MATH 1B DISCUSSION WORKSHEET - 9/20/18

MIDTERM REVIEW QUESTIONS!

[Note that I haven't actually seen the midterm so this is really just me guessing.]

1. Section 7.1

(1) Evaluate
$$\int_0^{\pi/2} e^x \cos(x)\, dx.$$

2. Section 7.2 - 7.3

If you need more practice with 7.2 and 7.3, I'd recommend working on my worksheet from August 28! The problems there are essentially everything you need to be able to do from those two sections. That worksheet, and its solutions, are available on bCourses.

3. Section 7.4

(2) Evaluate
$$\int \frac{x^4 + x^3 + x^2 + 1}{x^2 + x - 2}\, dx.$$

4. Section 7.5

Do this section's problems if you haven't already! They're fantastic practice.

5. Section 7.7

(3) Find the expression giving the error bound for the Midpoint Sum approximation of the function
$$f(x) = 3x^2 + x^2 \sin(x) - 4x \sin(x) - 2\sin(x) + 4x \cos(x) - 8\cos(x)$$
in K partitions in the interval $[0, 4]$.

6. Section 7.8

(4) Using the comparison test, determine whether
$$\int_0^\infty \frac{xe^{-2x}}{x^3 + 1}\, dx$$
converges or diverges.

(5) Evaluate
$$\int_0^\infty xe^{-x}\,dx.$$
[For bonus points, find an integral to compare it to once you figure out whether it converges.]

7. Section 8.2

(6) Consider the region bounded by $f(x) = \sqrt{1 + e^x}$ and the x-axis between $0 \le x \le 1$. Find the area of the surface obtained by rotating the curve f(x) about the x-axis.

8. Section 8.3

For hydrostatic forces, Section 8.3 Questions 3-11 should get you all the practice you need!

Moments and Centers of Mass are literally just plug and chug. Memorize the equations(!!), and remember that wherever there's an x term or $f(x)$ term it can be replaced with y and $g(y)$, respectively, but beyond that these problems are super straightforward. For practice, look at my worksheet from September 13 or Questions 25-35 in the textbook.

9. Section 8.4

I don't want to give questions on the biology section because honestly I have no idea what he'd even ask on the exam about them, but if you know the formulas from the sheet and what they mean I'm sure you'll be fine. Do the homework as well!

(7) [Question 5 from Section 8.4] A demand curve is given by $p(x) = 450/(x + 8)$. Find the consumer surplus if the selling price is \$10.

10. Section 8.5

(8) Consider the function
$$f(x) = \begin{cases} Ae^{-cx} & x \ge 0 \\ 0 & \text{otherwise.} \end{cases}$$

(a) Find the value of A in terms of c such that f is a Probability Density Function. [What's the name of this type of PDF?]

(b) Find the value d such that
$$Pr[x > d] = 0.5.$$
In other words, find the value of d, in terms of c, such that there's an exactly 50 percent chance that the x from our random variable is greater than d. [What's the name of this value d?]