Launch Into Math 5

Launch Into Data and Means

Festival of Culture

The Zora Neale Hurston™ Festival of the Arts and Humanities is held every year in Eatonville, Florida. The festival celebrates the life of Zora Neale Hurston, an African-American writer and filmmaker.

Hurston wrote about what it was like to be an African-American woman in the early 1900s. She also made films about black Americans living in rural areas where poverty was common. Hurston cared deeply about her culture and her community's challenges.

More than 50,000 people a year attend the festival to honor Zora Neale Hurston. They celebrate her life, her culture, and the community that she wrote about and loved.

All About Zora!

- Zora Neale Hurston grew up in Eatonville, Florida. Her father was one of the town's first mayors.
- Zora dropped out of school at 13 when her mother died. When she was 26, she claimed to be 16 so she could go to high school.
- A library in Fort Pierce, Florida, is named after Zora. Movies and documentaries have been made about her life.

Three Reads

First, read to understand the situation.

Next, read to understand the amounts.

Then, read to ask what mathematical questions could be asked about the problem.

Around 10,000 people attended the first Zora Neale Hurston festival in 1990. The total attendance for the last 30 years has been around 1,500,000 people. In 2020, more than 60,000 people attended the festival over a 9-day period.

In Her Own Words

"I love myself when I am laughing."

Zora Neale Hurston

Go Online

For the interactive lesson

Read the final question. Make a plan to solve the problem.

Around 10,000 people attended the first Zora Neale Hurston festival in 1990. The total attendance for the last 30 years has been around 1,500,000 people. In 2020, more than 60,000 people attended the festival over a 9-day period.

How could you estimate the number of people attending each day during the 2020 festival?

Write, model, or draw to solve the problem.

Discuss with a partner or in a group.

Math Talk

How could you estimate the number of people that have attended each year since 1990? What has happened to attendance over time? Discuss what answer makes sense in this situation.

Chapter 18

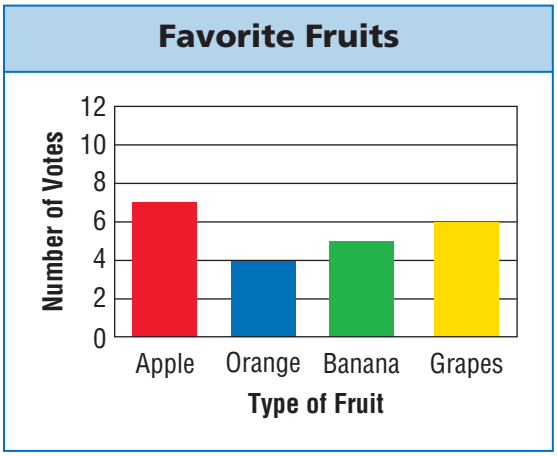
Name _____

Collect, Represent, and Interpret Data

Show What You Know

Read and Use a Bar Graph

Use the graph to answer the questions.



1. Which fruit received the most votes?

   _____

2. Which fruit received 5 votes? _____

3. There were _____ votes in all.

Division

Find the quotient.

4. $35\overline{)980}$

5. $16\overline{)352}$

6. $24\overline{)3{,}456}$

7. $42\overline{)3{,}276}$

Compare Decimals

Compare. Write <, >, or =.

8. 2.48 ◯ 2.53

9. 0.3 ◯ 0.04

10. 4.63 ◯ 4.3

11. 1.7 ◯ 1.70

MATH in the Real World

Kayla scored 110 in the first game she bowled, but she can't remember her score from the second game. The average of the two scores is 116. Help Kayla figure out what her second score was.

