

MATH 222, Lec. 3, EXAM #2

YOUR NAME

T.A.'s NAME

Show all your work. No calculators or references.

1.(20 points)
2.(20 points)
3.(20 points)
4.(20 points)
5.(20 points)
Total

1. Determine which of the following sequences $\{a_n\}$ converge or diverge. If the sequence converges find the limit.

(a) $a_n = \frac{\ln(4 + e^n)}{2n}$ (b) $a_n = (1 + 3/n)^{2/n}$

2. Decide whether the following series converge or diverge. Justify your answer.

(a)
$$\sum_{n=2}^{\infty} \frac{1}{n (\ln n)^3}$$

(b)
$$\sum_{n=1}^{\infty} \frac{n^2 + 1}{n^4 + 1}$$

3. Decide whether the following series are absolutely convergent, conditionally convergent, or divergent. Justify your answer.

$$(a) \sum_{n=1}^{\infty} \frac{(-1)^n 3n}{4n-1}$$

$$(b) \sum_{n=0}^{\infty} \frac{(-1)^n n^3}{3^n}$$

4. Find the radius of convergence and interval of convergence for the series

$$\sum_{n=0}^{\infty} \frac{(-3)^n (x-1)^n}{\sqrt{n+1}}$$

5. Find a Taylor series expansion about $x = 0$ for the function $f(x) = \ln(1 + x^2)$. What is the interval of convergence?