CNCM Math Bowl Preliminary Round 1

CNCM Administration

Let there be two positive numbers in AlgebraLand, x and y, $x + y = 56$, x and y are both even, x is divisible by 3, but not 5. y is divisible by 5, but not 3. Lastly, AlgebraLand has a strict rule. None of its numbers can be 6, due to 6 cents being stolen the other day from a local supermarket. What is the positive difference of x and y?

There are 20 red and 25 purple marbles in a jar. 14 marbles are randomly removed from the jar and put in a second jar. What is the expected value of the positive difference between the number of red marbles in the second jar and the number of purple marbles remaining in the first jar?

What is the sum of the coefficients of the polynomial $(9x - 7)^{15}$.

18 students are separated into 3 rooms of 6. Find the probability that Cameron and Tom are in the same room, but Kyler is not.

Find the maximum number of times that 8 lines can intersect on a single plane.

How many numbers from 1 to 1000 (inclusive) do not contain the digit 3?

Find the sum of all real roots of $4 + \sqrt{x} = \sqrt{x}(\sqrt{x - 6} + 1)$

Find the total number of 1's in the base 2 conversion of all numbers 1-10 inclusive.

When 3 distinct numbers are added 2 at a time, the sums turn out to be $30, 67$, and 43. What is the sum of the digits of the number produced when these 3 distinct numbers are added together?

The product of 7 not necessarily distinct prime numbers is 14528. Find the prime factorization of this number.

For what value of x does $1 + x + x^2 + x^3 + \cdots = 10$?

How many 3 digit palindromes (a palindrome is a number that if read backwards, it is the same number, such as 4004).

Find the units digit of 19^{103}

A calculator tells you that x, to 7 decimal places, is equal to 15.3245553. From analysis it is known that $x = a + \sqrt{b}$ such that $0 < a < b$ and that a and b are integers. Find x.

Find the number of positive integers greater than $\frac{\sqrt{5}}{2}$ and less of the reciprocal of $\left(2^{-2}\right)\left(\frac{-1}{3^3}\right)$ $\left(\log_{10} 0.001\right)$