Getting Started.

1. Log in to your Sage Cloud account.
   (a) Start the Chrome browser.
   (b) Go to http://cloud.sagemath.com and sign in.
   (c) You should see an existing Project for our class. Click on that.
   (d) Click “New”, call it c04, then click “Sage Worksheet”.

2. Use \texttt{plot()} to sketch one period of \cos x.

   To sketch multiple plots on the same axis, use the “+” symbol between the \texttt{plot} commands.

3. Sketch \( x^2 \) and \( x^3 \) on the interval \((-2, 2)\).

4. Use Help on the \texttt{plot()} function to learn how to add color to a graph sketch (type \texttt{plot?} and evaluate \texttt{plot?}).

5. Sketch \( x^2 \) and \( x^3 \) on the interval \((-2, 2)\). Make one graph red and the other graph green.

6. Evaluate \( f(x) = x^3 - x \). Find \( f(1) \), \( f(100) \). Try \texttt{plot(f,-2,2)} and \texttt{plot(f(x),-2,2)} and \texttt{plot(f)}.

7. Evaluate \( c = \frac{27}{14} \). Find \( f(c) \).
8. Define a new variable “y” by evaluating \texttt{var("y")}. Now sketch \( g(x) = x^2 + y^2 - 2 \) for \(-1 \leq x \leq 1\) and \(-1 \leq y \leq 1\) by evaluating \texttt{plot3d(x**2+y**2-2, (-1,1),(-1,1))}.

9. Solve \( x^2 - 1 = 0 \) by evaluating \texttt{solve(x**2-1,x)}

10. Find all solutions of \( \sin \theta = \frac{1}{2} \) by hand. Now try \texttt{solve(sin(x)-.5,x)}. Explain Sage’s result.

11. Draw the graphs of the following equations by hand. Find the solutions by hand.
\[
\begin{align*}
&x^2 + y^2 = 4 \\
y &= x + 1
\end{align*}
\]
Now use \texttt{solve()} to find the intersection points of the graphs of this system of equations. First use the Help by typing \texttt{solve?}.

12. Sketch the graph of \( f(x) = x^5 + x^4 + x^3 - x^2 + x - 1 \). Find the root (zero) of this function: \texttt{find_root(x^5+x^4+x^3-x^2+x-1,-1,1)}. Now try \texttt{find_root(x^5+x^4+x^3-x^2+x-1,-1,0)}. Explain the result.