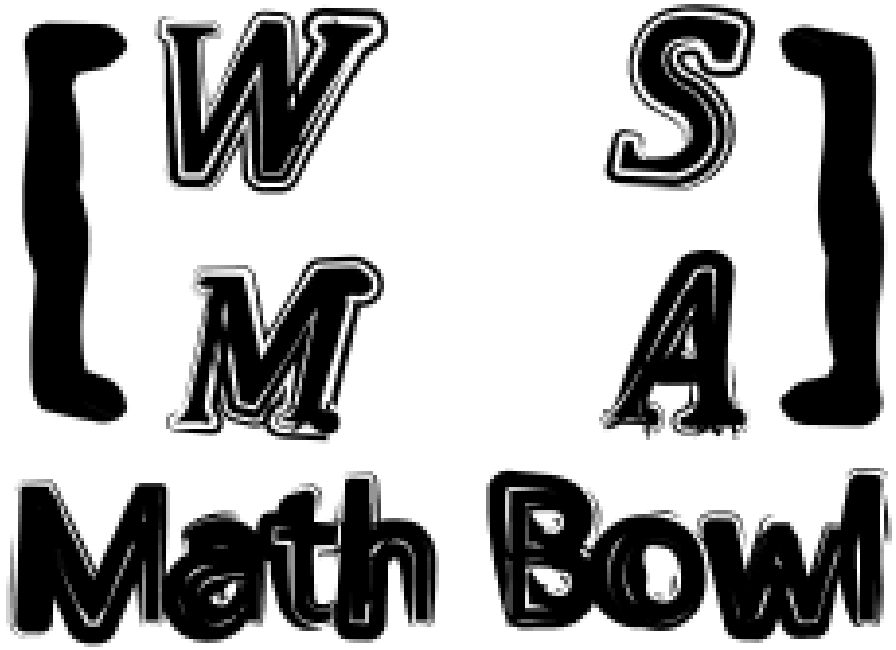

Mental Math

4th Annual WSMA Math Bowl
March 29, 2014

Problem 1

Jacob has a certain number of baseball cards and his sister Serina has 6 more than he. If the product of their respective number of cards is 40, find the total number of cards they have combined.

Problem 2

If a bat and a ball cost 110, and the bat costs 100 more than the ball, how much does the ball cost?

Problem 3

Let x be an integer so that9<x2<99. What is the difference between the maximum and the minimum value of x?

Problem 4

Evaluate 1001^2-999^2.

Problem 5

Evaluate the sum of the sum of the first four cubes and the alternating sum of the first three squares, minus the number whose value tripled is four more than its value doubled.

Problem 6

Two 6 faced dice A and B, labeled with positive integers from 1 to 6, were rolled. How many possible ways can the sum of the numbers on the dice be a multiple of 4?

Problem 7

Evaluate log(2)2048.

Problem 8

A hemisphere of radius R has the same volume as a cone of base radius r and height 2r. What is the ratio R/r?

Problem 9

Foris goes to a restaurant that offers a three course dinner consisting of an appetizer, a soup and an entrée. He decides to have the three course meal. There are 5 veg and 3 non-veg appetizers, 4 veg and 3 non-veg soups, and 12 veg and 8 non-veg entrées. Find the number of meals available to him if he decides that at least one of the food items in the three course dinner will be vegetarian.

Problem 10

Find the remainder when 212112121*212112122*424224243 is divided by 6.

Problem 11

The arithmetic mean of a and b is greater or equal to the geometric mean. Find the range of a and b that satisfies this condition.

Problem 12

How many pairs of positive integer solutions are there to the equation 201320132013x+310231023102y= -201331022013?

Problem 13

What is the expected value in a game in which a player rolls a standard six sided dice three times, and he gets n-3 dollars profit when rolled an value of n.

Problem 14

Andrew and Foris are running a race around a track. They both run at constant rates. It is given that over 5 hours Andrew can run 9 complete laps while Foris can only run 6. Given that they start at the same place, how much time will pass in minutes after they start running until they are at the same place again?

Problem 15

What is the 24th prime number?

Problem 16

What is the area of the triangle with vertices (1, 2), (3, 3), and (6, 6)?