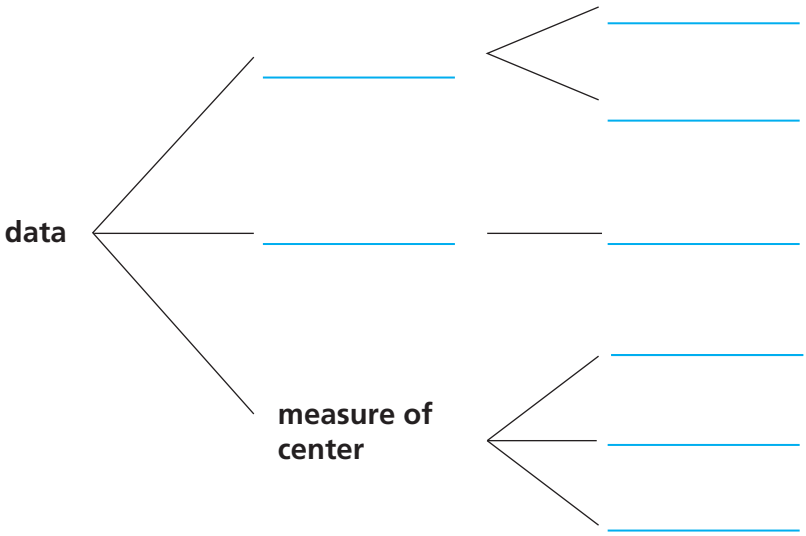
_____

Vocabulary Builder

Go Online | For more help

Visualize It

Use the checked words to complete the tree map.



Connect to Vocabulary

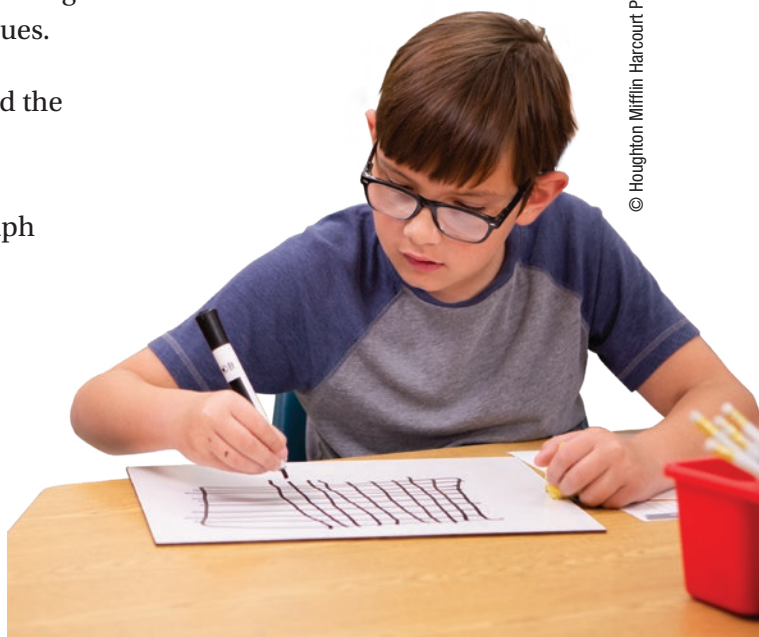
Review Words
- data
- ✓ frequency
- ✓ line plot
- ✓ scale

Preview Words
- ✓ interval
- ✓ line graph
- ✓ mean
- ✓ measure of center
- ✓ median
- ✓ mode
- range

Understand Vocabulary

Complete the sentences using the review and preview words.

1. A graph that uses line segments to show how data changes over time is called a _____ .
2. The _____ is the middle value when a data set with an odd number of values is ordered from least to greatest.
3. A _____ is a number line with Xs that show the _____ of the values in a data set.
4. You can calculate the _____ of a data set by adding the values and then dividing the sum by the number of values.
5. The item(s) that occurs most often in a data set is called the _____ of the data.
6. The difference between the values on the scale of a graph is an _____.



Name _____

Collect and Organize Data

I Can collect and organize data.

Florida's B.E.S.T.

- **Data Analysis & Probability** 5.DP.1.1
- **Mathematical Thinking & Reasoning** MTR.1.1, MTR.2.1, MTR.4.1, MTR.6.1

UNLOCK the Problem Real World

Data are sets of numbers or pieces of information. Conducting a survey is one way to collect data. When you ask people questions and record their answers, you are conducting a survey. Making an observation is another way to collect data. When you collect data by looking at an object or event, you are making an observation.

You can use a table to record the data you collect.

Activity **Conduct a survey of the students in your class and record the results in a tally table.**

STEP 1 Measure your pencil to the nearest $\frac{1}{4}$-inch.

STEP 2 Title your table. Include the units of measure.

STEP 3 Survey the students in your class. Record their results in the table.

STEP 4 Analyze your data.

Which was the most common length?

_____

Which was the least common length?

_____

How many students did you survey? _____

Math Talk

MTR 4.1 Engage in discussions on mathematical thinking.

Describe how your survey results compare with those of a friend.

Examples

When you conduct a survey, you must ask a good question.

- **Would you rather have a delicious yellow banana or a brown banana?**

  You can answer this question, but the word *delicious* might lead you to choose the yellow banana. It is not a fair question. So, this survey question is not a good question.

