New Vocabulary
frequency
frequency table

Frequency Tables

Name _____ Class _____ Date _____

GET STARTED

1

5	8	15	20	7
14	6	11	19	12
16	12	12	10	4
11	18	13	9	14
13	17	16	12	15

Ages of Visitors to Science Museum	
Age Interval	**Tally**
1–5	
6–10	
11–15	
16–20	

2

Ages of Visitors to Science Museum		
Age Interval	**Tally**	**Frequency**
1–5		
6–10		
11–15		
16–20		

3 Visitors' ages 1 through 10: _____ + _____ = _____

Visitors' ages 6 through 15: _____ + _____ = _____

Interval with greatest frequency: _____

BUILD THE CONCEPT

For the data shown, which intervals would be better to use?

Number of Customers		
Hours	**Tally**	**Frequency**
0–2	||||	4
3–5	||||	4
6–8	𝍸 ||	7
9–11	||	2

Number of Customers		
Hours	**Tally**	**Frequency**
0–5	𝍸 |||	8
6–8	𝍸 ||	7
9–11	||	2

TRY IT TOGETHER

Complete the frequency table. Then use the table to answer each question.

4

Number of Journal Pages Written		
Pages	**Tally**	**Frequency**
1–4	𝍸 𝍸	
5–8	𝍸 |||	
9–12	||||	

5 How many people wrote 4 pages or fewer? _____ people

6 How many people wrote 8 pages or fewer?

_____ + _____ = _____ people

7 How many people wrote in a journal altogether?

_____ + _____ + _____ = _____ people

WORK ON YOUR OWN

HOW TO

Interpret a Frequency Table

Using Symbols

1.

Daily Minutes of Exercise		
Minutes	**Tally**	**Frequency**
1–20	𝍸 ||||	9
21–40	𝍸 𝍸 |||	13
41–60	𝍸 |	6

2. **How** many students exercised **40** minutes or less?

9 + **13** = 22 students

Using Words

Count the number of tally marks to determine the frequency.

Look at each interval and its frequency to answer questions.

Pictographs

Name _____ Class _____ Date _____

GET STARTED

1. $6 \times 4 =$ _____

2. $3 \times 4 =$ _____

3. How many books did Kay read?

   _____ × _____ = _____ books

Bookworm Club	
Member	**Number of Books Read**
Juan	📖📖📖📖📖📖📖
Heather	📖📖📖📖
Kay	📖📖📖📖📖📖
Mark	📖📖📖

Key: Each 📖 = 2 books

4. **a.** Which member read the most books?

   _____

   b. Which member read the fewest books?

   _____

   c. How many more books did Juan read than Mark?

   Juan: _____ × _____ = _____

   Mark: _____ × _____ = _____

   _____ − _____ = _____ books

BUILD THE CONCEPT

Twelve students voted for football. Complete the pictograph using this information.

1 star = _____ votes

2 stars = _____ votes

3 stars = _____ votes

4 stars = _____ votes

Favorite Sports	
Sport	**Votes**
Hockey	★
Soccer	★★★
Baseball	★★
Football	

Key: Each ★ = 3 votes

TRY IT TOGETHER

Use the pictograph to answer each question.

a. How many tickets were sold on Tuesday?

_____ × _____ = _____

b. How many tickets were sold on Thursday?

_____ × _____ = _____

c. How many tickets were sold on both Tuesday and Thursday?

_____ + _____ = _____

Tickets Sold	
Day	**Number of Tickets**
Monday	
Tuesday	
Wednesday	
Thursday	
Friday	

Key: Each  **= 5 tickets**

WORK ON YOUR OWN

HOW TO

Interpret a Pictograph

Use the pictograph titled Tickets Sold.

