

Math 1220 Section 1 - Fall 2007
Exam II

Answer the questions in the spaces provided on the question sheets. Show all work to receive credit. If you use a convergence test, state which test you are using. Each question is worth 10 points.

Name: _____

$$1. \lim_{x \rightarrow 0} \frac{\tan^{-1} x - x}{8x^3} =$$

$$2. \lim_{x \rightarrow 0} \left(\csc x - \frac{1}{x} \right)$$

$$3. \int_1^{\infty} 2xe^{-x^2} dx =$$

$$4. \int_0^4 \frac{dx}{(2-3x)^{1/3}} =$$

5. Find the sum of the series or show that it diverges:

$$\sum_{k=0}^{\infty} \left[2 \left(\frac{1}{4} \right)^k + 3 \left(-\frac{1}{5} \right)^k \right]$$

6. Determine if the following sum converges or diverges:

$$\sum_{k=1}^{\infty} k e^{-3k^2}.$$

7. Determine if the following series is absolutely convergent, conditionally convergent or divergent:

$$\sum_{n=1}^{\infty} (-1)^{n+1} \frac{n}{n^2 + 1}.$$

8. Find the convergence set for the given power series:

$$\sum_{n=1}^{\infty} (-1)^n \frac{(x-2)^n}{n}.$$

9. Find the power series representation of the given function and determine its radius of convergence:

$$f(x) = \frac{x^2}{1 - x^4}.$$

10. Find the Taylor series of f in $x - a$.

$$f(x) = 1 + x^2 + x^3, \quad a = 1.$$