

Last name \_\_\_\_\_

First name \_\_\_\_\_

**LARSON—MATH 255—HOMEWORK WORKSHEET h02**  
**Getting Started.**

1. Create a Cocalc/Sage Cloud account.
  - (a) Start the Chrome browser.
  - (b) Go to `http://cocalc.com`
  - (c) “Create new account” using **your VCU email address** .
  - (d) You should see an existing Project for our class. Click on that.
  - (e) Click “New”, then “Sage Worksheet”, then call it **h02**.
  - (f) For each problem number, label it in the SAGE cell where the work is. So for Problem 1, the first line of the cell should be **#Problem 1**.
2. Sketch the graph of  $x^3 - 3$  on the interval  $(-2, 2)$ .
3. Sketch one period of  $\tan x$ .
4. Sketch one period of  $\sin x$  and one period of  $\cos x$  on the same coordinate system. Make them different colors.
5. Sketch the (2-variable) function  $g(x, y) = x^2 - y^2 - 2$ . Choose an  $x$ -range and a  $y$ -range so that you can best see any important features of the function.
6. Solve  $x^4 - 1 = 0$ . (There are 4 solutions, possibly repeated, in the complex numbers  $\mathbb{C}$ . Does SAGE give them all?)
7. Solve  $x^2 + x = 100$ .
8. Find all solutions of  $\cos \theta = \frac{1}{2}$  by hand. Now evaluate `solve(cosx)-0.5,x`. Explain SAGE’s result.
9. Define variables  $b$  and  $c$ . Solve  $bx + c = 0$ .
10. Draw the graphs of the following equations.

$$\begin{cases} x^2 + y^2 = 9 \\ y = x + 2 \end{cases}$$

11. Now use `solve()` to find the intersection points of the graphs of this system of equations. (It would be useful to graph and solve first by hand. And see that SAGE produces what you already expected.)
12. Consider the following system. Sketch the graphs of these lines on the same coordinate system (by hand and then with `plot`), then `solve` to get the exact point of intersection. 
$$\begin{cases} 2x + y = 20 \\ -x + y = 0 \end{cases}$$
13. Draw a triangle between  $(2, 2)$ ,  $(3, 2)$ , and  $(3, 1)$  using the line command. Don't forget the bottom side of your triangle.
14. Use the `polygon` command to make a pentagon. You pick the vertices of your pentagon.
15. Define a function `my_function` that takes an arbitrary string as input and prints *something* (you choose: it might be, "The Dodgers are undefeated!", etc).
16. Test the function you defined in the last example.
17. Write your own function `quad_product` that takes *four* inputs) and *returns* their product.
18. Test the function you defined in the last example.

### Getting your homework recorded

When you are done, before you leave class...

- (a) Click the "Make pdf" (Adobe symbol) icon and make a pdf of this worksheet. (If CoCalc hangs, click the printer icon, then "Open", then print or make a pdf using your browser).
- (b) Send me an email with an informative header like "Math 255 - h02 worksheet attached" (so that it will be properly recorded).
- (c) Remember to attach today's classroom worksheet!