

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. A starter example

4. For each series below,

- i. expand the sigma notation,
- ii. write the first 5 terms in the *series*,
- iii. write the first 5 terms in the *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) $\sum_{n=1}^{\infty} \left(\frac{2}{3}\right)^n$

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

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

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

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

- The series converges if _____
- The series diverges if _____

6. Revisit the series in #4. Which ones do you think converge? Diverge? How sure are you about your conclusions?