

Homework Set 6

DUE: OCT 30 - NOV 1, 2017 (AT THE BEGINNING OF RECITATION)

1. Decide if the following series converge or diverge. If they converge, find their limit.

(a)
$$\sum_{n=1}^{\infty} \frac{\pi}{5^n}$$

(b)
$$\sum_{n=1}^{\infty} \frac{4^n}{5^n}$$

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

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

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

2. Use the Integral Test to decide if the following series converge or diverge:

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

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

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

3. Use the comparison, ratio, or root tests to decide if these series converge or diverge:

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

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

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

(d)
$$\sum_{n=1}^{\infty} \frac{n+1}{n^3 - 3n^2 + 4}$$