Chapter 13 Homework **Name:** _____

Compute the following permutations and combinations:

1a. ${}_5P_2$ 1b. ${}_5C_2$

1c. ${}_6P_2$ 1d. ${}_4C_4$

1e. ${}_4P_3$ 1f. ${}_6C_3$

1g. ${}_4P_4$ 1h. ${}_3C_2$

1i. ${}_3P_2$ 1j. ${}_5C_2$

2. A hot sauce company has developed ten new hot sauces, but only want to market the three best-tasting hot sauces. In order to identify the best-tasting sauces, the company has people taste the hot sauces and give taste ratings. But, because this is a hot sauce the company only wants to have each person taste four of the ten hot sauces. How many combinations of four hot sauces can be administered across people?

3. You have an unbiased six-sided die that you roll 10 times and record the number of dots on the side facing up. You consider a roll of 3 to be a *success* and any other number a *failure*. Based on this information answer the following:

3a. What the probability of successfully rolling a 3?

3b. What is the probability of failing to roll a 3?

3c. Based on the information above, what is the probability of rolling a 3 five times out of ten rolls? (When raising the p and q values to their respective exponents carry out your work to <u>six</u> decimal places for accuracy. Round your final answer to three places.)

4. Using the same die and success/ failure information from #3, say that you roll the die 10,000 times and count the number of 3's (successes).

4a. What is the expected mean number of 3's that you will roll after 10,000 rolls of the die?

4b. What is the approximate variance of this distribution of die rolls?

4c. What is the approximate standard deviation of this distribution of die rolls?

4d. Say that you end up rolling a three 1750 times. What is the z-Score of this number of threes?

4e. What is the probability of rolling this many three's or more?