

## Chapter 15 Group Work

For each of the questions below, give your answer first in  ${}_nC_r$  or  ${}_nP_r$  form, then find the numerical answer.

- 1.) The board of directors of Microsoft has 13 members, including Bill Gates. In how many ways can one choose:
  - a.) A committee of 4 members (President, VP, Treasurer and Secretary).
  - b.) A committee of 4 members (President, VP, Treasurer and Secretary), where Bill Gates must be President?
  - c.) A committee of 4 members where all members have equal standing?
  - d.) A committee of 4 members where all members have equal standing, but Bill Gates is NOT a member?
- 2.) There are 117 Division I-A college football teams.
  - a.) How many Top 10 rankings are possible?
  - b.) How many ways are there to choose 8 teams for a playoff?
- 3a.) In Texas Holdem Poker, a player is first dealt two cards face down. How many different opening hands are there?
- 3b.) Next, 3 cards are shown face up all at the same time (called the flop). How many different "flops" are there?

## Probability

The probability of an event is the number of possibilities in which that event happens divided by the total number of possibilities.

**Example:** What is the probability that you will roll a 3 in one roll of a fair 6 sided die?

**Answer:** If you roll a die, there are 6 possible outcomes. We call this a Sample Space and write the outcomes like this:  $\{1,2,3,4,5,6\}$ . Only one of these possibilities is the one we want, so the probability of rolling a 3 is  $1/6 = 0.167$ . Notice that probabilities are always between 0 and 1.

**Example:** What is the probability that you will roll a pair (the same number twice) in two rolls of a fair 6 sided die?

First you must calculate the total number of outcomes. How many ways are there to roll a 6 sided die twice?

Now how many ways are there to roll a pair?

Now divide your second answer by your first. Did you get 0.167?

**Example:** What is the probability that you will roll "Snake eyes" (two 1's) in two rolls of a fair 6 sided die?

**Example:** If you flip a fair coin, what is the probability of getting heads?

**Example:** If you flip a fair coin 20 times, how many heads should you get?

Try it. Did you get the right answer? Why or why not?