LARSON—MATH 255–HOMEWORK WORKSHEET h03
Lists, Calculus, Matrices

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 **h03**.
   (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`.
2. Sketch the graph of $f(x) = x^5 - x^4 + x^3 - x^2 + x - 1$. Find the root (zero) of this function.
3. Use list comprehension to produce a list of the cubes of all the integers from 2 to 17.
4. Create a list L of all the integers from 3 to 99.
5. Create a list Z of 99 zeros.
6. Evaluate `L=[[7,1],[2,6],[4,5]]`. Now evaluate `L[1]`. Then evaluate `L[1][0]`. Explain what you got.
7. Use *list comprehension* to get a list of the squares of the numbers from 55 to 61.
8. Define L to be the list of numbers from 55 to 61. Use list comprehension to *filter* the even numbers in that list.
9. Use list comprehension to filter the prime numbers from your list L.
10. Find the 3^{rd} derivative of x^x.
11. Let $h(x, y) = xy^2$. Find the partial derivative of h with respect to x.
12. Let $h(x, y) = xy^2$. Find the partial derivative of h with respect to y.
13. Let $h(x, y) = xy^2$. Find the 2^{nd} partial derivative of h with respect to y.

14. Find the integral of $3x^2$ on the interval $[2, 4]$.

15. Find a numerical approximation of the function $t^{20}e^t$ on the interval $[1, 2]$

16. How good is your answer? (How bad can the error of your answer be?)

17. Consider the system: $\begin{cases} x + 3y = 5 \\ x + 3y = 7 \end{cases}$

    Find a matrix that represents this system, find the row-reduced echelon form of this matrix, rewrite this as an equivalent system of linear equations and interpret (explain what this reduced system tells you about the solutions to your original system).

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 - h03 worksheet attached" (so that it will be properly recorded).

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