Using Symbols	Using Words
1. How many tickets were sold on Wednesday?	Find the question.
2. Row labeled **Wednesday** is needed.	**Find the row in the pictograph that gives the information needed to answer the question.**
3. 3 pictures in the row	Count the pictures in the row.
4. **Each** picture represents **5 tickets.** **3 × 5 = 15** **There were** 15 tickets sold on **Wednesday.**	**Multiply that number by the number in the key.**

Bar Graphs

Name _____ Class _____ Date _____

GET STARTED

1. 8 5

2. 15 − 7 = _____

3. How many pets does Troy have?

   _____ pets

4. Which student has more pets, Jaime or Sam?

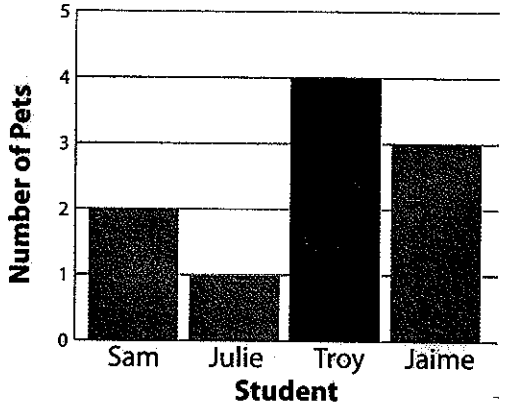
   Jaime: _____ pets

   Sam: _____ pets

   _____ > _____

   _____ has more pets than _____.

Pets

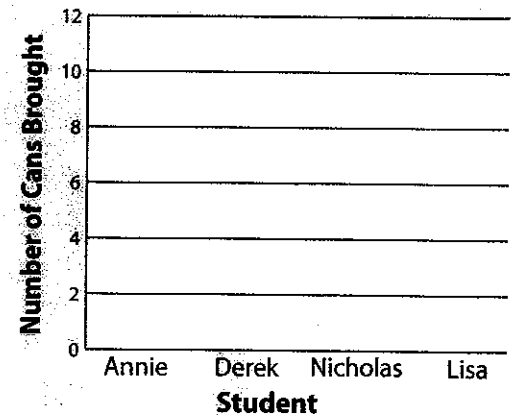


BUILD THE CONCEPT

Use the frequency table to complete the bar graph.

Class Canned Food Drive	
Student	**Number of Cans Brought**
Annie	10
Derek	8
Nicholas	5
Lisa	12

Class Canned Food Drive



TRY IT TOGETHER

Use the bar graph to answer each question.

a. Which topping was chosen the most?

_____

b. Which topping was chosen the least?

_____

c. How many students chose hamburger?

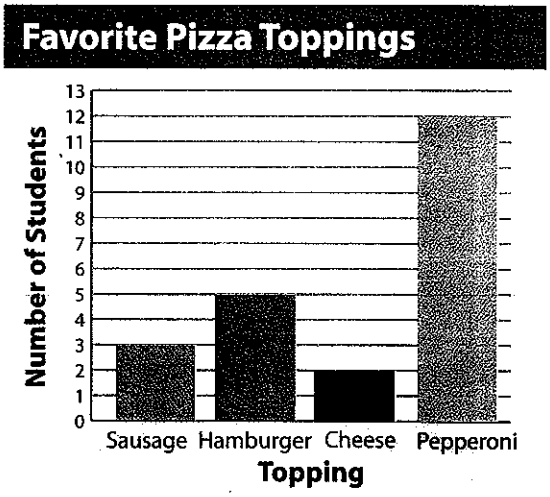
_____

d. How many students chose sausage?

_____

e. How many more students chose hamburger than sausage?

_____ − _____ = _____ students



WORK ON YOUR OWN

HOW TO

Interpret a Bar Graph

Use the bar graph titled Favorite Pizza Toppings.

Using Symbols	Using Words
1. **Title:** Favorite Pizza Toppings	Read the title.
2. **Labels:** Topping, Number of Students **Categories:** Sausage, Hamburger, Cheese, Pepperoni **Scale:** 0–13 **Interval:** 1	Look at the labels, categories, scale, and interval.
3. **How many** students chose cheese? 2 students	Read across from the top of the bar to the scale to answer questions.

