1. spinning an even number on a spinner and then spinning another even number on the second spin

2. guessing on two multiple choice questions

Find the probability of each set of events.

3. drawing a brown sock from a drawer of 4 brown socks, 10 black socks, and 6 gray socks, replacing it, then drawing a gray sock

4. drawing a pair of black socks from a drawer of 4 brown socks, 10 black socks, and 6 gray socks

5. Calista has 4 one-dollar bills, 2 five-dollar bills, and 3 ten-dollar bills in her wallet. If she randomly chooses 2 bills from her wallet, what is the probability that both are five dollar bills?

6. There are 10 true/false questions on a test. You do not know the answer to 4 of the questions, so you guess. What is the probability that you will get all 4 answers right?

7. There are 9 students in the After-School Club. Names are being drawn at random to help with the school carnival. What is the probability that Jess will be chosen second?
**Practice C**

### 105 Probability of Independent and Dependent Events

#### Reteach

Events are independent when the outcome of one event has no effect on the outcome of a second event. Rolling a number cube and flipping a coin are independent events.

Find the probability of rolling a 4 and flipping heads.
1. There are 6 outcomes for the number cube and 2 outcomes for the coin.
2. Using the Fundamental Counting Principle, there are \(6 \times 2 = 12\) possible outcomes of rolling a number cube and flipping a coin.
3. Make a list of the possible outcomes:
   - \((1, H), (2, H), (3, H), (4, H), (5, H), (6, H), (1, T), (2, T), (3, T), (4, T), (5, T), (6, T)\)

   How many possible ways are there of rolling a 4 and flipping heads? 1
4. \(P(4 \text{ and heads}) = \frac{\text{number of ways 4 and heads can occur}}{\text{number of possible outcomes}} = \frac{1}{12}\)

Events are dependent when the outcome of one event does have an effect on the outcome of the next event. Drawing two marbles in a row without replacing the first marble are dependent events.

A bag contains 3 blue and 5 red marbles. Find the probability of drawing 2 blue marbles in a row without replacing the first marble.
5. The total number of marbles in the bag is 8. There are 3 blue marbles in the bag.
6. If you draw a blue marble on the first draw, there are 2 blue marbles left in the bag.
7. \(P(\text{blue marble on second draw}) = \frac{2}{7}\)
8. \(P(\text{blue, blue}) = P(\text{blue on 1st draw}) \times P(\text{blue on 2nd draw}) = \frac{3}{8} \times \frac{2}{7} = \frac{3}{28}\)

#### Challenge

**Pascal’s Triangle**

A special pattern, called Pascal’s Triangle, can be used to find some probabilities. The triangle is called Pascal’s Triangle because Pascal was one of the first mathematicians to formally study probability.

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Suppose 3 coins are flipped.
1. List all the possible outcomes.
   - HHH, HHHT, HHTH, HTHH, HTHT, HTTH, THHT, THTH, TTHH, TTT
2. How many outcomes show: 2 heads and 1 tail? 2 tails and 1 head? 3 tails?
   - 3, 3, 1
3. How do the outcomes compare to row 3 of Pascal’s Triangle?
   - They are the same.

Find the probability of each event when flipping 3 coins.
4. 3 heads? \(\frac{1}{8}\)
5. 2 heads? \(\frac{3}{8}\)
6. 1 head? \(\frac{3}{8}\)
7. 0 heads? \(\frac{1}{8}\)

Use Pascal’s Triangle to find the following probabilities if 4 coins are flipped.
8. 4 tails \(\frac{1}{16}\)
9. 3 tails \(\frac{4}{16} \div 4\)
10. 2 tails \(\frac{6}{16} \div 3\)
11. 1 tail \(\frac{4}{16} \div 4\)
12. 0 tails \(\frac{1}{16}\)

#### Problem Solving

Write the correct answer.

1. Li rolls a pair of number cubes twice. On both rolls, the sum is 7. Are the rolls dependent or independent events?
   - independent events
2. Nine boys and 12 girls want to play soccer. Teams are formed by selecting one player at a time. Is the probability of selecting a boy after a girl is selected dependent or independent?
   - independent event
3. Greg has 12 cards. Half are black, and half are red. He picks two cards out of the deck. What is the probability that both cards are red?
   - \(\frac{5}{22}\)
4. In basketball, Alan makes 1 out of every 4 free throws he attempts. What is the probability that Alan will make his next 3 free throws?
   - \(\frac{1}{64}\)
5. There are 8 blue marbles and 7 red marbles in a bag. Julie pulls two marbles at random from the bag first. What is the probability that she first pulls a blue marble and then a red marble?
6. You roll a 1–6 number cube twice. What is the probability that you roll a 3 on the first roll and a 6 on the second roll?
7. Andrew has \$2.00 in quarters in his wallet, including three state quarters. He takes two quarters out of his pocket. What is the probability that they are not state quarters?
8. Jamie has 3 raffle tickets. One hundred tickets were sold. Her name was not drawn for the first prize. What is the probability that her name will be drawn for the second prize?