Homework 10.1

This homework will not be handed in. It will be covered on Exam 2

1. For each of
   §11.1: Problems 17, 19, 21, 29, 31, 33, 35, 39, 45.
   
   (a) Graph a few terms of the sequence. How many depends on how easily you can answer
   the next question.
   
   (b) What is the limit of the sequence?

2. For each of
   §11.2: Problems 15–33 odd.
   Does the series converge? Give a brief reason for your answer.

3. For each of
   §11.3: Problems 15–23 odd.
   Is the series convergent? Give a brief reason for your answer.

4. Find a strong comparison for each convergent series in Problem 3.

5. For §11.3: Problem 15, approximate the sum as follows.

   (a) Compute \( \sum_{1}^{10} \frac{1}{n^2 + 4} \)

   (b) Use your strong comparison and an integral to bound the error:

   \[ \sum_{11}^{\infty} \frac{1}{n^2 + 4} \]

   Answer:

   (a) 0.566

   (b) Depends on your strong comparison. I got error less than 0.099.

   
   Answer: Depends on your cutoff point and your strong comparison. However, you should have

   \[ 0.69174 - (\text{your answer}) < (\text{your error bound}) \]
7. Approximate the sum in §11.3: Problem 19 with an error no greater than 0.00001 as follows.
   (a) Use a strong comparison and an integral to bound the error
   \[
   \sum_{a+1}^{\infty} n e^{-n^2}
   \]
   (b) Set this to be less than 0.00001 and solve for \( a \).
   (c) Compute
   \[
   \sum_{1}^{a} n e^{-n^2}
   \]
   Answer: Depends on your comparison. I used \( x e^{-x^2} \) and got \( a = 4 \), so
   \[
   \sum_{1}^{4} n e^{-n^2} \approx 0.40488
   \]

8. Approximate the sum in §11.3: Problem 23 with error no greater than 0.02. Follow the outline in Problem 7.