

# Homework 5

Math 232 section 006

Due: Tuesday, October 23rd

1. Determine if the following integrals converge or diverge. Evaluate those that converge.

(a)  $\int_{-\infty}^{\infty} e^{-r^2} r \, dr$

(b)  $\int_{10}^{\infty} \frac{\ln x}{x^2} dx$

(c)  $\int_0^1 \frac{x}{\sqrt{1-x^2}} dx$

2. Evaluate the following integral:  $\int \frac{5x^2 + 4x + 3}{x(x+1)^2} dx$

3. Prove that  $\int_{-\infty}^0 e^x \cos x \, dx$  is convergent.

4. Use the integral test to determine if the following series converges or

diverges:  $\sum_{n=1}^{\infty} \frac{n}{(n^2 + 1)^2}$

5. Find the Taylor series (about  $x = 0$ ) for the function:

$$f(x) = \frac{3x^2}{(x+4)(2-x)}$$