Circle Graphs

Name _____ Class _____ Date _____

GET STARTED

1. $\begin{array}{r} 54 \\ +\ 39 \\ \hline \end{array}$

2. $\begin{array}{r} 32 \\ -\ 25 \\ \hline \end{array}$

3. What percent of the trash thrown away is paper products? _____

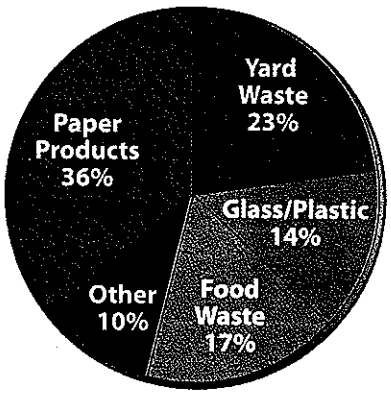
4. What percent of the trash thrown away is **not** paper products?

   _____% − _____% = _____%

   Or

   _____% + _____% + _____% + _____% = _____%

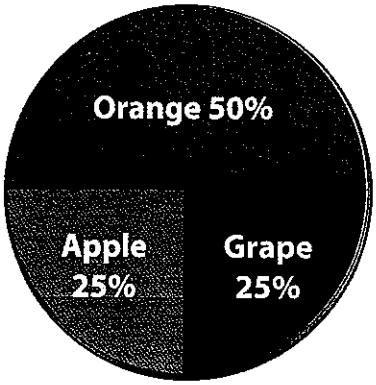
Trash Thrown Away



5. Which category represents about one-fourth, or about 25%, of all trash thrown away? _____

BUILD THE CONCEPT

Favorite Type of Juice



What total percent is represented by the graph? _____

Which section represents one-half of the graph? _____

Which 2 sections represent one-fourth of the graph each?

_____ and _____

TRY IT TOGETHER

Use the circle graph to answer each question.

6. What percent of birds at the bird sanctuary are doves?

   _____

7. What percent of birds at the bird sanctuary are **not** doves?

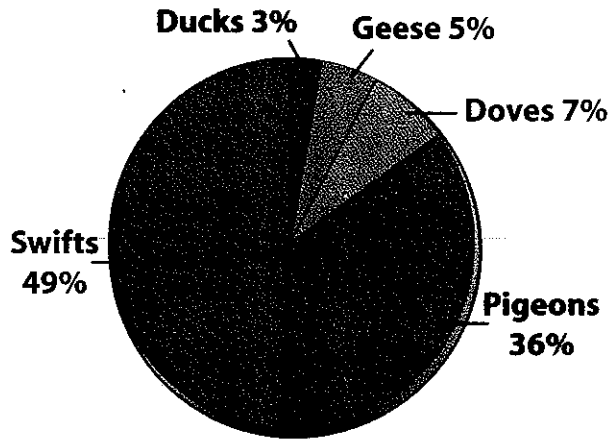
   _____% − _____% = _____%

   Or

   _____% + _____% + _____% +

   _____% = _____%

Birds at the Bird Sanctuary



8. Which birds account for about one-half, or about 50%, of the birds at the bird sanctuary? _____

WORK ON YOUR OWN

HOW TO

Interpret a Circle Graph

Use the circle graph titled Birds at the Bird Sanctuary.

Using Symbols	Using Words
1. **Title:** Birds at the Bird Sanctuary	Read the title.
2. **Categories:** Geese, Doves, Pigeons, Swifts, Ducks	Look at the categories for each section. The circle represents 100%, or 1 whole.
3. What percent of birds at the bird sanctuary are pigeons? 36%	Use the labels and the size of each section to answer questions.

