4.1 Section Exercises

Sample Spaces

Find the sample space for the given experiment.

1. Two coins are tossed.
2. A child's board game contains a spinner with three colors: orange, yellow, and green. Give the sample space for two consecutive spins.
3. Choose an outfit consisting of one top and one bottom from three shirts (T-shirt, button-down, and sweater) and two pants (one pair of jeans and one pair of slacks).
4. A bag contains four marbles: one each of green, red, blue, and violet. Two marbles are drawn from the bag. Assume that the first marble is not put back in the bag before drawing the second marble.
5. When buying a new car, you've narrowed your choices to three colors: red, black, or silver. You also need to decide whether to have a sunroof or not, and whether you want leather or cloth interior.
6. When ordering a pizza with a coupon, you have a choice of crusts: thin, hand-tossed, or stuffed. You can also choose one topping from the following: pepperoni, ham, sausage, onion, bell pepper, or olives.
7. When choosing your seat at the opera, you can choose from three levels and then whether you want an aisle seat or not.
8. When building your new house, you have a choice of flooring for the kitchen: tile, concrete, or wood. You must also choose the counter tops from the following: granite, concrete, wood, or stainless steel.

Types of Probability

Determine whether each probability is subjective, experimental, or classical.

9. Jeff wants to know whether a certain coin is fair or not. He flips the coin 100 times and obtains tails 61 times. He calculates that the probability of obtaining a tail with his coin is 61%.
10. Caroline estimates that there is only a 10% chance that they will have a quiz in biology.
11. Mr. Dorrough's 18 students have dropped their names in the hat for a prize drawing. Stephanie calculates that she has a 1/18 chance of winning.
12. On a game show, the contestant must choose one of three doors, behind one of which is a new car. He has a one-in-three chance of winning the car.
13. A computer manufacturer estimates that there is less than a 5% chance that its customers will want to switch brands within the first year.
14. A student is randomly assigned to one of 5 College Algebra sections. The student's probability of getting assigned to one of two sections taught by the instructor the student prefers is $\frac{2}{5}$.

Experimental Probability

Calculate each experimental probability.

15. A very large bag contains more coins than you are willing to count. Instead, you draw a random sample of coins from the bag and record the following numbers of each type of coin in the sample before returning the sampled coins to the bag.

Coins in a Bag			
Quarters	**Dimes**	**Nickels**	**Pennies**
23	29	17	38

If you randomly draw a single coin out of the bag, what is the probability that you will obtain:

a. A nickel?

b. A penny?

c. Either a quarter or a dime?

16. A telemarketer's computer selects phone numbers at random. The telemarketer has recorded the number of respondents in each age bracket for one evening in the following table.

Number of Respondents by Age			
18–25	**26–35**	**36–45**	**Over 45**
29	40	55	51

What is the probability that the next respondent will be:

a. Over 45?

b. Between 26 and 35?

c. At least 36?

Classical Probability

Calculate each classical probability. Assume that individual outcomes are equally likely.

17. Martha has a box full of 17 different vintage vinyl records: 5 rock, 3 blues, 6 pop, and 3 R&B. If she randomly pulls out a record, what is the probability that it is a blues record?

18. Chloë puts a coin into a gumball machine that contains 12 blue, 15 pink, 9 orange, 16 yellow, and 14 white gumballs. What is the probability that Chloë gets a yellow gumball?

19. New players at a certain casino are issued a "players card" at random when they first enter the casino. The cards are preloaded with either \$25 or \$50 in free play amounts. There are 5 different designs of cards for each amount. What is the probability that the card issued to a new player is preloaded with \$50 in free play?

20. What is the probability that a person selected at random will have a March birthday? (Assume that every day of the year contains an equal number of birthdays, and the person was not born in a leap year.)

21. If Mark grabs a utensil out of a drawer without looking, what is the probability that he grabs a fork if there are 7 knives, 9 spoons, and 6 forks in the drawer?

22. If Timmy is fishing in his newly stocked pond and knows that there are 200 bream and 150 bass in it, what is the probability that the first fish he catches will be a bass?

23. John is at a cookout and wants to get a drink from the cooler. If there are 12 colas, 10 bottles of water, and 5 root beers in the cooler, what is the probability that he randomly grabs a root beer?

24. A college algebra class has 14 freshmen, 21 sophomores, 9 juniors, and a senior enrolled. What is the probability that the professor randomly selects the senior to answer a question?

25. Mary Ann is sewing and needs the spool of white thread. Her basket of sewing supplies is sitting next to her, and it contains 26 different colors of thread, including the white spool she needs. If she grabs one spool without looking, what is the probability that she has chosen the white spool of thread?

26. For a school fundraiser, 1000 raffle tickets are sold for $5 each. Each ticket is assigned a three-digit number using the digits 0–9. What is the probability that the winning ticket will be one with three repeating digits?

27. If you roll one six-sided die twice, what is the probability that the second number rolled is at least as large as the first?

28. Each night in a family of four siblings, the parents randomly assign the order for the siblings to take their nightly baths. What is the probability that the youngest sibling has to take her bath last?