

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 “Worksheets”, then call it **c03**.
 - (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. Evaluate “pi”. Then use $n(-)$ to find a decimal approximation for π .
3. Evaluate “e”. Find a 6-digit approximation for e
4. Find $\log 10$
5. Find $\log_{10} 10$.
6. Find $\sin \frac{\pi}{3}$
7. Find $\tan \frac{\pi}{2}$.
8. Find $\arcsin \frac{1}{2}$

Sage doesn’t understand degrees—only radians. What can you do here?
9. Find $\sin 47^\circ$, and a decimal approximation.

`plot` is Sage’s powerful and flexible command for plotting functions of a single variable.
10. Sketch the graph of x^3 on the interval $(-2, 2)$.
11. Sketch the graph of $|x - 1|$ on a “nice” interval.
12. Sketch $\cos x$.
13. Sketch $\cos t$. What happens? What do you think the difference is?
14. Sketch $\cos x$ on the interval $(-2\pi, 2\pi)$.

15. Sketch x^2 and x^4 on the interval $(-2, 2)$.
16. 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)`.
17. Define a constant $c = \frac{27}{14}$ by evaluating `c=27/14`. Find $f(c)$.
18. Define a new variable “ y ” by evaluating `var("y")`. Now sketch $g(x, y) = x^2 + y^2 - 2$ for $-1 \leq x \leq 1$ and $-1 \leq y \leq 1$ by evaluating `g(x,y)=x**2+y**2-2` and then `plot3d(g(x,y), (x,-1,1), (y,-1,1))`.
19. Solve $x^2 - 1 = 0$ by evaluating `solve(x**2-1, x)`
20. Solve $x^2 + 1 = 0$.
21. Solve $x^2 + x = 25$.
22. Find all solutions of $\sin \theta = \frac{1}{2}$ by hand. Now evaluate `solve(sin(x)-.5, x)`. Explain Sage’s result.
23. 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)`
24. 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...

- 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).
- Send me an email with an informative header like “Math 255 - c03 worksheet attached” (so that it will be properly recorded).
- Remember to attach today’s classroom worksheet!