Test 3 Review

•The test will cover sections 4.1-4.3, and 4.5-4.8.

•To study, you should look over your notes, rework HW problems, quizzes, and work out the practice problems from the list on blackboard. The Review Questions at the end of Chapter 4 will also be good practice.

•You can also try taking a "practice" test under normal testing conditions by choosing a question from each section (of the practice problems I gave you, or from the supplementary questions at the end of Chapter 4) and then trying to work these questions out on your own in 65 minutes. This can be helpful if you are the type of person who has test anxiety.

•Some practice problems to work on in class today:

1. Dominic has attached his new baby brother/sister to a kite and it letting the baby drift away in the wind. Assuming that the kite stays at a constant height of 100 feet above the ground and kite string is coming out of the spool at a constant rate of $5\sqrt{3}$ feet/minute, find the rate at which the angle of elevation (that is, the angle between the kite string and the ground) is changing when the kite string is 200 feet long.
2. Calculate $\lim_{x\to\pi^+} \dfrac{x-\pi}{\cos x}$ and $\lim_{x\to\infty} \ln(x^4+3)\cdot x^{-2}$
3. Sketch the graph of $f(x)$ given that:
   - $f(0) = 3$ and $f(1) = 0$
   - $x = 2$ is a vertical asymptote.
   - $f'(x) > 0$ on $(-\infty, -1)$, $(2, 5)$ and $(5, \infty)$
   - $f'(x) < 0$ on $(-1, 2)$.
   - $f''(x) > 0$ on $(-\infty, -2)$ and $(5, \infty)$
   - $f''(x) < 0$ on (-2, 2) and (2, 5)
   - $\lim_{x\to\infty} f(x) = \infty$ and $\lim_{x\to(-\infty)} f(x) = 1$
4. A farmer wants to use fencing to construct a rectangular pen and subdivide it into six equal rectangles. Thus the fencing will be used for both the perimeter of the pen and the pieces that go across the inside to form the subdivisions. The farmer has exactly 408 meters of fencing. Find the outer dimensions of the pen he can build with the maximum possible area. Make sure that your answer is a maximum.
5. A ball is dropped from a building 100 feet high. Given that acceleration due to gravity is -32 feet/second^2, find the velocity of the ball when it hits the ground.
6. Use Newton's Method to approximate $\sqrt[5]{1000}$ correct to four decimal places.
7. Find the most general antiderivative of $f'(x) = x(x+2)^2 + \sec^2 x$.
8. Find the absolute maximum and absolute minimum of the function $f(x) = \frac{2}{3}x^3 - \frac{3}{2}x^2 - 9x + 2$ on the interval [-2, 5].