Line Graphs

Name _____ Class _____ Date _____

GET STARTED

1. 19 25

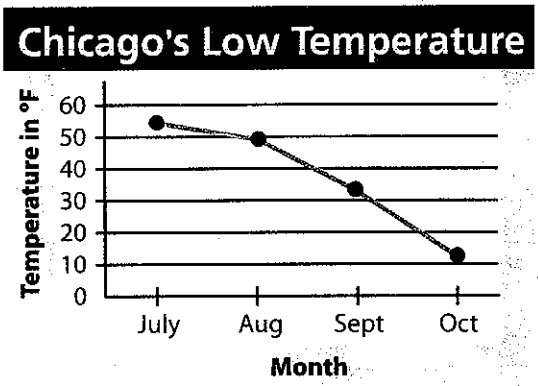
2. 135 115

3. What was the low temperature in Chicago in September? _____

4. In which month was the low temperature 50°F? _____

5. How much did the temperature decrease from July to August?

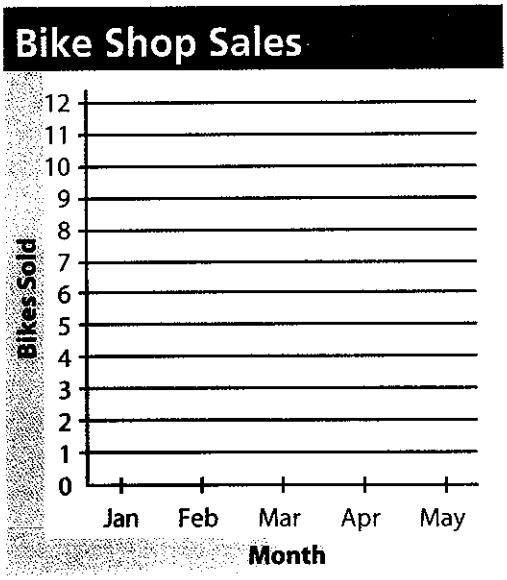
_____ − _____ = _____°F



BUILD THE CONCEPT

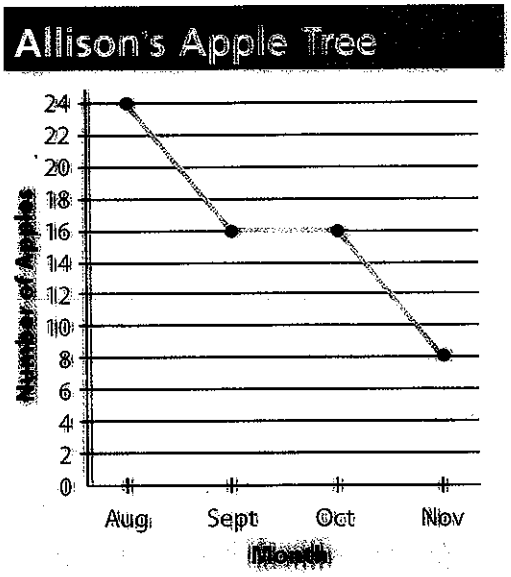
Use the table to complete the line graph.

Bike Shop Sales	
Month	**Bikes Sold**
January	8
February	9
March	10
April	10
May	7



TRY IT TOGETHER

Use the line graph to answer each question.



6 **a.** How many apples were on the tree in August? _____

b. How many apples were on the tree in September? _____

7 **a.** Did the number of apples on the tree increase or decrease from August to September? _____

b. What is the difference in the number of apples on Allison's tree in August and September?

_____ − _____ = _____ apples

WORK ON YOUR OWN

HOW TO

Interpret a Line Graph

Use the line graph titled **Allison's Apple Tree**.

Using Symbols

1. **Title:** Allison's Apple Tree
2. **Labels:** Month, Number of Apples
   Categories: Aug, Sept, Oct, Nov
   Scale: 0–24
   Interval: 2
3. Between which 2 months was there no change in the number of apples on the tree?

   September and October

Using Words

Read the title.

Look at the labels, categories, scale, and interval.

If the line **rises**, the quantity **increases**.
If the line **falls**, the quantity **decreases**.
If the line is **horizontal** or **flat**, there is **no change**.

