10.1 Outcomes and Events

Essential Question In an experiment, how can you determine the number of possible results?

An *experiment* is an investigation or a procedure that has varying results. Flipping a coin, rolling a number cube, and spinning a spinner are all examples of experiments.

1 ACTIVITY: Conducting Experiments

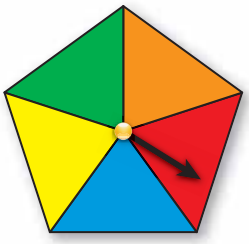
Work with a partner.

a. You flip a dime.

There are ____ possible results.

Out of 20 flips, you think you will flip heads ____ times.

Flip a dime 20 times. Tally your results in a table. How close was your guess?



b. You spin the spinner shown.

There are ____ possible results.

Out of 20 spins, you think you will spin orange ____ times.

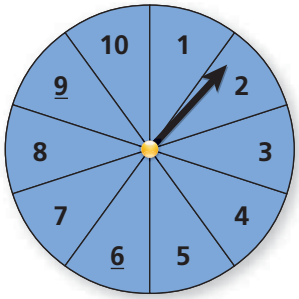
Spin the spinner 20 times. Tally your results in a table. How close was your guess?

c. You spin the spinner shown.

There are ____ possible results.

Out of 20 spins, you think you will spin a 4 ____ times.

Spin the spinner 20 times. Tally your results in a table. How close was your guess?



Probability and Statistics

In this lesson, you will

- identify and count the outcomes of experiments.

2 ACTIVITY: Comparing Different Results

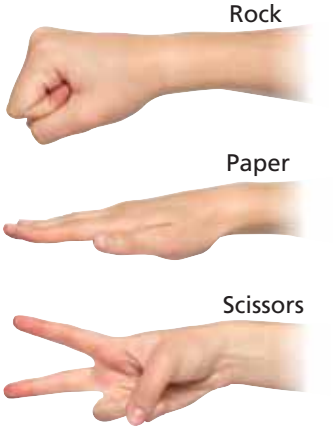
Work with a partner. Use the spinner in Activity 1(c).

a. Do you have a better chance of spinning an even number or a multiple of 4? Explain your reasoning.

b. Do you have a better chance of spinning an even number or an odd number? Explain your reasoning.

3 ACTIVITY: Rock Paper Scissors

Work with a partner.



a. Play Rock Paper Scissors 30 times. Tally your results in the table.

b. How many possible results are there?

c. Of the possible results, in how many ways can Player A win? Player B win? the players tie?

d. Does one of the players have a better chance of winning than the other player? Explain your reasoning.

Math Practice

Interpret a Solution

How do your results compare to the possible results? Explain.

Rock *breaks* scissors.
Paper *covers* rock.
Scissors *cut* paper.

		Player A		
				
Player B				
				
				

What Is Your Answer?

4. IN YOUR OWN WORDS In an experiment, how can you determine the number of possible results?

Practice Use what you learned about experiments to complete Exercises 3 and 4 on page 404.

10.1 Lesson

Check It Out
Lesson Tutorials
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Key Vocabulary
experiment, *p. 402*
outcomes, *p. 402*
event, *p. 402*
favorable outcomes, *p. 402*

Key Ideas

Outcomes and Events

An **experiment** is an investigation or a procedure that has varying results. The possible results of an experiment are called **outcomes**. A collection of one or more outcomes is an **event**. The outcomes of a specific event are called **favorable outcomes**.

For example, randomly selecting a marble from a group of marbles is an experiment. Each marble in the group is an outcome. Selecting a green marble from the group is an event.

Possible outcomes

Event: Choosing a green marble

Number of favorable outcomes: 2

Reading

When an experiment is performed *at random* or *randomly*, all of the possible outcomes are equally likely.

EXAMPLE 1 Identifying Outcomes

You roll the number cube.

a. What are the possible outcomes?

The six possible outcomes are rolling a 1, 2, 3, 4, 5, and 6.

b. What are the favorable outcomes of rolling an even number?

even	*not* even
2, 4, 6	1, 3, 5

The favorable outcomes of the event are rolling a 2, 4, and 6.

c. What are the favorable outcomes of rolling a number greater than 5?

greater than 5	*not* greater than 5
6	1, 2, 3, 4, 5

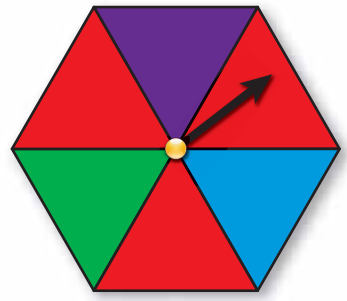
The favorable outcome of the event is rolling a 6.

On Your Own

Now You're Ready
Exercises 5–11

1. You randomly choose a letter from a hat that contains the letters A through K.
   - **a.** What are the possible outcomes?
   - **b.** What are the favorable outcomes of choosing a vowel?

EXAMPLE 2 Counting Outcomes



You spin the spinner.

a. How many possible outcomes are there?

The spinner has 6 sections. So, there are 6 possible outcomes.

b. In how many ways can spinning red occur?

