Calculus 2 - Test 2 Review

Dr. Graham-Squire, Spring 2013

•The test will cover sections 5.7-5.10, 6.1-6.4, and 6.6.

•To study, you should look over your notes, labs, rework HW problems, quizzes, and problems from the notes, as well as work out the practice problems given for each section. The Review Questions at the end of Chapters 5 and 6 will also be good practice (For Chapter 5: page 424 #11-15, 17-23, pages 425-426 #22-28, 30-35, 47, 48, 49(b), 55-60, 61 (for number 61, do a comparison by removing the +2 from the bottom), For Chapter 6: pages 488-489 #1-18, 20, 22, 23, 25, 28,29)

•Calculators and/or Sage/Maple will be needed on this test, but for certain questions you will not be allowed to use them.

•Appropriate questions from my website are Test 2: #1-5, 7; Test 3: #1.

•Some practice problems to work on:

1. Evaluate the integrals. Be sure to use correct notation where necessary and to show all of your work.

   (a) $\displaystyle\int_1^{\sqrt{2}} \frac{x^5}{\sqrt{4-x^2}}\,dx$ (Round to nearest .001)

   (b) $\displaystyle\int_0^2 \frac{3}{\sqrt{2-x}}\,dx$

2. Use the Midpoint Rule with six subintervals (M_6) to approximate $\displaystyle\int_0^3 \frac{dt}{1+t^2+t^4}$. Then use Sage, Maple or a graphing calculator to calculate the actual integral.

3. Sketch the region enclosed by $y = x^3 - 9x$ and $y = -5x$ and then find its area. (Note: the answer is not zero).

4. Consider the region W bounded by $y = \frac{1}{x}$, $y = 0$, $x = 1$ and $x = 3$. Find the volume of the solid obtained by rotating W about (a) the line $y = -3$ and (b) the y-axis.

5. Calculate the arc length of the curve $y = 4(x-3)^{3/2}$ for $3 \le x \le \frac{37}{12}$.

6. A tank has the shape of an inverted circular cone with height 10 meters and base radius 4 meters. It is filled with water to a height of 8 meters. Note: The density of water is 1000 kg/cubic meter, and gravity is 9.8 m/sec^2

   (a) Find the work required to empty the tank by pumping all of the water to the top of the tank.

   (b) Find the work required to pump the water to a point that is 6 meters above the top of the tank.

7. We have a cable that weighs 3 lbs/ft attached to a bucket filled with coal that weighs 700 lbs. The bucket is initially at the bottom of a 600 ft mine shaft. Answer each of the following.

   (a) Determine the amount of work required to lift the bucket to the midpoint of the shaft.

   (b) Determine the amount of work required to lift the bucket from the midpoint of the shaft to the top of the shaft

   (c) Determine the amount of work required to lift the bucket all the way up the shaft.