

TEST 3

(MATH 200 (A), Fall 06)

1. Use partial fractions to show that $\sum_{k=1}^{\infty} \frac{1}{k(k+1)} = 1$. (10 pts)

2. For the geometric series $\sum_{n=0}^{\infty} e^{-3n}$, find the following: (15 pts)

(a) the first three terms (b) The ratio r (c) The sum of the series.

3. Use the Integral Test to determine whether the series $\sum_{n=1}^{\infty} \frac{5n}{\frac{5}{2}n^2 - 1}$ converges or diverges. (10 pts)

4. Use the Comparison Test to determine whether the series $\sum_{n=1}^{\infty} \frac{1 + \sin n}{n^2}$ converges or diverges. (10 pts)

5. Use the Ratio Test to determine whether the series $\sum_{n=1}^{\infty} \frac{e^n}{n!}$ converges or diverges. (15 pts)

6. Use the n -th Root Test to determine whether the series $\sum_{n=1}^{\infty} \frac{n^n}{(2^n)^2}$ converges or diverges. (15 pts)

7. Find the Taylor series of $f(x) = \frac{1}{x^2}$ at $x_0 = 1$. Make sure you include the n^{th} - term of the series. (15 pts)

8. Find the *radius* of convergence around $x = 1/2$ and the interval of convergence for the power series: $\sum_{k=1}^{\infty} \frac{3^k}{k} (x - \frac{1}{2})^k$. (10 pts)