

**EXAM 2**  
Math 132  
August 1, 2008

Name \_\_\_\_\_

1. For each of the following integrals, determine whether or not they converge or diverge.

(a)  $\int_0^{\pi/2} \cot(x) \, dx$

(b)  $\int_1^5 \frac{2}{\sqrt{5-x}} \, dx$

(c)  $\int_{-\infty}^0 xe^{-4x} \, dx$

(d)  $\int_1^{\infty} \frac{1}{x^2} \, dx$

2. Does the sequence  $a_n = \frac{3n^2 + 1}{5n^2 - 8}$  converge or diverge? If it converges what does it converge to?

3. Is the sequence  $a_n = \frac{3^n}{e^n + 1}$  convergent or divergent? Why?

4. For each of the following series show whether or not the series converges or diverges.

(a) 
$$\sum_{k=1}^{\infty} \frac{k+1}{k^2 + 2k + 3}$$

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

$$(c) \sum_{k=1}^{\infty} \frac{2 + \cos(k)}{k}$$

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

$$(e) \sum_{k=1}^{\infty} \frac{k^2}{e^k}$$

$$(f) \sum_{k=1}^{\infty} \frac{2k}{k!}$$

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

$$(h) \sum_{k=1}^{\infty} \frac{e^{3k}}{k^{3k}}$$

5. Is the series  $\sum_{k=0}^{\infty} (-1)^k \frac{3}{2^k}$  a geometric series? Explain your answer. If it is geometric, does it converge and to what?

6. Does the series  $\sum_{n=1}^{\infty} \frac{(-1)^n}{n\sqrt{n}}$  converge conditionally? Does it converge absolutely?

7. Find the radius and interval of convergence for the power series  $\sum_{k=0}^{\infty} \frac{2^k}{k^2} (x+2)^k$