

Review Problems for Test 2

1. How many 5-digit numbers are there (not starting with 0) with exactly two 4's, and no other repeated digits?
2. How many results are possible when three identical dice are rolled?
3. How many ways are there for 8 different customers to line up at four different teller windows at the bank, where the order in each line matters?
4. How many different outcomes are there if a coin is flipped 5 times? Of these, how many have exactly 2 heads?
5. Set up a generating function for the number of ways to distribute 10 identical detectives among 4 different crime scenes so that the first crime scene has either 2 or 3 detectives, and each of the other crime scenes has at least one detective.
6. Make up a counting problem whose solution is the coefficient of x^{10} in $(1+x^2)(1+x+x^2+\dots)^2$
7. Use the concept of "committee selection" to construct a combinatorial identity for $\binom{3n}{3}$
8. How many arrangements are there of the letters in HAWAII:
 - a) with no restriction?
 - b) with both A's together?
 - c) with both A's together and the I's separated?
 - d) with no consecutive A's and no consecutive I's?