

Name: Solutions

Section: 5 6 9 10

1. Find the sum of the geometric series $\sum_{n=1}^{\infty} \frac{(-1)^n}{5^n}$ ratio = $-\frac{1}{5}$

$$\frac{\text{first term}}{1 - \text{ratio}} = \frac{-\frac{1}{5}}{1 - (-\frac{1}{5})} = \frac{-1}{5 + 1} = -\frac{1}{6}$$

2. Determine if the following series converge or diverge. You may use techniques of geometric series, telescoping series, p -series, divergence test, and integral test.

(a) $\sum_{n=1}^{\infty} \frac{1}{\sqrt[3]{n}}$ p -series $p = \frac{1}{3} \leq 1$

series diverges

(b) $\sum_{n=1}^{\infty} \frac{2-n}{3-n}$ Divergence test:

$$\lim_{n \rightarrow \infty} \frac{2-n}{3-n} \stackrel{4}{=} \lim_{n \rightarrow \infty} \frac{-1}{-1} = 1 \neq 0$$

series diverges