Math 116 Quiz 7: § 9.1-9.3 **Tue 20 Nov 2012**
(Sequences and Series) **Name:** _____

You have 35 minutes to complete this quiz. Eyes on your own paper and good luck!

1. **Definitions/Concepts.** (1 pt ea) Decide whether each of the statements below is *True* or *False*. Write the entire word *True* or *False*. If the statement is false, briefly explain why.

   (a) A convergent sequence is bounded.

   (b) A bounded sequence converges.

   (c) Changing a finite number of terms in a series does not change whether or not it converges, although it may change the value of its sum if it does converge.

   (d) If $\sum_{n=1}^{\infty} a_n$ converges, then $\lim_{n\to\infty} a_n = 0$.

2. **Questions/Problems.** *(from April 2011 Final Exam)* You are trapped on an island, and decide to build a signal fire to alert passing ships. You start the fire with 200 pounds of wood. During the course of a day, 40% of the wood pile burns away (so 60% remains). At the end of each day, you add another 200 pounds of wood to the pile. Let W_n denote the weight of the wood pile immediately after adding the nth load of wood (the inital 200-pound pile counts as the first load).

   (a) (3 pts) Find expressions for W_1, W_2, W_3.

   (b) (3 pts) Find a closed form expression for W_n (a *closed form* expression means your answer should not contain a large summation).

(c) (2 pts) Instead of starting with 200 pounds of wood and adding 200 pounds every day, you decide to start with P pounds of wood and add P pounds every day. If you plan to continue the fire indefinitely, determine the largest value of P for which the weight of the wood pile will never exceed 1000 pounds.

3. **Computations/Algebra.**

(a) (1 pt) Find a formula for the general term of the sequence $\frac{1}{3}, \frac{2}{5}, \frac{3}{7}, \frac{4}{9}, \frac{5}{11}, \ldots$.

$$s_n =$$

(b) (2 pts) Does the sequence given by $s_n = \frac{2n+(-1)^n 5}{4n-(-1)^n 3}$ converge or diverge? If it converges then find its limit.

(c) (3 pts) Find the first three terms of the sequence of partial sums for the series $\sum_{n=1}^{\infty} \frac{1}{n(n+1)}$.

(d) (2 pts) Does the series $\sum_{n=1}^{\infty} \frac{n+1}{2n+3}$ converge or diverge?