Last name _____

First name _____

LARSON—MATH 255–CLASSROOM WORKSHEET 03
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 **c03**.

   (f) For each problem number, label it in theSAGE cell where the work is. So for Problem 1, the first line of the cell should be `#Problem 1`.

   Review

   - The multiplication operator in SAGE is "*". The most common error inSAGE is forgetting to put in a "*" when multiplying.

   - produces *exact* answers. You often have to *force*SAGE to give you a decimal approximation of what you've calculated.

   - log in SAGE is the *natural log* (it *is* possible to compute logs in *any* base though).

   - Angles in SAGE are assumed to be in radians (angles in degrees must be converted to radian measure).

   New

   `plot` is SAGE's powerful and flexible command for plotting functions of a single variable.

2. Sketch the graph of x^3 on the interval $(-2, 2)$.

3. Sketch the graph of $|x - 1|$ on a "nice" interval.

4. Sketch $\cos x$.

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

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

7. Sketch $x^3 - x$ with y-range between $y = -6$ and $y = 6$.

8. Sketch x^2 and x^4 on the interval $(-2, 2)$.

9. Define a function $f(x) = x^3 - x$ by evaluating `f(x)=x**3-x`. Then find $f(1)$, $f(100)$. Evaluate `plot(f,-2,2)` and `plot(f(x),-2,2)` and `plot(f)`.

10. Define a constant $c = \frac{27}{14}$ by evaluating `c=27/14`. Find f(c).

11. Define a new variable "y" by evaluating `var("y")`. Now sketch $g(x, y) = x^2 + y^2 - 2$ for $-1 \le x \le 1$ and $-1 \le y \le 1$ by evaluating `g(x,y)=x**2+y**2-2` and then `plot3d(g(x,y), (x,-1,1),(y,-1,1))`.

12. Solve $x^2 - 1 = 0$ by evaluating `solve(x**2-1,x)`.

13. Solve $x^2 + 1 = 0$.

14. Solve $x^2 + x = 25$.

15. Find all solutions of $\sin \theta = \frac{1}{2}$ by hand. Now evaluate `solve(sin(x)-.5,x)`. Explain SAGE's result.

16. Define variables a, b and c. One way to do this is with the command `var("a b c")`. Solve $ax^2 + bx + c = 0$ by evaluating `solve(a*x**2+b*x+c, x)`.

17. Draw the graphs of the following equations by hand. Find the solutions by hand.

$$\begin{cases} x^2 + y^2 = 4 \\ y = x + 1 \end{cases}$$

Now use `solve()` to find the intersection points of the graphs of this system of equations. First use the Help by typing `help(solve)`.

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 - c03 worksheet attached" (so that it will be properly recorded).

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