LARSON—MATH 255–CLASSROOM WORKSHEET 04
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 "Worksheets", then call it **c04**.

   (f) For each problem number, label it in the Sage cell where the work is. So for Problem 2, the first line of the cell should be `#Problem 2`.

2. Sketch $\cos t$. What happens? What do you think the difference is?

3. Sketch $\cos x$ on the interval $(-2\pi, 2\pi)$.

4. Sketch $\tan x$ with x-range between $x = -\pi$ and $x = \pi$, and y-range between $y = -6$ and $y = 6$.

5. Find $\sin \frac{2\pi}{3}$ to 30 digits of precision. (You may have to look back at your old worksheets or code. That will be common until your skills become locked-in).

6. Define variables a, b and c. Solve $ax^2 + bx + c = 0$. What does the output mean?

7. How do you use `solve` to solve systems of more than one equation? Use the Help by evaluating `help(solve)` and look at examples with more than one equation.

8. 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. $\begin{cases} 2x + y = 20 \\ -x + y = 0 \end{cases}$

9. Consider the following system. Sketch the graphs of these equations on the same coordinate system (by hand and then with `plot`), then `solve` to get the exact points of intersection. $\begin{cases} y = x^2 \\ y = x \end{cases}$

10. Type in the following program and evaluate. (Note that there are *exactly* four spaces before the word "print").

```
def write_string(string_name):
    print(string_name)
```

    Now type `write_string("hello world!")` and evaluate.

    In order to do sophisticated calculations, or to allow for multiple inputs, you will need to write *programs*. Our "hello world!" program was the first example. It included a `print` statement. Other program features, in almost any language, include *conditional statements* (if..then..) and *loops*.

11. Type in the following function definition and evaluate.

```
#This function will implement the absolute-value function

def absolute(x):
    if x>=0:
        return x
    else:
        return -x
```

12. Now test it. Try `absolute(4)`, `absolute(-4)`, etc.

13. The hashtag and what follows it is a *comment*. These are useful explanations or reminders and are ignored by the compiler. Add your own comment using "#" in the cell where you defined `absolute(x)` like "Math is fun!". Evaluate to check that Sage ignores it.

14. Now *use* the program you just wrote in another program. Evaluate and test the following.

```
def abs_plus_five(x):
    return absolute(x)+5
```

15. You don't have to add five, you can add *any* number by adding a *parameter*.

```
def abs_plus(x,y):
    return absolute(x)+y
```

16. Now test it. Try `abs_plus(4,5)`, `abs_plus(-4,5)`, `abs_plus(-4,23)`, etc.

17. Write your own function `triple_product` that takes *three* inputs (call them anything, or x, y, z is fine) and *returns* their product.

18. **Extra: Learn more Python!**. If you have extra classtime, use it to learn more Python. Go to Codecademy (`codeacademy.com`), sign up for a free account, and do the *Learn Python 2* tutorial `https://www.codecademy.com/learn/learn-python`. (This one is totally free—and useful.)

Getting your classwork 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 - c04 worksheet attached" (so that it will be properly recorded).

(c) Remember to attach today's classroom worksheet!