

**Margin Exercise Answers**

1.  $\frac{1}{151,200}$  2.  $\frac{1}{143}$  3.  $\frac{108}{715}$  4.  $\frac{1176}{4199}$

## 9.6 Exercises

### Applications

Solve and write your answer in reduced fraction form.

1. A newly created soccer team chooses three different colors for the team jersey. If they randomly choose from 20 different colors, what is the probability that the jersey will be black with blue sleeves and a green team logo?
2. Peter chooses a random password containing four different digits, from 0 to 9, for his smartphone. What is the probability that his password will be 1984?
3. Monica selects four of the seven rainbow colors to paint stripes on the walls in her room. If she wants all of the colors to be different, what is the probability that she will paint the walls, from top to bottom, in blue, orange, indigo, and red?
4. Five friends stand in a row for a group photo. If all of them are different heights, what is the probability that they will stand in either ascending height order or descending height order?
5. A family is planning a trip to Europe. There are seven countries they would like to visit, including Italy. However, they only have enough time to visit three countries. If the family randomly selects three countries to visit, what is the probability that the first selected country will be Italy?
6. A new five-digit password is automatically generated every month to provide account security. In the password, each digit is unique. What is the probability that the password generated in July is the same as the password generated in June?
7. Alex generates a name for his podcast by randomly picking four different letters and writing them down. What is the probability that name of the podcast will be “Alex”?
8. An inexperienced tour manager of a rock band plans a tour of 10 cities by randomly picking the order that the cities will be visited. If there is only one tour plan that would be the least expensive, what is the probability that the tour will be planned in the least expensive way?
9. A creative writing teacher needs to choose 4 short story prompts to assign during the semester. He can choose from one prompt of each of the following genres: self-help, biography, romance, autobiography, science fiction, fantasy,

- mystery, and historical fiction. What is the probability that the chosen books will be assigned in the order fantasy, mystery, self-help, and autobiography?
10. A hacker knows that the password he wants to break contains five different English letters. If the password is not case sensitive, what is the probability that the hacker will correctly guess it in the first three attempts?
  11. A journalist decides which of his four interviews and two investigations are worthy to be published. If he is going to publish only two articles, what is the probability that these articles will be interviews?
  12. The exit from an escape room opens if you press the correct three out of nine buttons at the same time. What is the probability that three randomly pressed buttons will open the exit on the first attempt?
  13. A box contains 7 fruit-flavored candies and 3 caramels. If you randomly pick 4 candies from the box, what is the probability that all of them will be fruit flavored?
  14. A car dealership had 9 silver cars and 7 blue cars at the beginning of the week. If 4 cars were sold during the week, what is the probability that all of them were silver?
  15. The menu of a small pizzeria consists of 9 pizzas and 6 pastas. John chooses 5 different dishes for his birthday party. What is the probability that he will choose only pizzas?
  16. Two classes in a high school hold an essay competition. Six students from each class chooses to participate. If there are only 4 winners, what is the probability that they are all from the same class?
  17. At the end of a festival, the organizers hold a small lottery with 3 prizes. If you bought two of the 50 lottery tickets, what is the probability that you will win two of the three prizes?
  18. Two groups of 10 cards are mixed together. If you randomly select 10 cards from the mix, what is the probability that they will all be from the first group?
  19. If you randomly draw 4 cards from a standard deck of 52 cards, what is the probability that they all will be spades? (Recall that each deck has 13 spades, 13 hearts, 13 clubs, and 13 diamonds.)
  20. Justin will get a 25% off discount code for an online shop if three people register at the shop using his affiliate link. He shares the link with his colleagues, 10 of which are men and 15 are women, and three of them register. What is the probability that the three people who registered through the link were women?

