x)$ above. Make this plot blue (`PlotStyle->RGBColor[0,0,1]`) and store the result as p2.
- ➠ Use the command `Show[p1,p2]` to display both functions on the same graph. Label your axes, look up how if you need to.
- ➠ Define $h(x) = \tan(x)$.
- ➠ Make a plot of $h(x)$, for $-\pi \leq x \leq \pi$. Remember that in Mathematica π is `Pi`.
- ➠ Now plot $h(x)$ as above, but use the option `PlotRange->All`. Does this plot look good? If not, fix it in a way similar to the examples with $f(x)$ above.
- ➠ Define $k(x)$ as the derivative of $h(x)$. To do this, do something like `k[x_]=D[...]`.
- ➠ Make a nice looking plot of $k(x)$.
- ☆ Pick your favorite equation, or if you don't have one, use $y = \frac{1}{x^2-25}$. Graph your chosen equation and its first two derivatives on the same set of axes. Each should have its own color.