Math 114: Exam 1 Prep

1. Study Sections 5.5, 6.2, 6.3, 6.4, 6.5, and 7.1.

2. Remember, often to find bounds of integration for areas/volumes corresponding to regions enclosed by curves you have to set the curves equal to each other and solve. This often involves polynomials, in which case you want to move all terms to one side (so 0 is on the other) of the equal sign. Why? Because factoring the polynomial gives you the solutions!

$$\begin{aligned} \text{Example: } & x^2 + 5 = 10x - 4 \\ & x^2 - 10x + 9 = 0 \\ & (x-1)(x-9) = 0 \\ & x = 1, 9. \end{aligned}$$

3. Draw the region enclosed by $y = x$ and $y = 12 - x^2$.

4. Find the area of the region enclosed by $y = x$ and $y = 12 - x^2$ by integrating with respect to x.

5. Find the area of the region enclosed by $y = x$ and $y = 12 - x^2$ by integrating with respect to y. Note this requires two integrals!

6. Find the volume of the solid produced by rotating the region enclosed by $y = x$ and $y = 12 - x^2$ about $y = -5$.

7. Find the volume of the solid produced by rotating the region enclosed by $y = (x-2)^2$ and $y = x$ about the y-axis.

8. Prove $\int ln(x)dx = xln(x) - x + C$ WITHOUT differentiating.

9. Compute $\int x\sin(x^2)dx$, $\int_0^1 ln(et)dt$, and $\int \frac{1}{5+5x^2}dx$

10. Set up but do not evaluate the integral to compute the arc length of e^x from 2 to 4.

The examples and practice problems in class are good to review too.