Mean and Median

Name _____ Class _____ Date _____

GET STARTED

1. 26
   12
   + 35

2. $3\overline{)45}$

3. **5, 4, 2, 9, 15**

   a. 5 + 4 + 2 + 9 + 15 = _____

   b. mean = _____ ÷ _____ = _____

   c. median: 5, 4, 2, 9, 15 → _____

4. **8, 10, 2, 4**

   a. 8 + 10 + 2 + 4 = _____

   b. mean = _____ ÷ _____ = _____

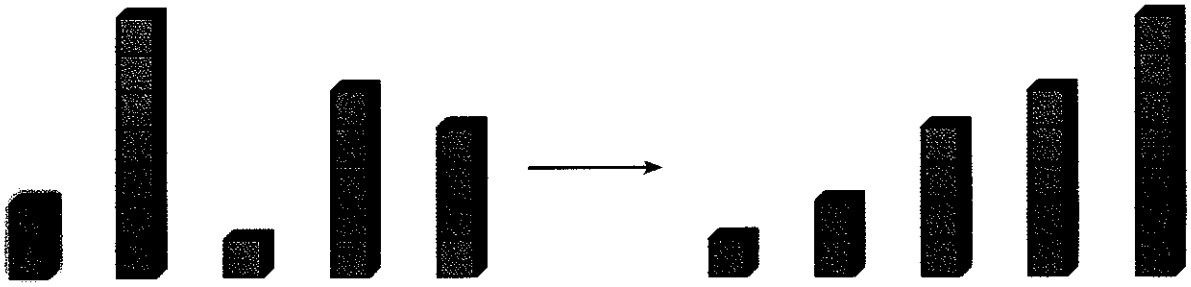
   c. median: 8, 10, 2, 4 → _____

   4 + 8 = _____

   median = _____ ÷ 2 = _____

BUILD THE CONCEPT

Use connecting cubes to find the median of 2, 7, 1, 5, and 4.
Arrange the stacks in order from shortest to tallest.



_____, _____, _____, _____, _____

How many cubes are in the middle stack? _____

The median of 2, 7, 1, 5, and 4 is _____.

TRY IT TOGETHER

Find the mean and median of each data set.

5 14, 16, 3

14 + 16 + 3 = _____

mean = _____ ÷ _____ = _____

14, 16, 3 → _____

median = _____

6 15, 2, 27, 10, 6, 12

15 + 2 + 27 + 10 + 6 + 12 = _____

mean = _____ ÷ _____ = _____

_____

_____ + _____ = _____

median = _____ ÷ _____ = _____

WORK ON YOUR OWN

HOW TO

Find the Mean of a Data Set

Using Symbols

1. **6, 7, 9, 3, 1, 4**
   6 + 7 + 9 + 3 + 1 + 4 = **30**
2. **6** numbers in the data set
3. 30 ÷ 6 = 5
   mean = 5

Using Words

Find the sum of the numbers in the data set.

Count the number of values in the data set.

Divide the sum by the number of values in the data set.

Find the Median of a Data Set

1. **6, 7, 9, 3, 1, 4**
   1, 3, 4, 6, 7, 9
2. **6** numbers in the data set
3. 1, 3, (4, 6), 7, 9
   4 + 6 = 10
   10 ÷ 2 = 5
   median = 5

Order the numbers in the data set from least to greatest.

Count the number of values in the data set.

If the number of values is an **odd** number, the median is the middle number.

If the number of values is an **even** number, add the two middle numbers and divide the sum by 2.

