Due on February 13, 2006, Monday

MATH 114 Homework 1

1. [**p631-ex65**] Find the values of p for which each integral converges.

$$\textbf{a}. \int_1^2 \frac{dx}{x(\ln x)^p}, \qquad \textbf{b}. \int_2^\infty \frac{dx}{x(\ln x)^p}.$$

2. [**p637-ex144**] Evaluate the following improper integral.

$$\int_{-\infty}^{\infty} \frac{4dx}{x^2+16}.$$

3. [**p637-ex148**] Does this improper integral converge or diverge?

$$\int_1^\infty \frac{e^{-t}}{\sqrt{t}}\, dt.$$

4. [**p638-ex218**] Evaluate the integral

$$\int_2^\infty \frac{4v^3+v-1}{v^2(v-1)(v^2+1)}\, dv.$$

5. [**p638-ex220**] Find a positive number a satisfying

$$\int_0^a \frac{dx}{1+x^2} = \int_a^\infty \frac{dx}{1+x^2}.$$