

Fall 2009

### **Problems of the Week (POWs) Assignments**

Your solution will be graded according to the Math 396 POW Scoring Rubric, and thus your write up should include all your reasoning, and not just a final answer.

*The **emphasis** of these assignments is on **clear, complete and precise explanations**. Please write your solutions in a way that a "typical" student in the 5-8<sup>th</sup> grade range will be able to follow it.*

If you do not like the score you receive on a particular POW, you can choose the other POW from that assignment and turn in your solution by 12/3. Please attach the POW you wish to replace. I will average the scores of the two attempts.

These problems were taken from: [www.eduplace.com](http://www.eduplace.com), <http://www.cmc.uwaterloo.ca>, *Crossing the River with Dogs Instructor Resources* by Johnson, Herr and Kysh; *Problem Solving Through Recreational Mathematics* by Averbach and Chein.

**POW 1 DUE 10/7:** Choose one of the following two problems:

In his autobiography, Count Burr Turr tells about an occasion during his childhood when he decided to write all the counting numbers from one to one million. It was a noble undertaking, but his arm gave out after he had written only 31,676 digits. Assuming that the Count was using decimal notation, what was the last digit he wrote before his arm grew numb?

The sum of all of the digits of the integers from 98 to 101 is  
 $9 + 8 + 9 + 9 + 1 + 0 + 0 + 1 + 0 + 1 = 38$

The sum of all of the digits of the integers from 1 to 2009 is

**POW 2 Due 10/21:** Choose one of the following two problems:

In a soccer league with 6 teams (P, Q, R, S, T, W), each team must eventually play each other team exactly once. So far, P has played one match, Q has played 2 matches, R has played 3 matches, S has played 4 matches, and T has played 5 matches. How many matches has W played so far?

In the fall, the members of the small and very exclusive Lawnsand Garden Club began to plan the following season's garden arrangements. After several meetings, the five members of the club (Mr. Issac Iris, Ms. Rita Rose, Madame Anastasia Azalea, Dr. Frederick Forsythia, and Sir Horace Holly) decided that each should send a plant to one of the others.

- The five plants corresponded, in some order to the names of these five people.
- Each of the five received exactly one plant; in no case did the receiver, or the sender, have the same name as the plant.
- Ms. Rose sent a holly to Dr. Forsythia.
- The recipient of the plant sent by the doctor sent a rose.
- The flower lover with the same name as the plant sent by Madame Azalea received a forsythia from the namesake of the plant that Maddame Azalea received.

Who sent what to whom?

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**POW 3 Due 11/25:** Choose one of the following two problems:

In the board game "Silly Bills", there are \$1, \$2 and \$3 bills.

There are 11 more \$2 bills than \$1 bills.

There are 18 fewer \$3 bills than \$1 bills.

If there is \$100 in total, then how many \$1 bills are there in the board game?

A list of six positive integers  $p$ ;  $q$ ;  $r$ ;  $s$ ;  $t$ ;  $u$  satisfies  $p < q < r < s < t < u$ . There are exactly 15 pairs of numbers that can be formed by choosing two different numbers from this list. The sums of these 15 pairs of numbers are:

25; 30; 38; 41; 49; 52; 54; 63; 68; 76; 79; 90; 95; 103; 117:

Which sum equals  $r + s$ ?