

Written Homework 7

MATH 126

Solve each of the following problems. Work out your problems on scratch paper first, then write your solutions neatly on the pages you plan to turn in. Write the problems in assigned order, with each problem clearly labeled. Use words to clearly explain your work and methods. The reader should never have to guess or infer your intentions.

For a brief guide to writing homework solutions, see *Writing Mathematics Well* from Harvey Mudd College.

Scan or photograph your solutions and submit them (as a single file) to the Written Homework 7 assignment on Moodle. This assignment is due at classtime on **Wednesday, October 15**.

1. Explain, using both words and mathematical notation, precisely what it means to say that

$$\sum_{a_n} = 5.$$

2. Compute the first six terms of the sequence of partial sums for the series

$$\sum_{n=1}^{\infty} \frac{(-1)^{n-1}}{n!}.$$

3. Find an infinite series (with all nonzero terms) that converges to $\frac{11}{9}$.

Hint: In class we found that $\frac{1}{3} = \frac{3}{10} + \frac{3}{100} + \frac{3}{1000} + \frac{3}{10000} + \cdots$.

4. Suppose that a ball is dropped a height of 5 meters and bounces, and on each bounce it rebounds two-thirds of its previous height. Find the total number of meters that the ball will travel, including the distance traveled on all bounces.
5. Determine whether each series converges or diverges (give a reason). If the series converges, find its sum (show your work).

(a) $\sum_{n=1}^{\infty} \frac{(-3)^{n-1}}{4^n}$

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