- **Do you like the color and smell of bananas? (Yes, No)**

  You cannot answer this question if you like the color but not the smell. The question asks about too many things. So, this survey question is not a good question.

- **What is your favorite fruit? (Apple, Orange, Banana, Other)**

  This survey question _____ a good question.

- **How many bananas did you eat last week?**

  It is possible to count how many bananas someone ate for a week. There is more than one possible answer. It _____ a good question.

- **You can record the results in a tally table.**

  Which choice got the least tally marks? _____

  Which choice got the most tally marks? _____

  How many people were surveyed? _____

	Tally
	𝍸 𝍸 ||
	𝍸 |
	|||
	𝍸 |||

Remember

A tally mark stands for one vote. It looks like this: I. Five tally marks look like this: 𝍸

Share and Show

Math Board

Tell if the survey question or observation is good.

1. How many pets do you have? (Cat, Dog, Other)

   You _____ answer this question, even if you have a bird,

   so it _____ a good question.

2. Observe children in the park and record how many like math.

   It _____ possible to look at children to know if they like math.

So, this observation _____ a good way to collect data.

Name _____

Tell if the survey question or observation is good. Explain your reasoning.

3. Would you rather eat a boring apple or a pineapple? (Boring Apple, Pineapple)

_____

_____

4. Observe three turtles and record the number of seconds it takes them to each walk 2 feet.

_____

_____

Use the table for 5–6.

5. Liam recorded the results of a survey of his classmates in the table at the right. What survey question did Liam most likely ask?

_____

$1.25	$1.10	$0.70	$0.05
$1.01	$0.99	$0.87	$0.36
$1.42	$0.50	$0.10	$1.03

6. How many classmates were surveyed? _____

Math Talk

MTR 4.1 Engage in discussions on mathematical thinking.

Write an unfair survey question and explain why it is not fair. Then correct the question so it is fair.

On Your Own

Tell if the survey question or observation is good. Explain your reasoning.

7. How many steps is it from your desk to the door in the classroom?

_____

_____

8. How many students are in your class?

_____

_____

9. Record the number of times the letters r, s, and t are used on a page in a book.

_____

_____

Use the tally table at the right for 10–12.

Drawing Tool	Tally
Color Pencil	𝍸 ||||
Crayon	𝍸 ||
Marker	𝍸 ||
Other	|||

10. Nella recorded the results of a survey in this tally table. What survey question did she most likely ask?

_____

11. How many people were surveyed? _____

12. Nella's survey question was, "Which two drawing tools did you use for your art project?" How many tallies would Nella record for each person she surveyed? How does that change your answer to Problem 11?

_____

13. WRITE Math Write a survey question that involves measuring. Provide at least three possible answers to your question.

Problem Solving Real World

Use the tally table at the right for 14–17.

Servings	Tally
0	
1	
2	
3	
4 or more	

14. Kiko asked her classmates how many servings of fruit they had yesterday.
    - There were two students who did not eat fruit yesterday.
    - Eight students who ate 1 serving of fruit.
    - The same number of students had 4 or more servings as had 0 servings.
    - There were 3 students who had 3 servings, and the same number of students had 2 servings.

    Record the results in the tally table.

15. What was the most common number of servings? _____

16. How many classmates did she ask? _____

17. WRITE Math Write a problem about the tally chart that has 6 as its answer.

_____

Name _____

Collect and Organize Data

Go Online
Interactive Examples

Tell if the survey question or observation is good. Explain your reasoning.

1. Where are you going for summer vacation? (Florida, New York, California, Staying Home)

   Not good; I cannot answer this question if I am going somewhere not listed, such as Ohio.

2. Record the number of pieces of mail you get in one week.

Use the table at the right for 3 and 4.

Each person in Ari's group chooses three different books from the bookshelf, lays them side-by-side, and measures the length in inches. He records the data in the table.

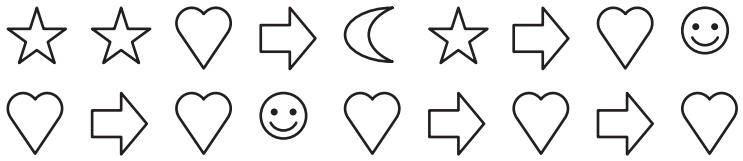
Length of Books	
$14\frac{1}{2}$ in.	$16\frac{3}{4}$ in.
$15\frac{1}{4}$ in.	$17\frac{1}{4}$ in.
$12\frac{1}{2}$ in.	$15\frac{3}{4}$ in.
$13\frac{3}{4}$ in.	$14\frac{1}{2}$ in.
$13\frac{1}{2}$ in.	15 in.
18 in.	$20\frac{1}{2}$ in.

