

3. From a group of 8 women and 6 men, a committee consisting of 3 men and 3 women is to be formed. How many different committees are possible if **2 men refuse to serve together** and **2 women will only serve if they are together**. [10 pts]
4. There are 5 couriers and 10 (identical) packages. In how many ways can they divide the packages among themselves? Be careful! El Chapo doesn't like mistakes! [10 pts]

5. If it is assumed that all $\binom{52}{5}$ poker hands are equally likely, what is the probability of being dealt 2 pairs? (This occurs when the cards have denominations a, a, b, b, c, and a, b, c are all distinct).

[10 pts]

6. 9 fair dice are rolled. What is the probability of getting 3 pairs and one triple? (This occurs when the dice have denominations a, a, b, b, c, c, d, d, d, where a, b, c, and d are all distinct) [10 pts]

7. A pair of dice is rolled until a sum of either 5 or 7 appears. Find the probability that a 5 occurs first [10 pts]

8. Suppose that A and B are mutually exclusive events for which $P(A) = 0.3$ and $P(B) = 0.3$. What is the probability that A occurs but B does not? [10 pts]

9. A total of 28 percent of American males smoke cigarettes, 7 percent smoke cigars, and 5 percent smoke both cigars and cigarettes. What percentage smokes cigars but not cigarettes? [10 pts]

10. Consider a group of 10 people. If everyone shakes hands with everyone else, how many handshakes take place? [10 pts]

Extra Credit

11. 6 children want to ride on a merry-go-round (a carousel). How many ways are there to sit them if 3 of them are friends and will only sit next to each other? [10 pts]

12. Give a combinatorial argument for the identity $k \binom{n}{k} = n \binom{n-1}{k-1}$ [10 pts]