

Name: _____
Spring 2018

MAT 296: HW 6
Due: 02/26

Problem 1: Determine whether the following improper integral converges or diverges. If it converges, give the value of the integral:

$$\int_0^{\infty} \frac{x}{(x^2 + 1)^2} dx$$

Problem 2: Determine whether the following improper integral converges or diverges. If it converges, give the value of the integral:

$$\int_2^6 \frac{dx}{6(x-2)^{3/2}}$$

Problem 3: Determine whether the following improper integral converges or diverges. If it converges, give the value of the integral:

$$\int_{-\infty}^{\infty} \frac{dx}{x^2 + 9}$$

Problem 4: Determine whether the following integral converges or diverges. If it converges, determine the value of the integral:

$$\int_{-\infty}^0 \sin \theta \, d\theta$$

Problem 5: Determine whether the following integral converges or diverges. If it converges, find its value.

$$\int_3^9 \frac{dx}{\sqrt{x^2-9}}$$

Problem 6: Determine whether the following integral converges or diverges. If it converges, find its value.

$$\int_{-2}^2 \frac{dx}{x}$$

Problem 7: Determine the values of p for which the integral

$$\int_e^{\infty} \frac{dx}{x(\ln x)^p}$$

converges. Find the value of the integral for these values of p .

Problem 8: Determine whether the following integral converges or diverges. [Hint: Try the Comparison Test for Integrals.]

$$\int_1^{\infty} \frac{\sin^2(e^x) + 3}{\sqrt[3]{8x^9 + 1729}} dx$$