3. What was the longest measure? _____

4. How many students measured books? _____

Use the tally table at the right for 5–7.

5. Ohanna has the following stickers. Tally the number of each type of sticker Ohanna has.



Sticker	Tally
☆	
⇨	
♡	
☺	
☾	

6. Which type of sticker occurs least often? _____

7. Ohanna gives 3 heart stickers to a friend. How many heart stickers does she have left? _____

Lesson Check

8. Which of the following survey questions or observations is good?

Ⓐ Do you like cheese pizza or stinky anchovy pizza better?

Ⓑ How many times do you blink in a minute?

Ⓒ Record the number of movies every student in the school watched last weekend.

Ⓓ Do you like where you sit in the classroom?

9. Carlton and his classmates each measured how far a toy car rolled during a science investigation. He records the result in the tally table. How many people conducted the science investigation?

Ⓐ 10

Ⓑ 19

Ⓒ 22

Ⓓ 37

Distance	Tally
2 m	𝍸 ||
2.5 m	𝍸 𝍸
3 m	||
3.5 m	|||

Spiral Review

10. Which symbol makes the following number sentence true?

$(7 + 3) \times 5 \bigcirc (7 \times 7) + 1$

Ⓐ $=$

Ⓑ $<$

Ⓒ $>$

Ⓓ $+$

11. A rectangular porch has a length of 10.75 feet and a width of 4.5 feet. What is the perimeter of the porch?

_____ feet

12. At a wedding reception, there are 25 tables. Each table has 8 party favors. How many party favors are there in all?

Ⓐ 40

Ⓑ 200

Ⓒ 260

Ⓓ 1,640

13. Which number is 200 more than the product of 6 and 3,950?

Ⓐ 23,500

Ⓑ 23,630

Ⓒ 23,700

Ⓒ 23,900

Name _____

Represent and Interpret Line Plots

I Can represent data in a line plot.

Florida's B.E.S.T.

- **Data Analysis & Probability** 5.DP.1.1, 5.DP.1.2
- **Mathematical Thinking & Reasoning** MTR.1.1, MTR.2.1, MTR.3.1, MTR.5.1

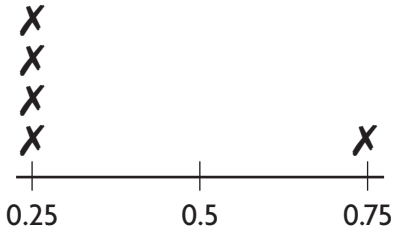
UNLOCK the Problem

Real World

Students have measured different amounts of soil into buckets to prepare for planting herbs. The amount of soil in each bucket is listed below.

0.25 kg, 0.25 kg, 0.5 kg, 0.75 kg, 0.25 kg, 0.25 kg
0.25 kg, 0.5 kg, 0.75 kg, 0.75 kg, 0.25 kg, 0.25 kg

What is the mean amount of soil in the buckets? The **mean**, or average, represents the amount of soil in each bucket if the soil is shared equally.



Amount of Soil in a Bucket (kg)

STEP 1 Count the frequency of each amount. Draw an ✗ for the number of times each amount is recorded to complete the line plot.

0.25 : _____ 0.5 : _____ 0.75 : _____

STEP 2 Find the total amount of soil in all the buckets that contain 0.25 kilogram of soil.

There are _____ buckets with 0.25 kilogram of soil. Multiply.

$7 \times 0.25 = 1.75$

STEP 3 Find the total amount of soil in all the buckets that contain 0.5 kilogram of soil.

There are _____ buckets with 0.5 kilogram of soil. Multiply.

$2 \times 0.5 = 1$

STEP 4 Find the total amount of soil in all of the buckets that have 0.75 kilogram of soil.

$3 \times 0.75 = 2.25$

STEP 5 Add to find the total amount of soil in all the buckets.

$1.75 + 1 + 2.25 =$ _____

STEP 6 Divide the sum you found in Step 5 by the number of buckets to find the mean. Round your answer to nearest hundredth.

$5 \div 12 = 0.42$

So, the mean for the amount of soil in a bucket is _____ kilogram.

Try This!

You can use the order of operations to find the sum. Then you can find the mean.

