HOMEWORK SET #6 / CO1A / Spring 2020

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 count the number of ways one can score 70 rolling 40 distinguishable dice?
3. Find the number of permutations of the set $\{1, 2, \ldots, n\}$ ($n \geq 6$) in which the patterns 124, 25, 35, 256, 536 and 213 do not appear.
4. Find the number of ways to pair off n couples into n coed teams such that the partners are all in different teams.
5. Find a formula for $\phi(n)$, the number or integers relative prime to n, assuming we are given the prime factorization of n.
6. A grade school class has three sport teams. For any two students in the class, there is at least one team so that the two students are members of that team. Prove that there is a team that contains at least 2/3 of the students of that class.
7. Assume A_1, $A_2, \ldots, A_n$ are subsets of a finite set S. Find an expression for the size of $S - \{A_1 \cap A_2 \cap \ldots \cap A_n\}$ in term of the unions of any number of A_i's (similar to the one we derived in class for $S - \{A_1 \cup A_2 \cup \ldots \cup A_n\}$ in term of the intersections of the sets A_i's). (20 points)

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