Exploring the World of Math

Name: _____ Date: _____

Final: Combinations, Permutations and Samplings

1. How many permutations can the same scientist study with four different parasites that we will call M, N, O and P?

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

{A, B, C, D, E}

{1, 2, 3, 4, 5, 6, 7, 8, 9}

3. A kangaroo has four Joeys over a period of time. Draw a tree diagram that shows the possible permutations of the offspring and answer the questions concerning the diagram.

4. How many outcomes have only three male Joeys?

5. How many outcomes have just two female Joeys?

6. How many outcomes have only 1 male offspring?

7. If a woman has five children, what is the probability of having all males?

8. Tonya is going to a restaurant that serves 4 appetizers, 2 soups and 3 salads, 5 main entrées and 4 desserts.
    a. How many permutations of the meals can we have if we choose from 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 dessert?

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

9. Miami wants to study three harmful organisms. We will call them B, C and D. What are all the permutations that Miami can choose from to study the organisms?

10. Our favorite singer is performing in a fund raising concert for endangered species that we will attend. The singer has 39 popular songs. She will only perform 3 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 29 flavors. How many permutations can we arrange and how many days before we would have to repeat a type of cone?

12. We are playing a card game with a deck of 52 cards. We draw a single card. What is the probability of getting a king on the first card?

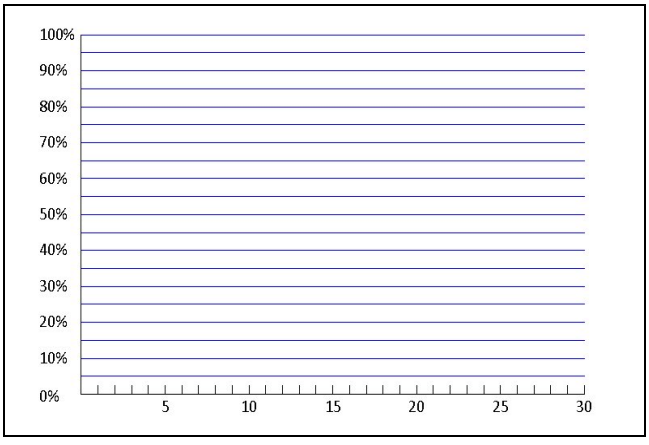
13. A scientist asks us to create a labeling system for the test folders that has 3 capital letters and some amount of numbers. She needs a system to hold 1 million tests but would not need more than 10 million. Create a labeling system and show that your system meets the requirement mathematically.

14. We are interviewing 15 vet tech candidates for 4 positions on a research team. One would act as senior tech, the other two are testers, and the last will be the data recorder. How many unique teams can be sent to Brazil for their assignment?

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

16. We are watching 25 teams race for a gold, silver or bronze medal in the road race. How many different outcomes can we observe?

17. We are observing 5 different animals that are feeding from a common trough. We create a probability graph that shows when an animal in this group goes to the trough. What percentage will this approach? Draw an example of the graph.



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

{A, B, C, D}

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

19. Rhonda has aqua, blue, red, yellow, orange and pink blouses, five different pairs of dark pants and four pairs of shoes. How many combinations she can arrange for her wardrobe on vacation?

20. A scientist has shown you a permutation of six characters that calculates to 19,535,040. 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 scientist is looking for?

21. You are playing the local lottery that has six balls drawn and the numbers on the 60 balls are 1 through 60. What is the probability that you can win with a single ticket? With twenty tickets?

22. You have 6 character pin that begins with two capital letters and then four numbers? How many different passwords can be created? If a hacker can try 30 passwords a second, how many minutes until they break into your account if it does not have a lockout set up?

23. We have 16 people in the class which are 10 women and 6 men.
    a. How many ways can they be arranged in a line?

b. If the first four in the line in order are Bob, Stan, Bill and John, how many ways can we arrange the group?