LARSON—MATH 255–CLASSROOM WORKSHEET 09
Calculus.

1. (a) Start the Chrome browser.
   (b) Go to `http://cocalc.com`
   (c) Login using **your VCU email address** .
   (d) Click on our class Project.
   (e) Click "New", then "Worksheets", then call it **c09**.
   (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`.

Review

2. Find $\int 3x\,dx$ by hand. Check with `integral(3*x,x)`.
3. Let f(x)=3x. Let fint=integral(3*x,x). Check that diff(fint,x)=f(x).
4. Find $\int_1^2 f(x)\,dx$ by hand. Check using `integral(f(x),x,1,2)`.
5. Sketch $g(t) = t^{20}e^t$ on $(0, 3)$.
6. Find $\int t^{20}e^t\,dt$.
7. Find $\int_2^3 t^{20}e^t\,dt$.

More Calculus in Sage

8. Find $\int 3x\,dx$ by hand. Check with `integral(3*x,x)`.
9. Let f(x)=3x. Let fint=integral(3*x,x). Check that diff(fint,x)=f(x).
10. Find $\int_1^2 f(x)\,dx$ by hand. Check using `integral(f(x),x,1,2)`.
11. Sketch $g(t) = t^{20}e^t$ on $(0, 3)$.
12. Find $\int t^{20}e^t\,dt$.
13. Find $\int_2^3 t^{20}e^t\,dt$.
14. Find a numerical approximation for $\int_2^3 t^{20}e^t\,dt$.
15. Try `numerical_integral(`$t^{20}e^t$`, 2, 3)`.
16. Find out what the second number of your answer means.

Tuples

A *tuple* is a Sage object, similar to a list, but with curved brackets instead of square brackets. These include pairs like $(2, 3)$, triples like $(4, 5, 6)$, etc.

17. Let `t=(2,3)`. Then evaluate t, and evaluate `type(t)`.

18. You can find the entries in a tuple just like you can with a list. Try $t[0]$, $t[1]$ and $t[2]$.

19. A tuple in Sage is an *immutable* object. You can't change it. Try to change the 0^{th} entry of t. Evaluate $t[0] = 5$.

Matrices

20. We can represent the system of linear equations $\begin{cases} 2x + y = 5 \\ x + 3y = 7 \end{cases}$ with the matrix $A = \begin{bmatrix} 2 & 1 & 5 \\ 1 & 3 & 7 \end{bmatrix}$

    Enter this in Sage using: `A=matrix(2,3,[2, 1, 5, 1, 3, 7])`. Then use `A.rref()` to find a matrix that represents an equivalent system in *row-reduced echelon form.*

21. 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.

22. Consider the system: $\begin{cases} x + y = 5 \\ 2x + 2y = 10 \end{cases}$

    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.

23. Let `A=matrix(2,2,[1,2,3,4])`, and `b=vector([5,6])`. Solve the matrix equation $A\hat{x} = \hat{b}$ using `A.solve_right(b)`.

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 - c09 worksheet attached" (so that it will be properly recorded).

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