$\left(3 \times \frac{1}{4}\right) + \left(4 \times \frac{1}{2}\right) + \left(3 \times \frac{3}{4}\right)$ Perform the operations inside the parentheses.

$\frac{\square}{\square} + \square + \frac{\square}{\square}$ Next, perform the addition.

$\square \div 10$ Divide the sum by the number of values.

$\frac{\square}{\square}$ Write the expression as a fraction.

Example

Shiloh divides three 2-pound bags of birdseed into smaller bags that have how much she puts in her feeders. The first bag is divided into bags weighing $\frac{1}{4}$ pound each, and the second bag is divided into bags weighing $\frac{1}{3}$ pound each. The third bag is divided into bags weighing $\frac{1}{2}$ pound each.

Find the number of $\frac{1}{4}$-, $\frac{1}{3}$-, and $\frac{1}{2}$-pound bags. Then graph the results on the line plot. The **range** is the difference between the greatest and the least values. Find the range of the data.

STEP 1 Write a title for your line plot.

STEP 2 Label $\frac{1}{4}$, $\frac{1}{3}$, and $\frac{1}{2}$ on the line plot to show the different amounts into which the three 2-pound bags of birdseed are divided.

STEP 3 Use division.

$2 \div \frac{1}{4}$ $2 \times \square = \square$

$2 \div \frac{1}{3}$ $2 \times \square = \square$

$2 \div \frac{1}{2}$ $2 \times \square = \square$

STEP 4 Draw an ✗ above $\frac{1}{4}$, $\frac{1}{3}$, or $\frac{1}{2}$ to show the number of birdseed bags.

STEP 5 To find the range, subtract the least weight from the greatest weight.

$\frac{1}{2} - \frac{1}{4} = \frac{2}{4} - \frac{1}{4} = \frac{1}{4}$

The range is $\frac{1}{4}$ pound.

Math Talk

MTR 4.1 Engage in discussions on mathematical thinking.

Explain why there are more $\frac{1}{4}$-pound bags than $\frac{1}{2}$-pound bags.

Name _____

Share and Show

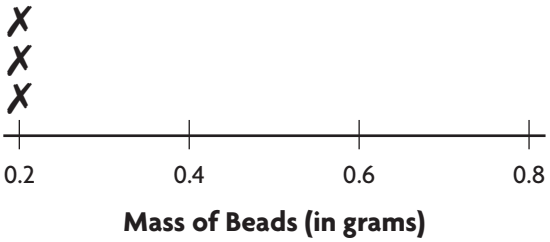
Math Board

Use the data to complete the line plot. Then answer the questions.

Liliana needs to buy beads for a necklace. The beads are sold by mass. She sketches a design to determine what beads are needed, and then writes down their sizes. The sizes are shown below.

0.4 g, 0.4 g, 0.8 g, 0.4 g, 0.2 g, 0.6 g, 0.2 g

0.8 g, 0.2 g, 0.4 g, 0.6 g, 0.6 g, 0.4 g



Mass of Beads (in grams)

1. What is the combined mass of the beads with a mass of 0.2 gram?

Think: There are _____ Xs above 0.2 on the line plot, so the combined mass of the beads is _____ gram.

2. What is the combined mass of all the beads with a mass of 0.4 gram?

_____

3. What is the combined mass of all the beads on the necklace?

_____

4. What is the mean mass of the beads on the necklace? Round to the nearest thousandth.

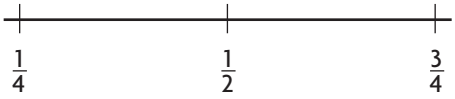
_____

On Your Own

Use the data to complete the line plot. Then answer the questions.

A breakfast chef used different amounts of milk when making pancakes, depending on the number of pancakes ordered. The results are shown below.

$\frac{1}{2}$ c, $\frac{1}{4}$ c, $\frac{1}{2}$ c, $\frac{3}{4}$ c, $\frac{1}{2}$ c, $\frac{3}{4}$ c, $\frac{1}{2}$ c, $\frac{1}{4}$ c, $\frac{1}{2}$ c, $\frac{1}{2}$ c



Milk in Pancake Orders (in cups)

5. How much milk combined is used in $\frac{1}{2}$-cup amounts? _____

6. What is the mean amount of milk used for an order of pancakes?

MATH on the Spot

_____

7. How many more orders of pancakes used $\frac{1}{2}$ cup of milk than $\frac{1}{4}$ cup and $\frac{3}{4}$ cup of milk combined?

