

MAC 1140
LA session

Week 12

1. Find the first five terms and the 50th term of each sequence

a) $\left\{ \frac{n-1}{n^2} \right\}_{n=1}^{\infty}$

b) $\left\{ \frac{(-1)^{n+1}}{n!} \right\}_{n=1}^{\infty}$

2. Find the first five terms of a sequence defined recursively as

a) $a_1 = 2, a_n = \frac{1}{1 + 2a_{n-1}}, n \geq 2$

b) $a_1 = 1, a_2 = 2, a_n = \frac{a_{n-1}}{a_{n-2}}, n \geq 3$

3. Find the formula for the n-th term of the sequence whose first several terms are given

a) $1, \frac{3}{4}, \frac{5}{9}, \frac{7}{16}, \frac{9}{25}, \dots$

b) $\frac{3}{4}, -\frac{4}{5}, \frac{5}{6}, -\frac{6}{7}, \frac{7}{8}, \dots$

4. Write out the sum. Do not evaluate

a) $\sum_{k=1}^9 \frac{k!}{k+1}$

b) $\sum_{k=1}^6 (-1)^k e^{-k}$

5. Write each sum using sigma notation. Do not evaluate.

a) $\frac{1}{1 \cdot 2} + \frac{1}{2 \cdot 3} + \frac{1}{3 \cdot 4} + \dots + \frac{1}{32 \cdot 33}$

b) $\frac{1}{2} - \frac{1}{2^2} + \frac{1}{2^3} - \frac{1}{2^4} + \dots + \frac{1}{2^{55}}$

6. Find each sum

a) $\sum_{k=1}^{87} (3k - 4)$

b) $\sum_{k=15}^{213} (2k^2 - 3k)$

c) $\sum_{k=1}^{52} (k-1)(2k+3)$