

MAT 222 - 061
Spring 2008
Test Two

Determine whether each of the following series (# 1 – 8) is **absolutely convergent**, **conditionally convergent**, or **diverges**. If the series is a convergent geometric series, find its sum. State the test you are using and show all details of the test. Always verify the conditions needed for the test to be valid.

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

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

3.
$$\sum_{k=1}^{\infty} \frac{1+k+k^2}{\sqrt{1+k^2+k^6}}$$

4.
$$\sum_{k=1}^{\infty} (-1)^k \frac{k}{5+k}$$

5.
$$\sum_{k=2}^{\infty} \frac{k^2+1}{k^3-1}$$

6.
$$\sum_{k=3}^{\infty} \frac{1}{k \ln k \ln(\ln k)}$$

7.
$$\sum_{k=1}^{\infty} \frac{e^k}{3^{k-1}}$$

8. Show that the series $\sum_{k=1}^{\infty} \frac{(-1)^k k}{4^k}$ converges and approximate the sum with an error no larger than 0.0005.

9. Determine the interval of convergence of the power series

$$\sum_{k=1}^{\infty} \frac{k(x-4)^k}{k^3+1}$$