

## Practice

### The Counting Principle

**Solve.**

1. A briefcase lock has 3 rotating cylinders, each containing 10 digits. How many numerical codes are possible?
2. A golf club manufacturer makes irons with 7 different shaft lengths, 3 different grips, 5 different lies, and 2 different club head materials. How many different combinations are offered?
3. There are five different routes that a commuter can take from her home to the office. In how many ways can she make a round trip if she uses a different route coming than going?
4. In how many ways can the 4 call letters of a radio station be arranged if the first letter must be W or K and no letters repeat?
6. How many 7-digit phone numbers can be formed if the first digit cannot be 0 or 1 and if no digit can be repeated?

### Permutations

*How many different ways can the letters of each word be arranged?*

1. CANADA

2. ILLINI

*Evaluate each expression.*

5.  $\frac{8!}{6!}$

10.  $\frac{P(7, 4) \cdot P(5, 3)}{P(6, 5)}$

**Solve.**

11. A photographer is taking a picture of a bride and groom together with 6 attendants. How many ways can he arrange the 8 people in a line if the bride and groom stand in the middle?

## Combinations

Evaluate each expression.

1.  $C(8, 2)$   
4.  $C(9, 3) \cdot C(6, 2)$

10. How many 5-sided polygons can be formed by joining any 5 of 11 points located on a circle?

**An urn contains 8 white, 6 blue, and 9 red balls. How many ways can 6 balls be selected to meet each condition?**

11. All balls are red.

12. Three are blue, 2 are white, and 1 is red.

13. Two are blue, and 4 are red.

## Probability

State the odds of an event occurring, given the probability of the event.

1.  $\frac{4}{11}$

2.  $\frac{2}{3}$

3.  $\frac{5}{99}$

State the probability of an event occurring, given the odds of the event.

7.  $\frac{2}{23}$

8.  $\frac{3}{5}$

9.  $\frac{4}{1}$

**A bag contains 1 green, 4 red, and 5 yellow balls. Two balls are selected at random. Find the probability of each selection.**

13.  $P(2 \text{ red})$

14.  $P(1 \text{ red and } 1 \text{ yellow})$

**A bank contains 3 pennies, 8 nickels, 4 dimes, and 10 quarters. Two coins are selected at random. Find the probability of each selection.**

17.  $P(2 \text{ pennies})$

18.  $P(2 \text{ dimes})$

19.  $P(1 \text{ nickel and } 1 \text{ dime})$

20.  $P(1 \text{ quarter and } 1 \text{ penny})$