Homework 6 - Math 1451-008 (Howle)
Due Monday 5/7/2012 in class

Name: _____ **R Number:** _____

This cover sheet must be attached as the top page of your homework.
See homework requirements in the syllabus.

1. Describe approximation of a definite integral by rectangles, the trapezoidal rule, and Simpson's rule. Describe each method; what approximation is used by each?

2. Approximate the integral
$$\int_0^2 x \cos x \, dx$$
using:

   (a) the trapezoidal rule with $n = 6$
   (b) Simpson's rule with $n = 6$

3. Determine how many subintervals are required to estimate the value of the integral
$$\int_{-1}^2 \sqrt{1 + x^2} \, dx$$
with error less that 0.05 using the Trapezoidal Rule.

4. For each of the following functions over the given interval, determine if the Mean Value Theorem for Integrals applies. If not, explain why not. If it does apply, find a value $x = c$ guaranteed by the theorem.

   (a) $f(x) = 15x^{-2}$ on $[1, 2]$
   (b) $g(x) = 12x^{-3}$ on $[-3, 3]$