A. Fundamental Counting Principle with Combinations
In the following examples, you will need to draw several lines representing fundamental counting principle, but each line will be filled using the formula for combinations.

1. How many different committees can be formed from six teachers and 20 students if the committee is to consist of 2 teachers and 3 students? HINT: There are two events taking place so draw two lines, but each line will be filled using the formula for combinations.

2. Michael is sent to the store to get five different bottles of regular soda and three different bottles of diet soda. If there are 10 different regular sodas and seven different diet sodas at the store, how many different choices does Michael have?

3. A man has 6 pairs of pants, 8 shirts, 5 ties, and 3 sport coats. He plans to pack for a trip taking 3 pair of pants, 5 shirts, 2 ties and 2 sport coats. How many different ways can he pack?

B. Probability using Combinations
In the following problems:

a) Determine the number of items in the sample space using the “Combination” formula
b) Determine the number of ways the desired event may occur using the “Combination”
c) Write your two answers as a fraction to indicate the probability of the desired event – reducing when necessary.

1. If the digits 0 through 9 are placed in a hat and three digits are selected at random, what is the probability that the three digits will be greater than 5?
   a) How many ways can three digits be selected from 10 digits?
   b) How many ways can three digits be selected from the digits greater than 5?
   c) What is the probability that the desired event occurs?
2. A committee is to be chosen from a group of 5 Freshmen and 4 Sophomores. If the committee is to have three members, what is the probability that the committee is all Freshmen?
   a) How many three member committees can be chosen from the 9 members?
   b) How many three member FRESHMEN committees can be chosen from the 5 freshmen?
   c) What is the probability that the desired event occurs?

3. A bag contains 3 quarters, 5 dimes, and 6 pennies. If 4 coins are selected at random, what is the probability that 3 pennies are selected?
   a) How many ways can four coins be selected from a bag of 14?
   b) How many ways can 3 pennies be selected from a group of 6?
   c) What is the probability that the desired event will occur?

YOU TRY: There are seven red marbles and four green marbles in a bag. What is the probability that if 3 marbles are selected they are all red?

HW: 12.9 PG 642 Problems 33, 35, 37
    12.10 PG 646 Problems 9, 11