Mode and Range

Name _____ Class _____ Date _____

GET STARTED

1. **5, 2, 5, 5, 4, 3, 4**

   a. _____

   b. greatest value: _____

   c. least value: _____

2. a. mode: _____

   b. range: _____ − _____ = _____

3. **14, 24, 13, 11, 16, 8**

   a. _____

   b. mode: _____

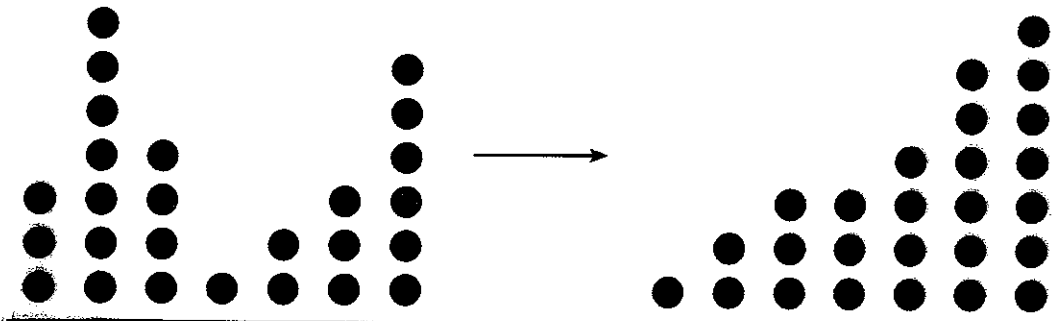
   c. greatest value: _____

   d. least value: _____

   e. range: _____ − _____ = _____

BUILD THE CONCEPT

Use the counters to find the mode of the data set.



3, 7, 4, 1, 2, 3, 6

mode = _____

TRY IT TOGETHER

Find the mode and range of each data set.

4. 12, 14, 17, 20, 17, 12, 6

   a. _____

   b. modes: _____

   c. greatest value: _____

   d. least value: _____

   e. range: _____ − _____ = _____

5. 3.5, 5.2, 8.5, 5.6, 4.0

   a. _____

   b. mode: _____

   c. range: _____ − _____ = _____

WORK ON YOUR OWN

HOW TO

Find the Mode and Range of a Data Set

Using Symbols

11, 13, 8, 12, 10, 7, 9, 8

least to greatest:

7, 8, 8, 9, 10, 11, 12, 13

Mode: 8

Range: 13 − 7 = 6

Using Words

Order the data values from least to greatest.

Choose the value or values that occur most often.

Find the difference between the greatest and the least values in the data set.

Possible Outcomes

Name _____ Class _____ Date _____

GET STARTED

1. **a.** 2 + 2 + 2 = _____ **b.** 3 + 3 = _____ **c.** 3 + 3 + 3 = _____

2. **Chores:** dusting, trash, laundry

   a. dusting, trash, laundry
   dusting, _____, _____
   b. laundry, trash, dusting
   laundry, _____, _____
   c. trash, _____, _____
   trash, _____, _____
   d. Possible ways to do chores: _____

3. **Main Dishes:** hamburger, hot dog
   Sides: French fries, beans, chips

   a. hamburger, French fries
   hamburger, _____
   hamburger, _____
   b. hot dog, _____
   hot dog, _____
   hot dog, _____
   c. Possible Early Bird Special combinations: _____

4. **Shirts:** white, blue, gray **Pants:** black, blue, gray

   a. white shirt, black pants; white shirt, blue pants; white shirt, gray pants
   b. blue shirt, _____; blue shirt, _____; blue shirt, _____
   c. gray shirt, _____; gray shirt, _____; gray shirt, _____
   d. Uniform combinations: _____

BUILD THE CONCEPT

Look at the shirts and pants in problem 4.

Number of shirts = _____

Number of pants = _____

Number of possible outcomes = _____

_____ × _____ = _____ possible outcomes

TRY IT TOGETHER

List all possible outcomes. State the number of possible outcomes.

5 

Penny: heads, _____

Nickel: heads, _____

_____

_____

_____

_____

_____ possible outcomes

6 **Cake Choices:** white, chocolate, spice

Icing: buttercream, cream cheese

_____

_____

_____

_____

_____

_____

_____ possible outcomes

WORK ON YOUR OWN

HOW TO

Find the Number of Possible Outcomes

Using Symbols

1. **Ice Cream Flavors:** chocolate, vanilla
   Toppings: sprinkles, peanuts

   chocolate, sprinkles

   chocolate, peanuts

   vanilla, sprinkles

   vanilla, peanuts

2. 4 possible outcomes

Using Words

Make an organized list of all the possibilities.

