MAT 201
Assignment 1
Tuesday, August 31, 2010

For full credit on these problems, each must be submitted with a complete and clear solution, showing all of your work. You may work with other classmates on these problems, but please indicate on your assignment if you received help. Partial answers and incomplete solutions may be eligible for some partial credit, depending on the level of completeness and demonstrated understanding.

1. Find the following indefinite integrals
   (a) \( \int x^2 + 5x + 3 \, dx \)
   (b) \( \int \cos t + \sin t + e^t + 3t \, dt \)

2. The empire state building is 450 meters tall at the tip. A rock is dropped from the tip.
   (a) Express the height of the rock as a function of the time \( t \) in seconds.
   (b) How long will it take for the rock to hit the ground?
   (c) What is the speed of the rock when it hits the ground?

3. Use the graph of \( f'(x) \) below to answer the following questions, given that \( f(0) = -3 \).

(a) Approximate the slope of \( f \) at \( x = 2 \).
(b) Is it possible that \( f(2) = -4? \)
(c) Which is larger, \( f(1) \) or \( f(2)? \)
(d) Sketch an approximate graph of \( f \).