_____

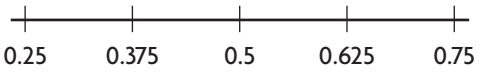
8. MTR Describe an amount you could add to the data that would make the mean increase.

_____

UNLOCK the Problem Real World

9. MTR For 10 straight days, Samantha measured the amount of food that her cat Dewey ate, recording the results, which are shown below. Graph the results on the line plot. What is the mean for the amount of cat food that Dewey ate daily?

0.5 scoop, 0.375 scoop, 0.625 scoop, 0.5 scoop, 0.625 scoop, 0.25 scoop, 0.75 scoop, 0.25 scoop, 0.5 scoop, 0.625 scoop



Amount of Cat Food Eaten (in scoops)

a. What do you need to know? _____

_____

b. How can you use a line plot to organize the information?

_____

_____

c. What steps could you use to find the mean for the amount of food that Dewey ate daily?

_____

_____

d. Fill in the blanks for the totals of each amount measured.

0.25 scoop = _____ scoop

0.375 scoop = _____ scoop

0.5 scoop = _____ scoop

0.625 scoop = _____ scoop

0.75 scoop = _____ scoop

e. Find the total amount of cat food eaten over 10 days.

_____ + _____ + _____ + _____ +

_____ = _____

So, the mean amount was _____.

10. Maya measured the heights of the seedlings she is growing. The heights were 1 in., $1\frac{1}{2}$ in., $\frac{1}{2}$ in., $\frac{3}{4}$ in., 1 in., $\frac{3}{4}$ in., $1\frac{1}{2}$ in., 1 in., $\frac{1}{2}$ in., and 1 in. Organize the information in a line plot.

What is the range of the height of the seedlings?

_____ inch

Name _____

Represent and Interpret Line Plots

Go Online
Interactive Examples

Use the data to complete the line plot. Then answer the questions.

A clerk in a health food store makes bags of trail mix. The amount of trail mix in each bag is listed below.

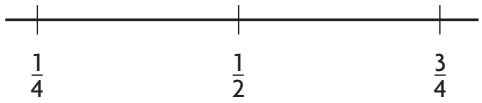
$\frac{1}{4}$ lb, $\frac{1}{4}$ lb, $\frac{3}{4}$ lb, $\frac{1}{2}$ lb, $\frac{1}{4}$ lb, $\frac{3}{4}$ lb,
$\frac{3}{4}$ lb, $\frac{3}{4}$ lb, $\frac{1}{2}$ lb, $\frac{1}{4}$ lb, $\frac{1}{2}$ lb, $\frac{1}{2}$ lb

1. What is the combined weight of the $\frac{1}{4}$-lb bags? 1 lb

Think: There are four $\frac{1}{4}$-pound bags.

2. What is the combined weight of the $\frac{1}{2}$-lb bags? _____

3. What is the combined weight of the $\frac{3}{4}$-lb bags? _____



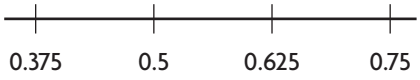
Weight of Trail Mix (in pounds)

4. What is the total weight of the trail mix used in all the bags? _____

5. What is the range of the weights of the trail mix? _____

Siroun uses crystals to make a bracelet. The lengths of the crystals are shown below.

0.5 cm, 0.625 cm, 0.75 cm, 0.5 cm, 0.375 cm, 0.5 cm, 0.75 cm,
0.375 cm, 0.75 cm, 0.625 cm, 0.5 cm, 0.375 cm, 0.625 cm, 0.75 cm



Lengths of Crystals (in centimeters)

6. What is the combined length of the 0.5-cm crystals? _____

7. What is the combined length of the 0.625-cm crystals? _____

8. What is the total length of all the crystals in the bracelet? _____

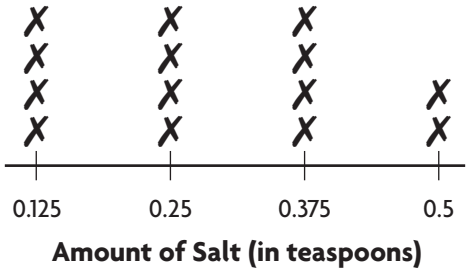
9. What is the mean length of each crystal in the bracelet? Round to the nearest thousandth. _____

10. WRITE Math Describe the steps you can use to find the mean of the decimal amounts.

_____

Lesson Check

A baker uses different amounts of salt when she bakes loaves of bread, depending on which recipe she is following. The amount of salt called for in each recipe is shown on the line plot.



