

# Homework 7

Name:

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**P 1.** Consider the series

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

1. Find a formula for  $s_n$ . [Hint: Find the partial fractions decomposition of  $\frac{2(n^2+3n+3)}{n(n+1)(n+2)(n+3)}$ ]
2. Find  $s_1, s_2, s_3$ , and  $s_4$
3. Find the sum of the series,  $S$ .

**P 2.** Consider the sequence with  $n$ th term

$$a_n = f^{(n)}(x)$$

where  $f(x) = \frac{1}{1-2x}$ .

- (a) Find the first five terms of the sequence.
- (b) Find a formula for the  $n$ th term of the sequence.
- (c) Simplify  $a_n/n!$