Practice Midterm 1

Math 253

February 6, 2024

You may use a hand-written sheet of notes.

Show your work where appropriate.

No calculators or cheating.

1. Find a formula for the general term in the following sequences.  
   Indicate whether you’re starting from or ; either choice is ok.  
   1. 2, 5, 8, 11, 14, …

* 1. , , , , , …

1. Suppose that , and for we have .   
   1. Write out the first five terms of the sequence.
   2. Find an explicit formula for .
2. Evaluate the following limits:

   2. .
3. Consider the series .
   1. Write it in sigma notation, that is, as or .
   2. Find the first three partial sums .

* 1. Does the series converge or diverge? If it converges, find the sum.  
     Hint: It is a geometric series, although it doesn’t start from 1.

1. Consider the telescoping series .  
   1. Find the first three partial sums

* 1. Give a formula for the nth partial sum .
  2. Does the series converge or diverge? If it converges, find the sum.

1. Use the integral test to decide whether the following series converge or diverge.