

# Practice 12-9

## Combinations

Simplify each expression.

- |                 |                 |                 |                 |                     |                  |
|-----------------|-----------------|-----------------|-----------------|---------------------|------------------|
| 1. ${}_9C_4$    | 2. ${}_{12}C_8$ | 3. ${}_9C_6$    | 4. ${}_{15}C_9$ | 5. ${}_{10}C_8$     | 6. ${}_{13}C_6$  |
| 7. ${}_{18}C_5$ | 8. ${}_{16}C_3$ | 9. ${}_{17}C_7$ | 10. ${}_9C_5$   | 11. ${}_{17}C_{13}$ | 12. ${}_{14}C_7$ |

13. A group of six tourists arrive at the airport 15 min before flight time. At the gate, they learn that only three seats are left on the airplane. How many different groups of three could get on the airplane?
14. In how many ways can you select 5 greeting cards from a choice of 12 cards at a store?
15. A committee of 4 students is to be formed from members of the student council. The student council contains 13 girls and 12 boys.
  - a. How many different committees of four students are possible?
  - b. How many committees will contain only boys?
  - c. What is the probability that the committee will contain only boys?
16. Suppose your math class consists of 24 students. In how many ways can a group of 5 students be selected to form a math team?
17. A jar of marbles contains 6 yellow and 8 red marbles. Three marbles are selected at random.
  - a. How many different groups of three marbles are possible?
  - b. How many groups of three marbles will contain only red ones?
  - c. What is the probability that the group of marbles will contain only red ones?
18. Suppose two members of your class need to be selected as members of the student council. Your class has 26 students in it. How many groups of two students can be selected?
19. The letters of the alphabet are written on slips of paper and placed in a hat. Three letters are selected at random.
  - a. How many different combinations of three letters are possible?
  - b. How many combinations consist only of the letters A, C, H, I, K, or Y?
  - c. What is the probability that the letters selected consist only of the letters A, C, H, I, K, or Y?
20. Three boys and four girls are running for president and vice-president of the student council. What is the probability that a boy will be elected president and a girl will be elected vice-president?
21. A lottery requires that you match three numbers in order. The three numbers are chosen from the numbers 1–20. What is the probability that you will win this lottery if numbers can be chosen only once?