11. Based on the line plot, how many recipes call for more than 0.25 teaspoons of salt?

12. What is the mean for the amount of salt called for in each recipe? Round to the nearest tenth.

13. What is the range of the amounts of salt?

Spiral Review

14. Ramona had $8\frac{3}{8}$ in. of ribbon. She used $2\frac{1}{2}$ in. for an art project. How many inches of ribbon does she have left? Find the difference in simplest form.

15. Ziazan bought $\frac{1}{2}$ pound of cheese for 3 sandwiches. If he puts the same amount of cheese on each sandwich, how much cheese will each sandwich have?

16. What is 92.583 rounded to the nearest tenth?

17. In Yoshi's garden, $\frac{3}{4}$ of the flowers are tulips. Of the tulips, $\frac{2}{3}$ are yellow. What fraction of the flowers in Yoshi's garden are yellow tulips?

Name _____

Represent and Interpret Line Graphs

Florida's B.E.S.T.
- **Data Analysis & Probability** 5.DP.1.1
- **Mathematical Thinking & Reasoning** MTR.1.1, MTR.2.1, MTR.3.1, MTR.5.1

I Can use a line graph to display and analyze real-world data.

UNLOCK the Problem Real World

A **line graph** is a graph that uses line segments to show how data changes over time. The series of numbers placed at fixed distances that label the graph are the graph's **scale**. The **interval**, or difference between one number and the next on the scale, should be equal.

Graph the data. Use the graph to determine the times between which the greatest temperature change occurred.

Recorded Temperatures							
Time (a.m.)	1:00	2:00	3:00	4:00	5:00	6:00	7:00
Temperature (in °F)	51.4	49.3	47.2	44.9	45.1	44.7	46.5

- Write related number pairs of data as ordered pairs.

(1:00, 51.4) (_____, _____)

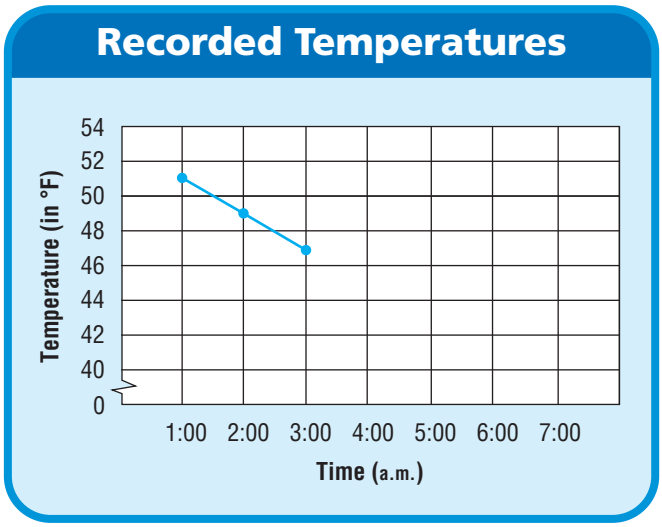
(_____, _____) (_____, _____)

(_____, _____) (_____, _____)

(_____, _____)

STEP 1 For the vertical axis, choose a scale and an interval that are appropriate for the data. You can show a break in the scale between 0 and 40, since there are no temperatures between 0°F and 44°F.

STEP 2 For the horizontal axis, write the times of day. Write a title for the graph and name each axis. Then graph the ordered pairs. Complete the graph by connecting the points with line segments.



Look at each line segment in the graph. Find the line segment that shows the greatest change in temperature between two consecutive points.

The greatest temperature change occurred between _____ and _____.

Try This! Sirvat used a rain gauge to collect data on the total rainfall during 6 days at her home in Miami. She read the amount of rain collected in the rain gauge each day and did not pour it out. Her data is shown in the table. Make a line graph to display Sirvat's data.

STEP 1 Write related pairs of data as ordered pairs.

(Mon, $2\frac{1}{2}$) (____, ____) (____, ____)

(____, ____) (____, ____) (____, ____)

STEP 2 Choose a scale and an interval for the data.

STEP 3 Label the horizontal and vertical axes. Write a title for the graph. Graph the ordered pairs. Connect the points with line segments.

