

## Homework #9: Sections 12.1, 12.2, and 12.3

Complete each question below. Answers should be carefully written up, showing all necessary work for each step to complete each problem. Your turned-in work should be neat and legible. If I cannot understand or follow your work you will not get credit for it. You may discuss these problems with myself, the TAs and Math Center tutors, and your classmates, but once you start writing up the problem to turn in, you must complete the write-up on your own. This assignment is out of **20 points**. It is due at the **start of class on Tuesday, November 3**.

1. (3 points) Find a formula for the general term  $a_n$  of the sequence  $(1, \frac{1}{3}, \frac{1}{15}, \frac{1}{105}, \dots)$ .
2. (7 points) Show that the sequence which is recursively defined by  $a_1 = 2$  and  $a_{n+1} = \frac{1}{3-a_n}$  is bounded between 0 and 2 and is monotone decreasing. Does this sequence converge? If so, find its limit.
3. (5 points) Express the repeating decimal  $2.5\overline{37}$  as a geometric series, and use the geometric series formula to write this repeating decimal as a fraction.
4. (5 points) Find all  $x$  values for which the series  $\sum_{n=1}^{\infty} \frac{(x+1)^n}{3^n}$  converges. What is the limit?