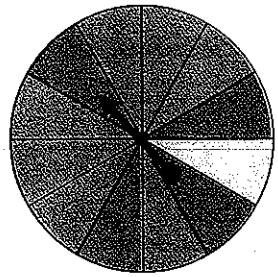
Count the number of possibilities in the set.

Predicting Outcomes

Name _____ Class _____ Date _____

GET STARTED

1. Possible outcomes: _____



2. Number of blue sections = _____

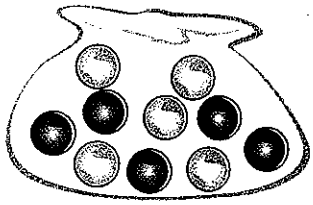
   Number of green sections = _____

   Number of yellow sections = _____

   Total number of sections = _____

3. **a.** It is likely that the spinner will land on _____.

   b. It is unlikely that the spinner will land on _____.



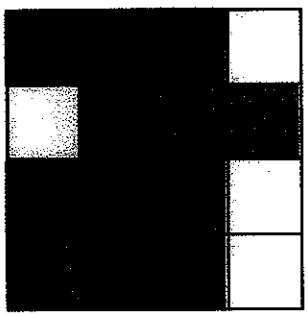
4. **a.** It is _____ that a yellow or a purple marble will be chosen.

   b. It is _____ that a red marble will be chosen.

   c. It is _____ that a yellow or a purple marble will be chosen.

BUILD THE CONCEPT

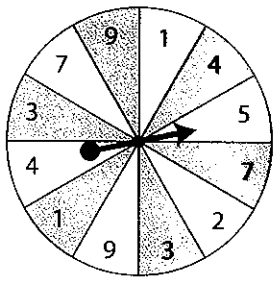
A bean bag is thrown on the board shown. Which is more likely, the bean bag landing on a green square or the bean bag landing on a blue square?



_____ square

TRY IT TOGETHER

Decide whether each outcome is likely or unlikely.



5. spinner lands on an odd number _____
6. spinner lands on 2 _____
7. spinner lands on a number less than 6 _____

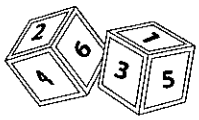
Decide whether the outcomes are equally likely.

8. spinner lands on a blue section or a yellow section _____
9. spinner lands on an odd number or an even number _____

WORK ON YOUR OWN

HOW TO

Decide Whether an Outcome Is Likely or Unlikely



Using Symbols	Using Words
1. Possible outcomes: rolling a 1, 2, 3, 4, 5, or 6	List the possible outcomes of the experiment.
2. Rolling a number less than 5: **likely** Rolling a 1: **unlikely**	The outcome is likely if the chance is greater that the outcome will happen than will not happen. The outcome is unlikely if the chance is greater that the outcome will not happen than will happen.

Decide Whether Outcomes Are Equally Likely

Using Symbols	Using Words
1. Possible outcomes: rolling a 1, 2, 3, 4, 5, or 6	List the possible outcomes of the experiment.
2. **Rolling** an even number **(2, 4, 6) is equally likely as rolling** an odd **number** (1, 3, 5).	If there is an equal chance that two outcomes will happen, then the outcomes are equally likely.

Simple Probability

Name _____ Class _____ Date _____

GET STARTED

1. Garth's dessert choices:

   Ice Cream Flavors: chocolate, vanilla

   Toppings: sprinkles, syrup, cherries

   _____ possible outcomes

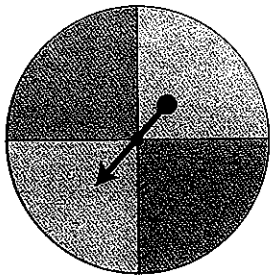
   chocolate ice cream, _____
   chocolate ice cream, _____
   chocolate ice cream, _____
   vanilla ice cream, _____
   vanilla ice cream, _____
   vanilla ice cream, _____

2. *P*(green) = _____ out of _____

3. *P*(white) = _____ out of _____

4. *P*(green, blue, yellow, or orange) = _____ out of _____

BUILD THE CONCEPT



Green or blue: _____ out of _____

The spinner will always land on green or blue.

