Combinations and Permutations Worksheet 1

1. The school board has seven members

   a. The board must have three officers: a chairperson, an assistant chairperson, and a secretary. How many different sets of these officers can be formed from this board?

   b. How many three-person committees can be formed from this board?

   c. Is part (a) asking for a number of *permutations* or a number of *combinations*? What about part (b)?

   d. How are your answers to parts (a) and (b) related?

2. Ralph Simpson has room for three plants on a windowsill.

   a. In how many different ways can three plants be arranged on his windowsill?

   b. Was (a) a permutation or a combination?

   c. Suppose Ralph has six plants. How many groups of three plants can be put on his windowsill?

   d. Was (b) a permutation or a combination?

   e. Suppose Ralph has nine plants. How many ways can three of these plants be arranged on his windowsill?

   f. Was (c) a permutation or a combination?

3. To open your locker, you must dial a sequence of three numbers called the lock's *combination*. Given that there are 40 numbers on a lock, how many different locker combinations are there?

4. Suppose fifteen people qualify for a college cheerleading squad, six women and nine men.

   a. How many six-member squads can be selected?

   b. Suppose that exactly two members of the six-member squad must be male. How many six-member squads can be selected?

   c. Find the probability of the event in part (b) if you were to pick the squads randomly.

5. Ten band directors at a summer band camp are planning to give a performance. One of the pieces they want to play calls for a Flute, an oboe, a bassoon, and a clarinet. Each of the band directors can play all four instruments. How many different quartets can they have?

6. Ophelia Payne has 35 CD's and two different CD players. Upstairs, she has a 6-disc changer. Downstairs she has a 20-disc changer.

   a. If she plans to play the 6 discs straight through starting on the first disc in the chamber, how many different ways can she arrange her 35 CD's into her upstairs changer?

   b. If she played them continuously on her downstairs player, how many different arrangements can she use?

   c. Assume she now wants to use the "shuffle" feature of the changer. How many different arrangements (of disc choices not total songs) can she create upstairs?

   d. How many arrangements can Ophelia make in the downstairs player on "shuffle" mode?

   e. In her car, Ophelia has a single disc player. Currently in her player is the "new" Red Hot Chili Peppers disc. This disc has 13 tracks. Ophelia hits the "random play" button which will randomly arrange the 13 tracks into an order. What is the probability that the tracks will play in the original order (1, 2, 3, 4, …, 13)?