

Math 231 Homework 5

Due Apr 15th Submit at the beginning of the class (Put into the box with your TA's name)
Do the calculation and write the numbers during the process

1. Use the integral test to determine whether the series is convergent or divergent.

a) $\sum_{n=1}^{\infty} \frac{1}{\sqrt[5]{n}}$

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

c) $\sum_{n=1}^{\infty} \frac{n}{n^2+1}$

2. (a) Use the sum of the first 10 terms to estimate the sum of the series $\sum_{n=1}^{\infty} 1/n^2$.

How good is this estimate?

(b) Find a value of n so that ensure that the error in the approximation $s \approx s_n$ is less than 0.001.

3. Find all positive values of b for which the following series converges:

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

4. Determine whether the series converges or diverges:

(a) $\sum_{n=1}^{\infty} \frac{n+1}{n\sqrt{n}}$

(b) $\sum_{n=1}^{\infty} \frac{9^n}{3+10^n}$

(c) $\sum_{n=1}^{\infty} \frac{1}{\sqrt{n^2+1}}$

5. Show that the series is convergent. How many terms of the series do we need to add in order to find the sum of the indicated accuracy?

(a) $\sum_{n=1}^{\infty} \frac{(-1)^{n+1}}{n^6}$ ($|error| < 0.00005$)

(b) $\sum_{n=0}^{\infty} \frac{(-1)^n}{10^n n!}$ ($|error| < 0.000005$)