Class 3. Counting Principles: combinations. Classical Probability. Conditional Probability.

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1 Counting Principles: Combinations

1. An bag contains 15 marbles of which 10 are red and 5 are white. 4 marbles are selected from the bag.
   (a) How many (different) samples (of size 4) are possible?
   (b) How many samples (of size 4) consist entirely of red marbles?
   (c) How many samples have 2 red and 2 white marbles?
   (d) How many samples (of size 4) have exactly 3 red marbles?
   (e) How many samples (of size 4) have at least 3 red?
   (f) How many samples (of size 4) contain at least one red marble?
2. 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:
   (a) there are no other restrictions?
   (b) 2 of the men refuse to serve together?
   (c) 2 of the women refuse to serve together?
   (d) 1 man and 1 woman refuse to serve together?

2 Conditional Probability

1. What is the probability that a family of two children has
   (a) two boys given that it has at least one boy?
   (b) two boys given that the first child is a boy?