

## Homework #8: Sections 8.4-8.8

Complete each question below. Answers should be carefully written up, showing all necessary work for each step to complete each problem. Your turned-in work should be neat and legible. If I cannot understand or follow your work you will not get credit for it. You may discuss these problems with myself, the TAs and Math Center tutors, and your classmates, but once you start writing up the problem to turn in, you must complete the write-up on your own. This assignment is out of **37 points**. It is due at the **start of class on Tuesday, October 27**.

- (7 points) Find all real values of the parameter  $p$  so that  $\int_0^2 \frac{\ln x}{x^p} dx$  converges.
- (5 points) What does the comparison theorem say about the integral  $\int_1^\infty \frac{|\sin(x)|}{x} dx$ ? Explain your answer in complete sentences. Do you think that this integral converges or diverges? What about the integral  $\int_1^\infty \frac{\sin(x)}{x} dx$ ? You can use a CAS to do test values of the limits to help justify your answers, if you want.
- (10 points) Complete Problem 24 in Section 8.7 of the book. Print out the Maple commands and graphs that you used in the problem.
- (5 points each) Solve the following integrals:

(a)  $\int \frac{x}{x^4 + x^2 + 1} dx.$

(b)  $\int \ln(x^2 - 1) dx$

(c)  $\int \frac{dx}{\sqrt{x} + x\sqrt{x}}$