Section 8.5 Permutations and ARRANGEMENTS

Name _____ Date _____

1. Using each of the digits 2, 5, 7, and 8 once in each number, how many different four-digit numbers can be formed?

2. From a wardrobe of 10 sweaters, 8 jeans, and 4 pairs of shoes, how many different outfits consisting of a sweater, jeans, and a pair of shoes can a student choose?

3. In how many different ways can a 3-person committee be selected from 6?

4. What is the sum of all possible three-digit numbers that can be written using the digits 3, 4, and 6 once in each number?

5. A student, taking a true-false test, randomly guesses at every one of the 10 answers. How many different sets of answers could be produced?

6. How many different sets of three cassettes can be chosen from a set of ten different cassettes?

7. In a random drawing, three names are chosen to win computers. If 30 names are entered in the contest, how many different sets of winners can be chosen?

8. A committee of 3 teachers is to be selected from a group of 10 teachers to write next years' MATH COUNTS competition. How many different committees can be selected?

9. A restaurant menu features 5 different appetizers and 3 different main dishes. A diner decides to order 2 appetizers and 1 main dish. How many such different orders can he make?

10. A softball league has 8 teams. During the season, each team plays each of the other teams exactly 3 times. What is the total number of games played by all teams?

11. In how many different arrangements can be letters in the word MATHCOUNTS be placed?

12. A student must choose 3 books from a list of 9 books. How many different 3-book choices does the student have?

13. In a regular heptagon ABCDEFG, how many triangles can be constructed whose vertices are among the points A, B, C, D, E, F and G?

14. A manufacturing company identifies its products by codes consisting of a letter (A-Z) followed by 3 digits (0-9) followed by another letter. How many different products can be the company manufacture before it uses up all possible codes?

15. A jar contains 13 red, 13 blue, 13 green, and 13 yellow marbles. How many marbles must you draw from the jar to be sure you have two of the same color?

16. Eight volleyball teams are to play each other twice. How many games are needed?

17. What is the largest multiple of 12 that can be written using each digit 0, 1, 2,…, 9 exactly once?

18. In how many ways can 5 books be arranged on a shelf if two of the books must remain together, but may be interchanged?

19. From a selection of six different colors, how many different flags can be made consisting of three vertical stripes if no stripes of the same color can be placed side by side?

20. In how many distinct ways can 3 green and 2 blue chips be arrange in a row?

21. George wants to find out how many three letter words in the English language have an “a” as the middle letter. How many possible arrangements of letters must be check?

22. How many distinct permutations can be formed from the letters in the name NATHAN?

23. A palindrome is a number whose value is unchanged when its digits are reversed. How many palindromes are there which are greater than 10 and less than 800?

24. Les has a total of $1.75 in coins in his pocket. If he has only quarters, dimes, and half-dollars, and at least one of each, what is the total number of coin combinations that he can have?

25. There are nine ping pong balls numbered 1-9 in a bag. If three balls are randomly selected without replacement, what is the probability, expressed as a common fraction, that the sum of the numbers on the balls will be odd?

26. In how many different orders can a group of six people be seated around a round table?

27. In how many different ways can 3 men and 4 women be placed into two groups of two people and one group of three people if there must be at least one man and one woman in each group?

28. A teacher asks for a group of volunteers from a class of 6 students to participate in a class project. Assuming that at least one student volunteers, how many combinations of volunteer are possible?

29. Telephone area codes in the U.S. are made up of three digits such that the first digit from 2 through 9, the second must either be 1 or 0, and the third digit cannot be 0. What is the total number of area codes possible?

30. In a singles tennis tournament, each player plays every other player exactly once. There is a total of 28 games. How many players are in the tournament?

31. Suppose a coin purse has 30 coins in it, all of which are either nickels, dimes, or quarters. How many different combinations of these coins are there whose value is $5?

32. How many distinct ways can the letters of the word PEOPLE be arranged so that the two P's are together and the two E's are together?

33. In how many different ways may 15 indistinguishable dimes be distributed among Susan, Frank, and Harold if each must receive at least one dime?

34. How many different ways can be five letters of the word STATE be scrambled if the two T's cannot be consecutive?

35. Two boys and four girls are officers of the Math Club. When the photographer takes a picture for the school yearbook, she asks the club's six officers and the faculty sponsor to sit in a row with the faculty sponsor in the middle and the two boys not next to one another. How many different seating arrangements are possible?