Exploring the World of Math

Name: _____ Date: _____
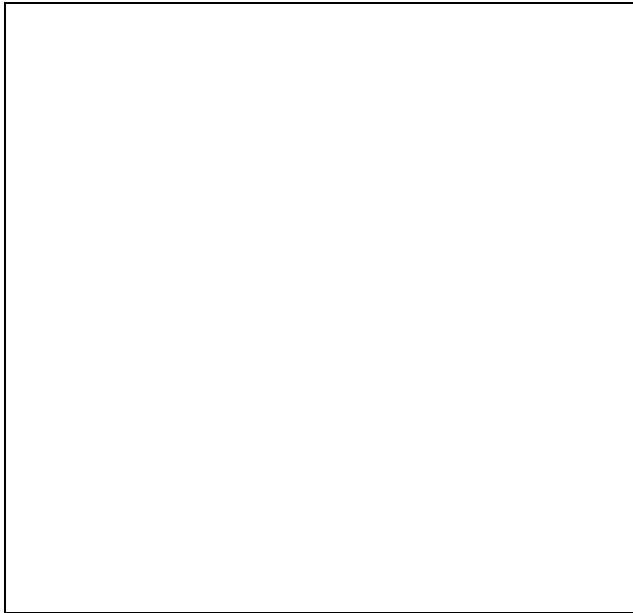
Test 3: Combinations, Permutations and Samplings

1. Roger, a Vet tech helps tag buffalo for one week. They tag 14 on Monday, 12 on Tuesday, 8 on Wednesday, 16 on Thursday and finish with 7 on Friday. The next month, the spotters count 9 out 60 tagged buffalo as herd crosses Hawkins creek. Estimate the herd size.

2. You have a 6 character password that can contain 26 capital letters, 26 lower case letters, 10 numbers and 12 special characters. You can use any one more than once. How many passwords combinations are there? What is the ratio of breaking your password?

3. You have 4 character pin for your debit card where you can only use numbers. How many tries can the hacker use to break your secret pin? What is the ratio of breaking your password?

4. The customer folders in the office have enough room to write four capital or lower case characters which could be letters A through Z or a through z followed by three numbers 0 through 9. An example is ABcd102. How many combinations can we have if we can repeat any letter or number?

5. A person orders a triple dip ice cream from a dairy farm that serves 38 different flavors. How many days can we visit the dairy farm before repeating any combination?

6. You are playing the lottery that has 7 balls drawn and the numbers on the 60 balls are 1 through 60. What is the probability that you can win with one ticket? With ten tickets? (Hint: this problem is setup similar to the ice cream problem)
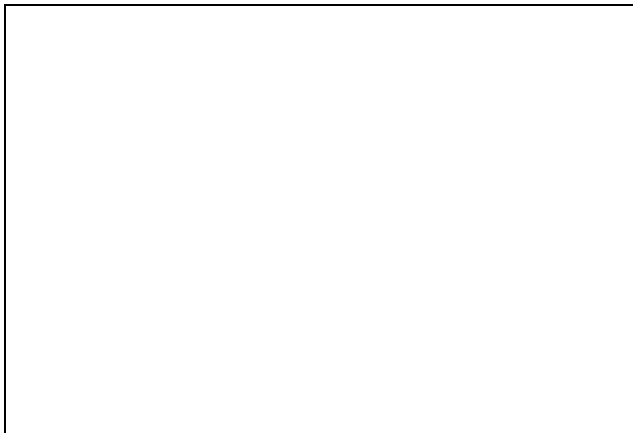
Tree Diagrams

7. Leaving your house, there are two directions you can drive (**E**ast and **W**est). At the end of the street there are three directions to that bring you to work. We will call them (**E**lm, **B**rice, **C**assidy). There are multiple entrances to work when the three routes converge and you can arrive to the building by four paths (**r1, r2, r3, r4**). Create a tree diagram showing the combinations.

8. How many unique routes are there to work?

9. You hear that there are two accidents on the way to work, what is the probability of picking the stopped route?

10. Your female horse has given birth two times. Create a tree diagram showing the combinations of the possible offspring.

11. What is the probability of having all females?

12. What is the probability of having just two males?

13. What is the probability of having only one female?

14. We have a scenario where we have one choice out of four and we want to draw a graph of the probability. Can you predict the shape of the graph?