Exploring the World of Math

Name: _____ Date: _____

Final: Combinations, Permutations and Samplings

1. Francis wants to study three harmful organisms. We will call them R, S and T. What are all the permutations that Francis can choose from to study the organisms?

2. How many ways can the same scientist study five different parasites that we will call F, G, H, I and J if the permutations that we will look at begins with I?

3. How many permutations are there of the following sets?

{W, X, Y, Z}

{1, 2, 3, 4, 5, 6, 7}

4. A horse has four foals over a period of time. Draw a tree diagram that shows the possible permutations of the offspring and answer the questions concerning the diagram.

5. How many outcomes have only two male foals?

6. How many outcomes have just three female foals?

7. How many outcomes have only 1 female offspring?

8. Carla has purple, red, yellow, orange and pink blouses, four different pairs of dark pants and 3 pairs of shoes. How many combinations she can arrange for her wardrobe on vacation?

9. A veterinarian has shown you a permutation of seven characters that calculates to 586,051,200. This permutation comprises of sample spaces that just has variations of the same data. How can we compute the combinations and what is the number that the veterinarian is looking for?

10. Our favorite singer is performing in a fund raising concert for endangered species that we will attend. The singer has 62 popular songs. She will only perform 5 songs at the concert. One of the songs will be her number one hit this year. How many unique combinations can be made for the concert?

11. We are eating ice cream cones everyday at the local confectionary. We order cones that can have three different flavors. The store has 21 flavors. How many permutations can we arrange and how many days before we would have to repeat a type of cone?

12. We have 12 people in the class which are 8 women and 4 men.
    a. How many ways can they be arranged in a line?

    b. If the first four in the line are Marianne, Stephanie, Barb and Connie, how many ways can we arrange the group?

13. A scientist asks us to create a labeling system for the test folders that has 2 capital letters and some amount of numbers. She needs a system to hold 1 million tests but would not need more than 10 million. Create a labeling system and show that your system meets the requirement mathematically.

14. We are interviewing 41 vet tech candidates for 3 positions on a research team. One would act as senior tech, the other is the tester, and the last will be the data recorder. How many unique teams can be sent to Brazil for their assignment?

15. If a woman has six children, what is the probability of having all females?

16. You have 5 character pin that begins with a capital letter and then four numbers? How many different passwords can be created? If a hacker can try 20 passwords a second, how many minutes until they break into your account if it does not have a lockout set up?

17. You are playing the local lottery that has six balls drawn and the numbers on the 48 balls are 1 through 48. What is the probability that you can win with a single ticket? With five tickets?

18. Frank is going to a restaurant that serves 6 appetizers, 4 soups and 3 salads, 4 main entrées and 3 desserts.
    a. How many permutations of the meals can we have if we choose from the appetizers, the salad, the entrees and the desserts?

    b. How many permutations of the meals can we have if we choose from the soup or salad, and the entrees?

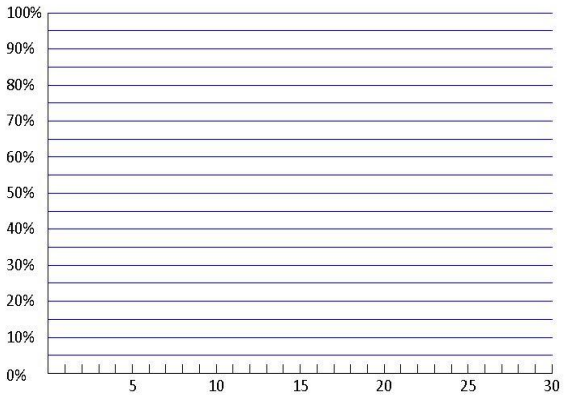
    c. What is the number of permutations if we choose from soup or salad or we have both?

19. We are playing a card game with a deck of 52 cards. We draw our first card. What is the probability of getting an ace on the first card?

20. Mark flips a coin, and then rolls a single die. How many different sample spaces are possible?

21. We are watching 30 teams race for a gold, silver or bronze medal in the bicycle race. How many different outcomes can we observe?

22. We are observing adult male giraffe, adult female giraffe, young male giraffe and young female giraffe approach the group leader. We create a probability graph that shows when the adult female giraffe approaches the group leader. What percentage will this approach? Draw an example of the graph.



23. How many combinations are there of the following sets?

{A, B, C}

{1, 2, 3, 4, 5}