

HOMEWORK SET #6 / CO1A / Fall 2009

- 1.) How many integers between 1 and 800 inclusive are divisible by none of 4, 6, 8, 12 and 13?
- 2.) Use the principle of inclusion and exclusion to solve: Twenty people each roll a dice. In how many ways can the score add up to 46?
- 3.) Use the principle of inclusion and exclusion to count the number of ways to choose 15 elements from a set of 6 a's, 6 b's and 8 c's.
- 4.) Assume A_1, A_2, \dots, A_n are subsets of a finite set S . Find an expression for the size of $S - \{A_1 \cap A_2 \cap \dots \cap A_n\}$ in terms of the unions of any number of A_i 's (similar to the one we derived in class for $S - \{A_1 \cup A_2 \cup \dots \cup A_n\}$ in terms of the intersections of the sets A_i 's).
- 5.) Use the principle of inclusion and exclusion to count the number of codewords of length 10 over the alphabet $\{1, 2, 3, 4\}$ containing each digit at least once.
- 6.) Find the number of permutations of the set $\{1, 2, \dots, n\}$ ($n \geq 6$) in which the patterns 124, 25, 35, 256, 536 and 213 do not appear.
- 7.) You must sit n pairs of policemen around a round table such that no policemen from the same pair are sitting next to each other. How many different ways can you do that?
- 8.) Find a formula for $\phi(n)$, the number of integers relative prime to n , assuming we are given the prime factorization of n .

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