Math 164
Fall, 2009 Name: **Solutions**
Quiz 11 - §§11.4, 11.5

For each of the following problems circle T if the given statement is always true and F if the statement is sometimes false. There is no partial credit on this part of the quiz.

1. T F A set with n elements has 2^n subsets.

   This is true. Think about the sum of the rows of Pascal's triangle.

2. T F If you toss seven fair coins, there are 120 ways to obtain at least one head and one tail.

   This is false. There are $2^7 = 128$ total possible ways for the coins to land. We can subtract the two ways that there is not at least one head and at least one tail (when they are all heads or all tails), so there are $128 - 2 = 126$ ways for this to happen.

   Complete the following problems. Show all work and explain your reasoning.

3. Write out the first 7 rows of Pascal's triangle.

$$\begin{array}{ccccccccccccccc}
 & & & & & & & 1 & & & & & & & \\
 & & & & & & 1 & & 1 & & & & & & \\
 & & & & & 1 & & 2 & & 1 & & & & & \\
 & & & & 1 & & 3 & & 3 & & 1 & & & & \\
 & & & 1 & & 4 & & 6 & & 4 & & 1 & & & \\
 & & 1 & & 5 & & 10 & & 10 & & 5 & & 1 & & \\
 & 1 & & 6 & & 15 & & 20 & & 15 & & 6 & & 1 & \\
1 & & 7 & & 21 & & 35 & & 35 & & 21 & & 7 & & 1
\end{array}$$

4. The ten longest Broadway runs include *The Phantom of the Opera* and *Les Miserables*. Four of the ten are chosen randomly (assume order is not important). How many of these groups of four would include neither of the two productions mentioned?

   There are ${}_{10}C_4 = 210$ total ways to choose 4 productions. There are ${}_8C_4 = 70$ ways to choose productions other than those mentioned, so 70 ways.