E Chapter 4 Exercises

Counting Techniques

Use counting techniques to answer each question.

1. Suppose you have money to buy 5 new downloads for your phone. If there are 12 new downloads you'd like to have, in how many different ways could you purchase your 5? (Assume that the order of the downloads does not matter.)
2. In planning the teaching assignments for next semester, Mr. Hinton must have a teacher in each of the 7 grades during each of the 6 periods of the day. If he has 10 teachers to choose from, which allows 3 teachers to be on break at a time, how many different teaching schedules could he come up with?
3. The student council at one high school must choose 2 representatives from each of the sophomore, junior, and senior classes to attend the annual student council convention. If there are 6 sophomores, 5 juniors, and 7 seniors on the student council, in how many ways can the group be chosen for the convention?
4. The Pancake House offers hash browns with up to five different toppings: cheese, ham, bacon, onions, and mushrooms. In how many different ways can the hash browns be served?
5. Richard is assigned the task of setting the passwords for every computer at his office. Different computers have different guidelines as to how the password may be set. How many different four-digit passwords using the digits 0–9 can he create under each of the following guidelines?
   a. The passwords must be odd and greater than 3000.
   b. The passwords must be even and greater than 4000.
   c. The passwords must be even and less than 5000.
6. Suppose that there are eight employees at a café in downtown Jackson, MS. The boss needs one employee to serve as host or hostess, one to clean tables, and one to supervise the kitchen. In how many ways can these tasks be assigned?
7. Chandra has ten pieces of jewelry in her jewelry case, and she wants to take four pieces with her on vacation. In how many ways can she select the jewelry for her trip?
8. A homeowner wants to plant some new trees in her yard. If she has 6 pink crape myrtles, 4 red oak trees, and 5 yellow poplar trees to plant in one row down the drive, in how many different ways can she plant them?
9. In planning the room assignments for the overnight field trip, Mrs. Viant needs to put 3 students and 1 chaperone in each room. If there are 12 students and 4 chaperones on the trip, how many room assignments can she possibly have for the rooms 100, 101, 102, and 103?
10. A stock symbol, or ticker symbol, is an arrangement of characters representing publicly traded companies. Originally, stocks traded on the New York Stock Exchange (NYSE) were represented by a ticker with up to 3 characters from the English alphabet and the digits 0-9 where repetition was allowed. What is the maximum number of stocks that could have originally been listed on the NYSE?

Counting Techniques and Probability

Use the most appropriate method to find the probability for each scenario.

11. If 56% of adults attend church services in a typical month, 46% listen to a Christian radio broadcast in a typical month, and 39% do both, what's the probability that a randomly selected adult will neither attend church nor listen to a Christian radio broadcast in a typical month?

12. A computer generates a 3-digit combination code for the lockbox on a rental property. The computer uses the digits 0-9 with repetition. Find the probability that the next code will consist of only odd digits.

13. Find the probability that out of the 1319 college freshmen on campus, you are randomly chosen by the yearbook staff to give a quote about your first year at college, which will be published in the yearbook.

14. In the dice game Yahtzee you achieve the most points by throwing a Yahtzee, which is throwing the same number on 5 different dice. Find the probability that you don't roll a Yahtzee in one roll.

15. In a large doll store, 47% of the dolls blink, 56% of the dolls have movable legs and arms, and 23% of the dolls neither blink nor have movable limbs. Find the probability that a doll chosen at random will both blink and have movable limbs.

16. In a class of 87 people, 27 wear glasses, 32 are blonde, and 38 are neither blonde nor wear glasses. Find the probability that a student chosen at random will have blonde hair and wear glasses.

17. Joe is eating colored candies, and he has 5 orange candies and 5 yellow candies left. If he randomly selects one candy at a time to eat, what is the probability that he eats the rest of the candies so that the colors alternate?

18. Emily has a bad habit of losing her keys. This time, she estimates that there is a 0.2 chance that she left them in her office, a 0.35 chance that she left them in her bag, and a 0.15 chance that she left them on the kitchen counter. What is the probability that her keys will be in none of these places?

19. Robert is ordering dessert, and he wants the fudge pie. The waitress tells him that he can have up to four toppings: ice cream, chocolate sauce, whipped cream, and a cherry. Since he cannot decide how many of the toppings he wants, he tells the waitress to surprise him. If the waitress randomly chooses which toppings to add, what is the probability that Robert gets just chocolate sauce and a cherry?

20. Out of 62 people surveyed, 22 own a laptop computer, 39 own a desktop computer, and 9 own no computer at all. What is the probability that a person selected at random from those surveyed owns both a laptop and a desktop computer?

21. Find the probability of drawing four cards from a standard deck of cards and not getting all aces. There are 52 cards in a standard deck of cards, of which four are aces.

22. What's the probability of rolling a total of at least 11 with two dice?

23. Raffle tickets for a trip to Miami are assigned three-digit numbers using the digits 0–9. What is the probability that the number on the winning ticket is either even or less than 300? (Assume that all possible ticket numbers are eligible to win.)

24. There are 5 red wines and 7 white wines in a box. Calculate the probability of randomly choosing 2 bottles of red wine one after another without replacement.

25. In a class of 28 students, the teacher randomly chooses students to answer questions by having a computer select assigned seat numbers. What is the probability that the same student is selected to answer 2 questions in a row if the computer is allowed to choose seat numbers with replacement?

26. A gumball machine at the local pizza place is filled with plastic toys. The machine is filled with 28 rings, 35 bouncy balls, 18 rubber spiders, and 41 tattoos. Suppose you and three friends want to get four toys from the machine, and you would like 2 rings and 2 tattoos. Find the probability that you get what you want on the first 4 tries. (This requires some thought. Don't undercount!)