Exploring the World of Math

Name: _____ Date: _____

Combinations and Permutations

1. You have an 8 character password that can contain 26 capital letters, 26 lower case letters, 10 numbers and 8 special characters. You can use any one more than once. How many passwords combinations are there? What is the ratio of breaking your password?

2. You have a 4 character password that has your pet's name and you use only lower case letters. How many tries can the hacker use to break your secret password? What is the ratio of breaking your password?

3. The customer folders in the office have enough room to write three capital characters which could be letters A through Z followed by five numbers 0 through 9. An example is ABC10203. How many combinations can we have if we can repeat any letter or number?

4. Another company has a folder system in the office have enough room to write three capital characters which could be letters A through Z followed by three numbers 0 through 9. An example is ABC102. How many combinations can we have if we cannot repeat any letter or number?

5. A person orders a triple dip ice cream from a dairy farm that serves 40 different flavors. How many days can we visit the dairy farm before repeating any combination?

Tree Diagrams

6. Leaving your house, there are two directions you can drive (**N**orth and **S**outh). Then there are three main highways to that bring you to school (**A**, **B**, **C**). There are multiple exits and you can arrive to the building by four paths (**p1, p2, p3, p4**). Create a diagram showing the combinations.

7. How many unique routes are there to the school?

8. You hear that there is a single accident by the school, what is the probability of picking the stopped route?

9. You chose to fly from Columbus to Seattle. You have four airlines leaving within an hour of each other (**NW, UN, SW DE**), When you arrive at Seattle International Airport, you have two choices of buses to take you to the small town on the Pacific coast (**A, B**). When you are dropped at the main street, you have 3 modes of transportation to the beach house (**cab, rental, bike**). Create a diagram showing the combinations.

10. How many unique routes are there to the beach?

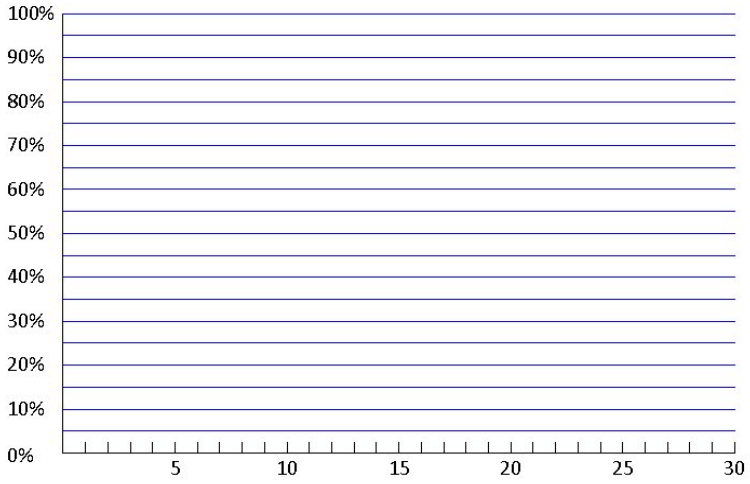
11. What is the probability that one route will keep you from your destination?

Sampling

12. We tagged 92 cows in the forest in June. We counted 13 tagged cows out of 247 this Wednesday at a creek crossing. What is the estimated number of cows on the ranch?

Graphing

13. We have a two choice scenario and we want to draw a graph of the probability. Can you predict the shape of the graph?



14. We have a 52 card deck. How many unique 5 cards hands can you have?

15. You are playing the lottery that has 6 balls drawn and the numbers on the 54 balls are 1 through 54. What is the probability that you can win with one ticket? With ten tickets?