

Math 111-002  
Assignment # 8

Please remember that the assignment consists of only a sample of the kind of questions you are supposed to be able to do. It is **not** a safe practice to just do the assignment, and that is why there is a list of “suggested practice problems” in the course web page.

1. Decide whether each integral is convergent or divergent. Evaluate those that are convergent.

(a)  $\int_3^{\infty} \frac{x}{(x^2 + 2)^2} dx$

(b)  $\int_2^{\infty} \frac{e^{-\sqrt{x}}}{\sqrt{x}} dx$

(c)  $\int_{-\infty}^{\infty} x^3 e^{-x^4} dx$

(d)  $\int_2^3 \frac{1}{\sqrt{3-x}} dx$

(e)  $\int_0^1 \frac{\ln x}{\sqrt{x}} dx$

2. Find the values of  $s$  for which the integral converges, and evaluate the integral for those values of  $s$ :

$$\int_e^{\infty} \frac{1}{x (\ln x)^s} dx.$$

3. Use comparison to determine whether the integral is convergent or divergent.

(a)  $\int_0^{\infty} \frac{\arctan x}{3 + 2e^x} dx$

(b)  $\int_1^{\infty} \frac{1}{\sqrt{x+1}} dx$

(c)  $\int_3^{\infty} \frac{3 + 2e^{-x}}{x} dx$