Math 141, Problem Set #12
(due **in class** Fri., 12/6/13)

Note: To get full credit for a problem, it is not enough to give the right answer; you must explain your reasoning.

Stewart, section 4.6, problems 4, 24.

Stewart, section 4.7, problems 32, 36, 38, 44, 46, 49, 52.

Also, do the following additional problems.

A. (a) Find the point on the graph of $y = |x|$ that is closest to the point $(2, 4)$.

(b) Find the point on the graph of $y = |x|$ that is closest to the point $(2, -4)$.

(Hint: to minimize the distance, minimize the square of the distance.) For both (a) and (b), you must use the First Derivative Test to confirm that the relevant critical point is indeed a local minimum.

B. Find the general antiderivative of $f(x) = |x|^3$.

C. Does the "greatest-integer function" $f(x) = [x]$ (where $[x]$ is defined as the greatest integer n satisfying $n \leq x$) have an antiderivative? Explain.

D. (a) Show that if f is odd, then every antiderivative of f is even. (Hint: We must show that if $f(x)+f(-x) = 0$ for all x and $F'(x) = f(x)$ for all x, then $F(-x) = F(x)$ for all x.)

(b) Show that if f is even, and f has an antiderivative, then f has exactly one antiderivative that is odd.

Please don't forget to write down on your assignment **who you worked on the assignment with** (if nobody, then write "I worked alone"), and write down on your time-sheet **how many minutes you spent on each problem** (this doesn't need to be exact).