MAC2311: Calculus 1 - Section 1

Quiz 4: Sections 4.7-4.9; 5.1-5.4 April 9, 2015

Name: _____

1. [5 points] A box with an open top is to be constructed from a rectangular piece of cardboard, 8 ft long by 3 ft wide, by cutting out a square from each of the four corners and bending up the sides. Find the side length of the square that yields the largest volume that such a box can have.

2. [7 points] A ball is thrown upward with a speed of 64 ft/s from the edge of a cliff 80 ft above the ground.
   (a) [4 points] Find its height above the ground t seconds later.
   (Hint: the *downward* acceleration due to gravity is 32 ft/s^2.)

   (b) [1 point] When does it reach its maximum height?

   (c) [2 points] When does it hit the ground?

3. [2 points] Use Part 1 of the Fundamental Theorem of Calculus to find the derivative of the function

$$g(x) = \int_7^{\tan x} \frac{dt}{1+t^2}.$$

4. [6 points] Let $f(x) = x^2$.

   (a) [4 points] Estimate the area under the graph of f from $x = 0$ to $x = 6$ using the Midpoint Rule with three rectangles.

   (b) [2 points] Find the area under the graph of f from $x = 0$ to $x = 6$.