Recitation #3 Warm-Up Problems
1/24/2014

1) At the end of 1994, Walter was half as old as his grandmother. The sum of the years in which they were born is 3838. How old will Walter be at the end of 1999?

2) The student lockers at Olympic High are numbered consecutively beginning with locker number 1. The plastic digits used to number the lockers cost two cents apiece. Thus, it costs 2 cents to label locker number 9 and four cents to label locker number 10. If it costs $137.94 to label all lockers, how many lockers are there at the school?

3) Define a sequence of real numbers $a_1, a_2, \ldots$ by $a_1 = 1$ and $a_{n+1}^3 = 99a_n^3$, for all $n \geq 1$. What is a_{100}? (Please answer in the form x^y, where x and y are integers.)

4) What is the sum of the digits in the number $2^{1999}5^{2001}$?

5) Before Ashley started a three hour drive, her car's odometer read 29792, a palindrome. At her destination, her odometer reading was a different palindrome. If Ashley never exceeded 75 miles per hour, what is the greatest possible value of her odometer reading at the end of her trip?

Recitation #3: Set Problems
1/24/2014

Fill in the blanks for the following groups of statements in questions 1 through 3. As for "showing your work," you should be able to explain in words what the notation in each question means and why your answer is right.

1) $|\{ \emptyset, \{0\}, \{1\}, \{11\}, \{0, 1\}, \{1, 2, 1 + 2\} \}| =$ ___________________

2) $A = \{0, 2, 4, 6\}$
   $B = \{0, 1, 2\}$
   $C = \mathbf{Z}^+$
   $(A \cup B) - C =$ ______________

3) $A = \{1, 3, 4, 5, 8\}$, $B = \{$__ , __ , __ , __ $\}$
   $A \cup B = \{ 1, 2, 3, 4, 5, 6, 8\}$
   $A - B = \{3, 5, 8\}$

4) Prove or disprove the following statement about sets, using any method.

$$A \cap (B \cup C) = (A \cap B) \cup C$$

5) Prove or disprove the following statement about finite sets, using any method:

If $|A \cap B| = |A \cup B|$, then $A = B$.