

Math 232 Worksheet 11 - Sequences and Series

1. Find the limit of the *sequence* if it converges. Otherwise explain why it diverges.

$$(a) a_n = \frac{n^2 + n + 2}{n^2 + n} \quad (b) a_n = \frac{n^2}{e^n} \quad (c) a_n = \cos\left(\frac{1}{2^n}\right) \quad (d) a_n = \frac{\sin(n^2)}{n}$$

2. Determine whether the *series* is convergent or divergent. *Find the sum* if it is convergent. If it is divergent, explain why.

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

Answer Keys:

1. (a) 1 (b) 0 (c) 1 (d) 0

2. (a) 1 (b) $\frac{2}{3}$ (c) $\frac{3}{2}$ (d) divergent