

Problem Set 3

Atul Anurag
email aa2894@njit.edu

1. Find the sum of the following series:

$$(a) \sum_{n=3}^{\infty} \frac{1}{(n-1)(n-2)}, \quad (b) \sum_{n=1}^{\infty} \frac{2^{2n} + 4^n}{6^n}$$

2. Use a **comparison test** to determine whether the series converges or diverges:

$$\sum_{n=1}^{\infty} \frac{1}{n} \left(\frac{1}{4}\right)^n$$

3. Use the **ratio test** to determine whether the series converges or diverges:

$$\sum_{n=1}^{\infty} \frac{(n+2)!}{n! 9^n}$$

4. Use the **root test** to determine whether the series converges or diverges:

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

5. Determine whether the following series is convergent or divergent. Please state which test you are using.

$$\sum_{n=1}^{\infty} \left(\frac{2+n^2}{1+2n^2}\right)^n$$

6. Determine whether the following series is convergent or divergent. Please state which test you are using.

$$\sum_{n=1}^{\infty} \left(\frac{1}{2}\right)^{1/n}$$