The spinner has 3 red sections. So, spinning red can occur in 3 ways.

c. In how many ways can spinning *not* purple occur? What are the favorable outcomes of spinning *not* purple?

The spinner has 5 sections that are *not* purple. So, spinning *not* purple can occur in 5 ways.

purple	*not* purple
purple	red, red, red, green, blue

The favorable outcomes of the event are red, red, red, green, and blue.

On Your Own

Now You're Ready
Exercises 12–17

2. You randomly choose a marble.

   - **a.** How many possible outcomes are there?
   - **b.** In how many ways can choosing blue occur?
   - **c.** In how many ways can choosing *not* yellow occur? What are the favorable outcomes of choosing *not* yellow?

10.1 Exercises

Check It Out
Help with Homework
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Vocabulary and Concept Check

1. **VOCABULARY** Is rolling an even number on a number cube an *outcome* or an *event*? Explain.
2. **WRITING** Describe how an outcome and a favorable outcome are different.

Practice and Problem Solving

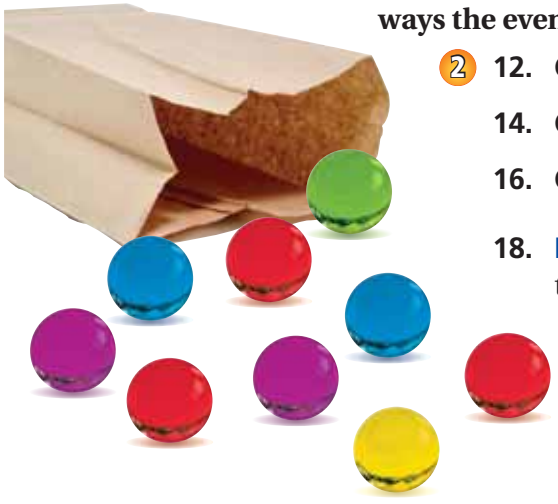
You spin the spinner shown.

3. How many possible results are there?
4. Of the possible results, in how many ways can you spin an even number? an odd number?

1 5. **TILES** What are the possible outcomes of randomly choosing one of the tiles shown?

You randomly choose one of the tiles shown above. Find the favorable outcomes of the event.

6. Choosing a 6
7. Choosing an odd number
8. Choosing a number greater than 5
9. Choosing an odd number less than 5
10. Choosing a number less than 3
11. Choosing a number divisible by 3



You randomly choose one marble from the bag. (a) Find the number of ways the event can occur. (b) Find the favorable outcomes of the event.

2 12. Choosing blue
13. Choosing green
14. Choosing purple
15. Choosing yellow
16. Choosing *not* red
17. Choosing *not* blue

18. **ERROR ANALYSIS** Describe and correct the error in finding the number of ways that choosing *not* purple can occur.

✗

purple	*not* purple
purple	red, blue, green, yellow

Choosing *not* purple can occur in 4 ways.

19. COINS You have 10 coins in your pocket. Five are Susan B. Anthony dollars, two are Kennedy half-dollars, and three are presidential dollars. You randomly choose a coin. In how many ways can choosing *not* a presidential dollar occur?

Susan B. Anthony dollar

Kennedy half-dollar

Presidential dollar

Tell whether the statement is *true* or *false*. If it is false, change the italicized word to make the statement true.

20. Spinning blue and spinning *green* have the same number of favorable outcomes on Spinner A.

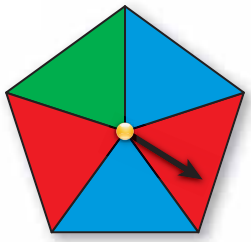
21. Spinning blue has one *more* favorable outcome than spinning green on Spinner B.

22. There are *three* possible outcomes of spinning Spinner A.

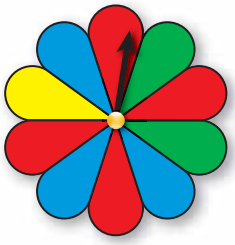
23. Spinning *red* can occur in four ways on Spinner B.

24. Spinning not green can occur in *three* ways on Spinner B.

Spinner A



Spinner B



25. MUSIC A bargain bin contains classical and rock CDs. There are 60 CDs in the bin. Choosing a rock CD and *not* choosing a rock CD have the same number of favorable outcomes. How many rock CDs are in the bin?

26. Precision You randomly choose one of the cards and set it aside. Then you randomly choose a second card. Describe how the number of possible outcomes changes after the first card is chosen.

Fair Game Review What you learned in previous grades & lessons

Solve the proportion. *(Section 5.4)*

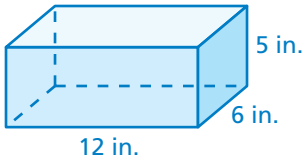
27. $\frac{x}{10} = \frac{1}{5}$

28. $\frac{60}{n} = \frac{20}{7}$

29. $\frac{1}{3} = \frac{w}{36}$

30. $\frac{25}{17} = \frac{100}{b}$

31. MULTIPLE CHOICE What is the surface area of the rectangular prism? *(Section 9.1)*



(A) 162 in.^{2} (B) 264 in.^{2}

(C) 324 in.^{2} (D) 360 in.^{2}