MIDTERM TWO REVIEW

This is just a study guide to help you prepare for Midterm Two. There could be stuff on the exam not covered by this review.

7.8
- Know how to set up and evaluate improper integrals (both type I and Type II)
- Remember that with all integrals, you must now check that there isn’t an asymptote inside your bound of integration. If there is, break your integral up into multiple integrals. (See WARNING on page 513)
- Know for what values of $p$ the integral $\int_1^\infty \frac{1}{x^p} dx$ is convergent. This integral is useful to use with the comparison theorem.
- Know the Comparison Theorem on page 514.

Appendix G
- Know the definition of the natural logarithmic function given on page A40
- Know the laws of logarithms given on page A41
- Be able to graph the function $e^x$ and its inverse $\ln(x)$
- Know what it means for $e^x$ and $\ln(x)$ to be inverses.
- Know the law of exponents on page A44 and A45
- Briefly review your homework problems from this section

8.1
- Know the arc length formula on page 526
- Know the alternative form of the arc length formula given on page 527
- Know how the arc length function on page 528 is just the arc length formula but the upper bound of the interval hasn’t been assigned a specific value yet
- Know how to do example 4 on page 529

8.2
- Know the formula for surface area when rotating about the x-axis
- Know the formula for surface area when rotating about the y-axis
- Be able to set up and solve both these type of problems

8.3
- For hydro force problems, if you are given the measurement in meters, use pressure = $\rho gd$ where $g = 9.8$, $d$ is depth in meters and for water, $\rho = 1000 \frac{kg}{m^3}$. 
For hydro force problems, if you are given the measurement in feet, use pressure $= \delta d$ where $d$ is depth in feet, and for water $\delta = 62.5 \frac{lb}{ft^2}$.

- Be able to set up and solve hydro force problems
- Know what center of mass is and a centroid
- Know what a moment is
- Know the additivity of moments principle
- Know the symmetry principle
- Know the formulas for finding $\bar{x}$ and $\bar{y}$ given on page 545 and 546
- Know the Theorem of Pappus given on page 546. If this theorem were tested, you would probably be given a problem where it would be easy to find volume using the Theorem of Pappus, but more challenging to find the volume using the shells or washer method. An example were this is the case is to find the volume of a torus.
- Be able to set up and solve problems for finding the center of mass

8.4

- Know what a demand curve is
- Know how to find consumer surplus
- Know that any time a story problem says marginal, it means derivative. For example, the marginal profit function is the derivative of the profit function.

8.5

- Know what the two requirements are for a function to be a probability density function (pdf)
- Know that $P(a \leq X \leq b) = \int_a^b f(x)dx$
- Know that the mean or average value is given by $\mu = \int_{-\infty}^{\infty} x f(x)dx$
- Know when you replace $\int_{-\infty}^{\infty} f(x)dx$ with $\int_a^b f(x)dx$ where $f(x)$ is a probability density function. For example, if the domain is $0 \leq x \leq 10$, you would have $\int_{-\infty}^{\infty} f(x)dx = \int_0^{10} f(x)dx$

11.1

- Know everything in red boxes in this chapter
- Know how to do the examples

11.2

- Know everything in red boxes in this chapter
- **Be able to state the test for divergence given on page 692**
- Be able to do example 6 on page 691