It is a _____ event.

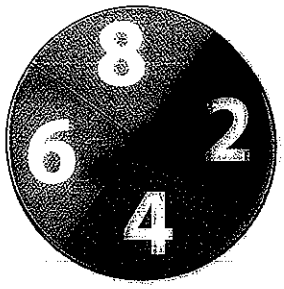
Yellow: _____ out of _____

The spinner will never land on yellow.

It is an _____ event.

TRY IT TOGETHER

Use the spinner to answer each question.



5. What is the probability of the spinner landing on 2?

   $P(2) =$ _____

6. What is the probability of the spinner landing on 4 or 6?

   $P(4 \text{ or } 6) =$ _____

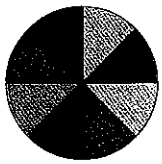
7. What is the probability of landing on an even number?

   $P(\text{even number}) =$ _____

WORK ON YOUR OWN

HOME TO

Find the Probability of an Event

Using Symbols	Using Words
1. $P(\text{orange}) = ?$  Number of orange sections: **2**	Find the number of favorable outcomes.
2. Number of total possible outcomes: **8**	Find the total number of possible outcomes.
3. $P(\text{orange}) = 2$ out of 8	Write the probability as: $P(\text{event}) =$ number of favorable outcomes **out of** total number of possible outcomes

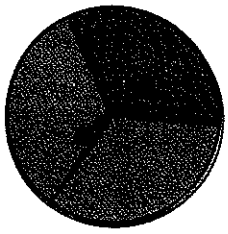
Problem-Solving: Using a Table

Name _____ Class _____ Date _____

GET STARTED

1 **a.** P(green) = _____ out of _____

b. P(blue) = _____ out of _____



2 Are the likelihoods of landing on an odd number and landing on an even number the same?

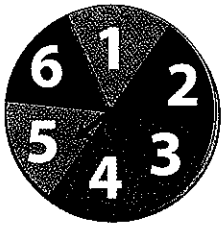
a. Find: _____

_____

b. How? _____

c. Solve.

Event	Favorable Outcomes	Number of Possible Outcomes	Probability
Odd Number	_____, _____, _____	_____	_____ out of _____
Even Number	_____, _____, _____	_____	_____ out of _____



The probability of landing on an odd number is _____ out of _____.

The probability of landing on an even number is _____ out of _____.

The two events are _____.

d. Is the answer reasonable? Explain. _____

_____

_____

TRY IT TOGETHER

Complete the table to solve the problem.

3 Is it more likely that the spinner will land on blue or white?

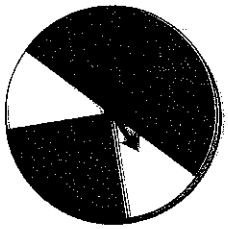
a. Find: _____

_____

b. How? _____

c. Solve.

Event	Number of Favorable Outcomes	Number of Possible Outcomes	Probability
Blue	_____	_____	_____ out of _____
White	_____	_____	_____ out of _____



P(blue) = _____ out of _____ *P*(white) = _____ out of _____

It is more likely that the spinner will land on _____ than on _____

d. Is the answer reasonable? Explain. _____

_____

WORK ON YOUR OWN

HOW TO

Solve a Problem Using a Table

Use the spinner from problem 3.

Is it more likely that the spinner will land on green or blue?

1. **Find:** whether it is more likely the spinner will land on green or blue
2. **How?** Complete the table.
3. **Solve.**

Event	Number of Favorable Outcomes	Number of Possible Outcomes	Probability
Green	3	8	3 out of 8
Blue	3	8	3 out of 8

P(green) = 3 out of 8 P(blue) = 3 out of 8 The 2 events are equally likely.

4. **Is the answer reasonable? Explain.** Yes, the number of favorable and possible outcomes are the same for both events.