Math 8 Enriched Section 8.4 Basic Probability and Counting Principles

Name _____   Date _____

1. A restaurant offers 4 different soft drink flavours, 5 different sandwiches and 3 different dessert selections. In how many ways can a person select one item from each category (a drink, a sandwich and a dessert)?

2. How many 2-digit whole numbers are there with the units digit being a multiple of 5?

3. Using the digits 2, 3, 5, and 9, how many 2-digit whole numbers can be formed if repetitions are not permitted?

4. Using the digits 1, 4, 6, and 9, how many 2-digit whole numbers can be formed if repetitions are not permitted?

5. A multiple-choice test has 8 questions, with 4 possible answers for each question. If a student were to guess the answer to each question, how many different ways would there b e to answer the test?

6. A car licence plate consists of 6 characters. The first 3 characters are letters excluding I, O, Q, and U. The last 3 characters are any of the numerals from 0 to 9. How many different licence plates are possible?

7. The dial on a combination lock contains markings which represent the numbers from 0 to 59. How many 3-number combinations are possible if the first and the third numbers must be different multiples of three, and the second number must not be a multiple of three?

8. How many different outfits consisting of a shirt, a pair of pants, and a sweater can be chosen from 4 shirts, 3 pants, and 2 sweaters?

9. In how many different ways can the letters in the word PRICE be scrambled?

10. In how many ways can 5 books be arranged on a shelf if 2 of the books must remain together?

11. How many three-digit numbers can be formed from the digits 1, 2, 3, 4, 5 if the 2 may be used any number of times but the other digits may be used at most once in any three-digit number?

12. 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?

13. How many different three-letter sets of initials are possible using the letters of the alphabet?

14. How many ways can I have three letters that is arranged so that they are in alphabetical order?

15. What is the largest number of mailboxes needed to hold 45 letters if each mailbox contains at least one letter, and no two mailboxes contain the same number of letters?

16. How many 3-digit numbers can be formed using the digits 0, 1, 2, 3, 4 if no repetitions are allowed?

17. How many different three0digit security codes are possible using the digits 1-5, if the second digit cannot be the same as the first, and the third digit cannot be the same as the second?

18. On a certain exam, you must answer 10 of 12 questions. How many different sets of questions can you choose? Express your answer as a whole number of sets.

19. If the digits can be used more than once, how many different even three-digit numbers can be written using the digits 1, 2, 3, 5, and 7?

20. How many different, positive three-digit numbers and four-digit numbers greater than 310 can be made using any three of the following eight digits without repetition: 1, 2, 2, 3, 4, 5, 6, 7?

21. Using the pennies, nickels, dimes, and quarters, in how many ways can you have 30 cents in change?

22. In how many different ways can change be made for a dollar bill using coins from a collection that contains four nickels, four dimes, four quarters, and two half-dollars?

23. A holiday fruit box contains a dozen each apples, oranges, and grapefruits. What is the least number of pieces of fruit must you pick to guarantee that you have three of the same kind?

24. At a party recently Cherry and some of her friends sat in a circle and passed around a bag containing 19 hard pretzels. Each took one pretzel as the bag passed. Chunlin got the first pretzel. How many people were in the circle, including Cherry?

25. Laura received in change pennies, dimes and quarters totalling $1.57. What is the minimum number of coins she could have received?

26. Ed has 41 cents in change. What is the fewest number of U.S. coins he could have?

27. Suppose 200 players enter a tennis tournament. If a player is eliminated when he or she loses a match, how many matches must be played to determine a winner?

28. In the game of *Five Flying Fish*, a goal is worth seven points and a basket is worth three points. There are no other ways to score points in this game. What is the largest score that cannot be obtained?

29. In Morse code, each symbol is represented by a sequence of dashes and dots. How many distinct symbols can be represented using sequences of 1, 2, 3, or 4 dots and/or dashes?

30. Carlin wrote a 477-page book on the history of mathematics. She numbered the pages by hand, beginning with page 1. How many total digits did she write when numbering the pages?

31. Kevin has a combination lock with numbers from 0 to 50. If the combination has three numbers, where the first and second number must differ by 4, then how many different combinations are possible?

32. Charlene's calculator displays the digits 0, 1, 6, 8 and 9 so that, when the calculator is held upside-down, these digits appear to be 0, 1, 9, 8 and 6 respectively. How many three-digit numbers look the same upside-down and right –side-up when using these five possible digits? (A three-digit string that begins with either "0" or "00" is not considered a three-digit number.)

33. There are 120 five-digit numbers which use the odd digits 1, 3, 5, 7 and 9. When these numbers are arranged in numerical order from smallest to largest, in what position do 75,391 fall?