Statistical Reasoning Name: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

WS 8.5: Permuations/Combinations Date: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ Day: \_\_\_\_\_\_

**Evaluate.**

1.  2.  3.  4.  5.  6. 

**Identify the following as a Permutation, Combination, or Counting Principle.**

1. In a race in which six automobiles are entered and there are not ties, in how many ways can the first four finisher come in?
2. The model of the car you are thinking of buying is available in nine different colors and three different styles (hatchback, sedan, and SUV). In how many ways can you order the car?
3. A book club offers a choice of 8 books from a list of 40. In how many ways can a member make a collection?
4. A medical researcher needs 6 people to test the effectiveness of an experimental drug. If 13 people have volunteered for the test, in how many ways can 6 people be selected?
5. From a club of 20 people, in how many ways can a group of three members be selected?
6. From the 30 pictures I have of my daughter’s birthday, my digital from will only hold 3 at a time.
	1. How many different groups of 3 pictures can I put on the frame?
	2. What if I just wanted the first 3 pictures to be my favorite, best smile, and cake smashing
7. A popular brand of pen is available in three colors, and four tips. How many different choices of pens do you have with this brand?
8. A corporation has ten members on its board of directors. In how many ways can it elect a presidents, vice-president, secretary, and treasurer?
9. For a segment of a radio show, a DJ can play 7 songs. If there are 12 songs to select from, in how many ways can the program segment be arranged?
10. How many different ways can a director select 4 actors from a group of 20 to attend a workshop on performing rock musicals?
11. What if the director in #10 wanted to fill the positions of lead, supporting actor, extra 1, extra 2.
12. Suppose you find 7 articles related to the topic of your research paper. In how many ways can you choose 5 articles to read?
13. You are trying to decide on a cell phone plan. You can choose from 5 different phones and 3 different call/text/data plans. How many different plans could you pick from?

**Find the number of possible arrangements.**

1. The ski club with ten members is to choose three officers for captian, co-captain, and secretary. How many ways can these offices be filled?
2. An election ballot asks voters to select three city commissioners from a group of 6 candidates. In how many ways can this be done?
3. The company Sea Esta has ten members on its board of directors. In how many ways can it elect a Presidents, Vice-President, Secretary, and Treasurer?
4. A popular brand of pen is available in three colors, and four tips. How many different choices of pens do you have with this brand?
5. A four person committee is to be elected from an organization’s membership of 11 people. How many different committees are possible?
6. A segment of a radio show wants to play 7 songs in a row without interruption. If there are 12 songs to choose from, in how many ways can the songs for this segment be arranged?
7. Suppose you are asked to list, in order of preference, the three best movies you have seen in the last year. If you saw 6 movies, how many ways can the three best be chosen and ranked?
8. You are on your way to Hawaii, but your parents say that your packing is limited to 4 pairs of shorts, 2 pairs of pants, 5 tops, and 3 shoes. How many different outfits can you create?
9. You are on your way to your grandparents house for the weekend and you want to take 4 books to read. If you have 12 books to chose from, how many different collections of 4 books can you take?
10. There are 12 stanbys who hope to get on a flight to Hawaii, but there are only 6 seats available. How many different ways can the 6 people be selected?
11. In the Long Beach Air Race six planes are entered and there are no ties. In how many ways can the first three finishers come in?
12. Seven bands have signed up to perform at the benefit concert but there is only enough time for 4 bands. How many different band lineups are possible?
13. How many three-character internet domain names are possible if:
	1. We can use letters only with no repetition?
	2. We can use letters or digits with repetition?
14. From 1959-1999, license plates in New Jersey followed the pattern of 3 letters followed by 3 numbers. After 1999, the pattern changed to 3 letters, followed by 2 digits, followed by another letter. There are no restrictions on the letters or digits.
	1. How many license plates were possible between 1959-1999?
	2. How many license plates are available after 1999?

1. Suppose New Jersey decided to not allow the letters D, T, or X in the first position OR the letters I, O, or Q in **any** position. How many license plates are available after 1999?