21. In preparation for a hike, two people are chosen to cook meals during stops. If the group consists of 5 men and 6 women, what is the probability that 1 man and 1 woman will be chosen to cook?
22. Anna and Zoe decided to each list their top 10 movies and then watch 3 movies from the combined list. If all the movies on their lists are different, what is the probability that they will choose 2 of Anna's movies and 1 of Zoe's movie?
23. Ten comedies and seven dramas have been sent to a film festival. If five films are to be demonstrated on the final day of the festival, what is the probability that there will be only one drama among them?
24. A scientist selects two different letters from 26 lowercase and 26 uppercase English letters as the names of two groups in an experiment. What is the probability that she will choose one lowercase and one uppercase letter?
25. If you choose 3 cards from a standard deck of 52 cards, what is the probability that exactly one of them will be a king? (Recall that a standard deck of cards has 4 kings.)
26. A student selects three out of five different types of sandwiches to take with him for lunch. If only one type of sandwich contains chicken, what is the probability that this type will be among the selected?
27. Ten students from the humanities department and eight students from the social science department take part in a race. If we assume that all of the students have the same running skills, what is the probability that only one student from the social science department will be one of the top three winners?
28. Eight junior computer programmers and five senior computer programmers are eligible to be on the team for a regional hackathon. If the team consists of 5 members, what is the probability that it will include 1 junior programmer and 4 senior programmers?
29. A child picks five toys from a bag containing five toys of each of five different shapes. What is the probability that the selected toys will all be of different shapes?
30. Out of a hundred pens in a box, ten have red ink. If you randomly choose three pens from the box, what is the probability that exactly one of them will have red ink?
31. A city is divided in two parts by a large river. The owner of a restaurant chain wants to open 6 new restaurants in the city, and she finds 6 potential locations on each side of the river. What is the probability that she will open 4 restaurants on the left side of the river and 2 on the right side?

32. A Doctor of Political Science has two popular lectures. He has 6 invitations to give the first lecture and 4 invitations to give the second lecture, all at different universities. Unfortunately, he only has time for 5 lectures. What is the probability that he will choose to read the first lecture 3 times and the second lecture 2 times?
33. A small shop sells 7 styles of T-shirts and 8 styles of sweaters. If a customer bought 5 different items of clothing, what is the probability that he bought 2 T-shirts and 3 sweaters?
34. A poet had 6 copies of his poetry collection left from a previous printing. He printed 10 new copies in preparation for a performance. If 4 books were sold after the performance, what is the probability that 2 were old copies and 2 were new copies?
35. A photographer selects 12 photographs for an exhibition. If he has 8 rural photographs and 6 city photographs, what is the probability that he will select 6 photographs of each type?
36. The list of questions at the end of a chapter consists of 13 questions, and a student can answer 7 of them. If a test includes 11 questions from the list, what is the probability that the student will be able to answer exactly 6 of them?
37. In a school known for its mathematics education, 9 students from class A and 11 students from class B compete for seven places on the team going to the national mathematics competition. What is the probability that the team will consist of 5 students from class A and 2 students from class B?
38. The menu of a fast food restaurant consists of 9 chicken sandwiches and 8 fish sandwiches. If there is an order for 7 different sandwiches, what is the probability that 4 of them are with chicken?
39. To celebrate the career of a famous writer born in the city, the local museum prepares an exhibit dedicated to the life of the writer. The museum owns 9 personal belongings of the writer and 9 drafts of his works. If they plan to display 8 items what is the probability that 5 of them will be personal belongings?
40. After the annual reviews, company management decides to promote 9 employees. Of the 20 people participating in the review, 7 have more than 5 years of work experience. What is the probability that all of the employees with more than 5 years of work experience all will be promoted?

## Writing & Thinking

41. Suppose you are choosing several objects from a set of different objects. Which of the two probabilities is greater: the probability of choosing certain objects in a specific order or the probability of choosing the same objects, but in a random order?

42. Is it helpful to know that characters in a password do not repeat when trying to guess it? Explain why.
43. What conditions should be met when using permutations and combinations to find the probability?
44. Assume you have 3 yellow and 2 green balls in a bag. In the event of drawing three balls from the bag, how can you find the probability that not all of them are yellow?