Homework 4 - Math 142, Frank Thorne (thorne@math.sc.edu)

Due Wednesday, September 18

Important: Please show your work, write in complete sentences, draw pictures and/or triangles when appropriate, and explain your reasoning clearly.

(The following theorem statement will be provided if needed on quizzes and exams.)

Theorem. If f'' is continuous and M is any upper bound for the values of $|f''|$ on $[a, b]$, then the error made in estimating $\int_a^b f(x)dx$ with the Trapezoidal Rule with n intervals is at most

$$\frac{M(b-a)^3}{12n^2}.$$

(a) Thomas, Chapter 8.5, 11-18, 33, 34, 39, 40.

For 17-18, consider using a method other than partial fractions.

(b) Thomas, Chapter 8.7, 5-8, 15-18, 24, 26.

Instructions: Do the Trapezoidal Rule only, no need to do Simpson's Rule. You may skip part (c) for 5-8, but instead please draw pictures representing the area you are computing.

In 15-18, the instructions should be revised slightly. You are not required to estimate the minimum number of subintervals needed, although you may. You should compute any number of subintervals which guarantees that your error is less than 10^{-4}.