



Problem 1 – Introduction to an Alternating Series

1. What do you notice about the path of the large dot?
2. Relate the illustration to a number line with both positive and negative values. What can you now say about the path of the dot?
3. If the center is 0 and each line is a term belonging to a series, what can you say about the series and its terms?

Problem 2 – Alternating Series Test

Use pages 2.3 to 6.1 to determine the convergence or divergence of the following series.

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

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

6.
$$\sum_{n=1}^{\infty} \frac{n}{(-3)^{n-1}}$$

7.
$$\sum_{n=1}^{\infty} \frac{(-1)^n 2n}{3n-1}$$

Problem 3 – Alternating Series Estimation

Use the spreadsheet on page 7.3 to answer the following questions.

8. Approximate the sum of the alternating series, $\sum_{n=1}^{\infty} \frac{(-1)^{n-1}}{2n!}$
 - i) by its first three terms
 - ii) by its first six terms
9. What do you notice about change in the sum as the value of n increases?
10. What do you think will occur with the approximation as the series approaches infinity?