REVIEW FOR TEST 4 OF CALCULUS I:

The first and best line of defense is to complete and understand the homework and lecture examples. Past that my old test might help you get some idea of how my tests typically look. Most of the test will be like problems you've done before, they may not be the same format but they should require the same skill set.

• the test is likely to divide up about 10% physics of motion in one-dimension 35% integration, 30% area, 30% volumes.

Acceleration, Velocity, Position:

1. Be able to calculate the velocity and position as a function of time if given the acceleration as a function of time and an initial position and velocity.

2. Be able to calculate the distance and/or displacement relative to a particular time interval given the velocity as a function of time.

Integration:

1. Antiderivatives or indefinite integration: know your basic antiderivatives. I might ask all of them. See all the homework from section 4.9. (page 143 has all the basic ones, and the corresponding derivatives)

2. Questions like 5.3#15 are out. I did not cover this idea in much depth.

3. What is the FTC? Be able to apply it to definite integrals. See all the homework from section 5.3.

4. Notice there are absolute value bars in $\int \frac{1}{x} dx = \ln|x| + c$. They matter.

5. Know the properties for definite and indefinite integrals. In particular, recall that we need the last property to deal with piecewise defined functions. (Ex. 6.3.5)

6. U-substitutions. Know how to do problems like the homework and examples from lecture, this will be about 35% of the test.

7. Know about the two main methods to calculate definite integrals involving u-substitution. I may ask a question which forces you to change the bounds.

Area Bounded by Curves:

1. First and foremost be able to graph curves similar to those encountered in lecture and/or homework. Be prepared to show your work. Find intersection points using algebra where appropriate.

2. You may be called upon to graph one of those "basic" functions from precalculus such as the exponential, sine, cosine, natural logarithm, and so forth. Ignorance of the graphs of these functions could be a major stumbling block in setting up a problem.

3. Be prepared to draw a picture which illustrates the typical rectangle, know how to find the formula for the infinitesimal area from the picture. Horizontal or vertical strips, when to use functions of x or functions of y, how do you choose?

4. Where do the bounds for integrating dA come from? Hint: this is why I require you draw the picture each and every time.

Volumes:

1. First and foremost be visualize to volumes similar to those encountered in lecture and/or homework. Be prepared to show your work. Find intersection points using algebra where appropriate.

2. For shapes like cones and pyramids know how to use linearity to find the needed formula for dA.

3. Can you find the volume of a sphere?

4. Be able to find the volume of solids of revolution. To begin with this requires we have a good picture of the area we wish to rotate. Then it is important to understand how the axis of rotation relates to the picture. There are many possibilities, again when do we need to work with functions of x and when functions of y? The lecture examples and homework contain more than enough variety to prepare for the test.

5. You can use cylindrical shells, but I don't intend to force the issue.