

Sample Test No. 2
Math 130 - Calculus and Analytical Geometry II

Value Problem

1. Find the limit of the following sequences, justifying each of your steps:

10 a) $\{a_n\} = \{(3 \ln n)^{1/n}\}$

10 b) $\{a_n\} = \left\{ \frac{n \sin n}{\sqrt{n^3 + 1}} \right\}$

10 2. Does the following series converge or diverge, and why?

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

10 3. Find the interval of convergence of the power series

$$\sum_{n=0}^{\infty} \frac{n}{3^n(n+1)} (x-2)^n$$

10 4. Use comparison tests to evaluate the convergence or divergence of the series

$$\sum_{n=1}^{\infty} \frac{2n-1}{\sqrt{n^6+1}}$$

10 5. Does the following series converge absolutely or only conditionally?

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

10 6. Write out the finite Taylor expansion for $f(x) = \sqrt{1+x}$ with $a = 0$ and $n = 3$. Use this expansion to approximate $\sqrt{1.2}$, and estimate the size of the error.