Math 253 Lesson 6 - Series Introduction

1. Write the following infinite sums using summation notation.

   a. $\frac{2}{1} + \frac{4}{1} + \frac{8}{2} + \frac{16}{6} + \frac{32}{24} + \frac{64}{120} + ...$

   b. $\frac{5}{4} - \frac{8}{9} + \frac{11}{16} - \frac{14}{25} + \frac{17}{36} - ...$

2. Write the sum in expanded form. Find at least 5 partial sums of the series. Graph both the sequence of terms and the sequence of partial sums on the same screen. Does it appear that the series is convergent or divergent?

   a. $\sum_{n=1}^{\infty} \frac{12}{(-5)^n}$

   b. $\sum_{n=1}^{\infty} (1.1)^{n+1}$

3. Is it even possible for the following series to converge?

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

c. $\sum_{n=1}^{\infty} \cos\left(\frac{1}{n}\right)$

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

d. $\sum_{n=1}^{\infty} \frac{1+3^n}{2^n}$

4. Telescope the sum and use the limit of the partial sums to find the infinite sum.

$\sum_{n=2}^{\infty} \frac{2}{n^2-1}$