SECTION 5.2: SERIES (DAY 1)

Things to know by the end of this section

a. how to use sigma notation *with facility*

b. the meaning of a *series*, especially as compared to a *sequence* (from §5.1)

c. the meaning of *a sequence of partial sums of a series* and how to find it.

d. what it means to say a series converges.

e. what a *geometric series* is and how to determine whether or not it converges.

f. what a *telescoping series* is and how to determine whether or not it converges.

1. An infinite series is

2. The sequence of partial sums of a series is

3. For each series below, expand the sigma notation and then write the first 5 terms in its sequence of partial sums, S_1, S_2, S_3, S_4, S_5. (Use a calculating device to get a decimal or fraction representation of the partial sums.)

   (a) $\displaystyle\sum_{n=1}^{\infty} \left(\frac{2}{3}\right)^n$

   (b) $\displaystyle\sum_{n=1}^{\infty} \frac{1}{n(n+1)}$

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

(d) $\sum_{n=1}^{\infty} \frac{n}{n^2+2}$

4. **Definition:** Given the series , its sequence of partial sums is .

   - The series converges if
   - The series diverges if

5. Revisit the series in # 3 and determine (if possible!) whether the series converges or diverges. Show your work!