Intermediate Math Circles
Counting
Problem Set

Exercise 1: Consider three-digit positive integers that use no digits other than 7, 8, or 9 such as 789 and 998. In total, how many of such three-digits positive integers exist?

Exercise 2: If you wrote down all of the integers from 3000 to 5999, inclusive, how many times would you write the digit 5?

Exercise 3: How many of the integers from 3000 to 5999, inclusive, contain at least one 5?

Exercise 4: Consider the integers from 400 to 899, inclusive. How many of these integers have at most one digit that is a 3?

Exercise 5: How many three-digit positive integers have exactly one even digit?

Exercise 6: If you wrote down all of the integers from 300 to 599, inclusive, what is the sum of all of the digits that you would write?

Here are a couple of different types of counting questions from past CEMC contests.

Exercise 7: How many positive integers are there between 10 and 1000 have the property that the sum of its digits is 3?

Exercise 8: An integer is defined to be *upright* if the sum of its first two digits equals its third digit. For example, 145 is an upright integer since $1 + 4 = 5$. How many positive 3-digit integers are upright?