

Fall 2005 Math 152

Week in Review 5

courtesy: Amy Austin

(covering sections 8.8,8.9)

Section 8.8

- Use the midpoint rule with $n = 5$ to approximate $\int_1^6 \frac{1}{x^2} dx$. Draw the approximating rectangles.
 - What is the exact error in using this approximation?
- Use the Trapezoid rule with $n = 4$ to approximate $\int_0^1 e^{x^2} dx$. Draw the approximating trapezoids.
 - Find an upper bound for the error in this approximation.
- How large do we need to choose n so that the approximation S_n to $\int_1^3 \ln x dx$ is accurate to within $\frac{1}{1000}$?

Section 8.9

- Determine whether the following integrals converge or diverge. Evaluate those that converge.

a.) $\int_{-\infty}^0 e^{3x} dx$

b.) $\int_{-\infty}^{\infty} \frac{1}{x^2 + 1} dx$

c.) $\int_1^3 \frac{1}{(x-1)^4} dx$

d.) $\int_{-1}^8 \frac{1}{\sqrt[3]{x}} dx$

- For each of the following integrals, determine whether the integral converges or diverges using the comparison theorem.

a.) $\int_1^{\infty} \frac{1}{\sqrt{x^3 + 4}} dx$

b.) $\int_1^{\infty} \frac{1 + e^{-x}}{x} dx$