

Homework Problems for Chapter 11, Section 7

(1) Determine whether  $\sum_{n=5}^{\infty} \frac{(4n^3 + n^2 + 5) \sin(n^2 - n)}{n^5 - n - 1}$  converges or diverges.

(2) Determine whether  $\sum_{n=6}^{\infty} \frac{n^3 - n - 7}{7n^4 + n^3 + 2}$  converges or diverges.

(3) Determine whether  $\sum_{n=2}^{\infty} \frac{1}{n(\ln n)^{3/2}}$  converges or diverges.

(4) Determine whether  $\sum_{n=8}^{\infty} \frac{(n+10)n! \cos(2^n - 3^n)}{(n+3)!}$  converges or diverges.

(5) Determine whether  $\sum_{n=5}^{\infty} \frac{\cos(n\pi)n^3}{n^4 - 2}$  converges or diverges.

(6) Determine whether  $\sum_{n=2}^{\infty} \left( \frac{n}{n+0.5} \right)^{n^2}$  converges or diverges.

Hint: What is  $\lim_{n \rightarrow \infty} \left( 1 + \frac{1/2}{n} \right)^n$ ?

(7) Determine whether  $\sum_{n=9}^{\infty} \frac{n^5 4^n}{5^n}$  converges or diverges.

(8) Determine whether  $\sum_{n=6}^{\infty} \frac{\cos(2^n + 3) \sqrt{n^2 - 4}}{n^3 + n + 7}$  converges or diverges.

(9) Determine whether  $\sum_{n=1}^{\infty} \frac{(-1)^n n}{\sqrt{4n^2 + 1}}$  converges or diverges.

(10) Determine whether  $\sum_{n=3}^{\infty} \frac{(n!)^2 3^n}{(2n)!}$  converges or diverges.

(11) Determine whether  $\sum_{n=2}^{\infty} \frac{3^n + n^2}{5^n - n^2}$  converges or diverges.