Rainfall Collected

Day	Rainfall (in inches)
Mon	$2\frac{1}{2}$
Tue	$2\frac{1}{2}$
Wed	$3\frac{1}{4}$
Thu	$6\frac{3}{4}$
Fri	$8\frac{1}{4}$
Sat	$9\frac{1}{2}$

Math Talk

MTR 6.1 Assess the reasonableness of solutions.

How could you use the graph to identify the two readings between which it did not rain? Explain.

Use the graph to answer the questions.

1. On which day was the total rainfall recorded the greatest?

_____

2. On which day did Sirvat record the greatest increase in rainfall collected from the previous day?

_____

Name _____

Share and Show

Math Board

Use the table at the right for 1–3.

Average Monthly Temperature in Tupelo, Mississippi					
Month	Jan	Feb	Mar	Apr	May
Temperature (in °F)	40.1	43.9	54.6	62.5	69.8

1. What scale and interval would be appropriate to make a graph of the data?

_____

_____

2. Write the related pairs as ordered pairs.

_____

_____

3. Make a line graph of the data.

4. Use the graph to determine between which two months the least change in average temperature occurs.

_____

On Your Own

Use the table at the right for 5–7.

Plant Height				
Month	1	2	3	4
Height (in inches)	20	25	29	32

5. Write the related number pairs for the plant height as ordered pairs.

_____

6. What scale and interval would be appropriate to make a graph of the data?

_____

7. Make a line graph of the data.

8. Use the graph to find between which two months the plant grew the most? the least?

_____

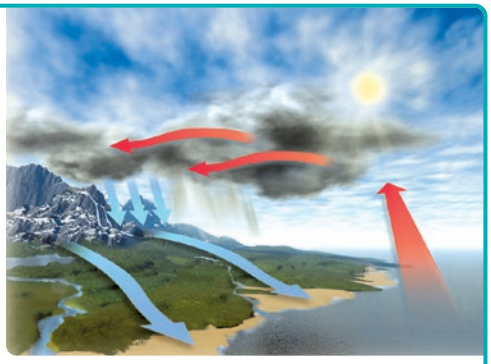
_____

9. Use the graph to estimate the height at $1\frac{1}{2}$ months.

_____

MATH on the Spot

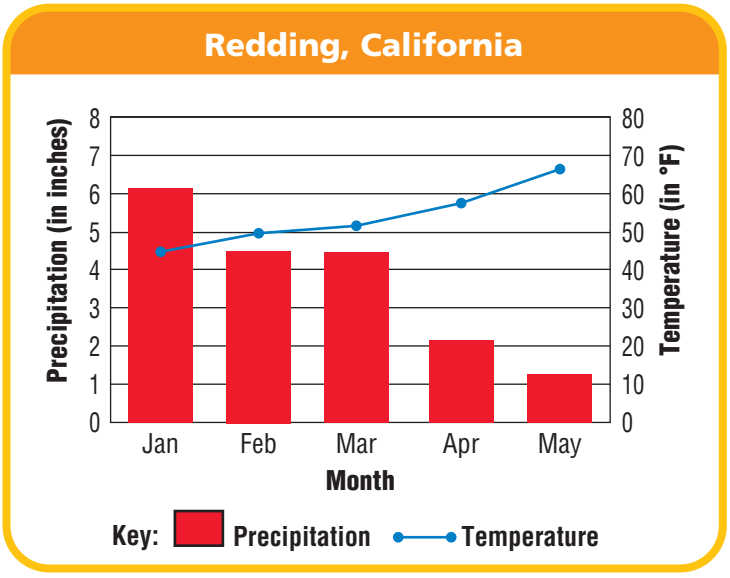
Connect to Science



Evaporation changes water on Earth's surface into water vapor. Water vapor condenses in the atmosphere and returns to the surface as precipitation. This process is called the water cycle. The ocean is an important part of this cycle. It influences the average temperature and precipitation of a place.

The overlay graph below uses two vertical scales to show monthly average precipitation and temperatures for Redding, California.

Use the graph for 10–11.

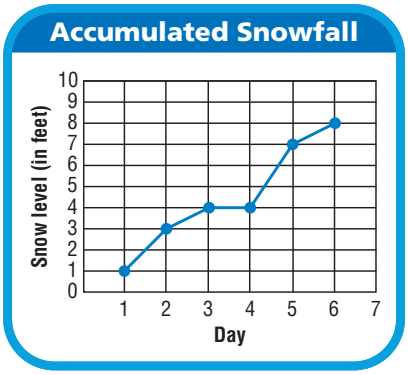


10. MTR Explain how the overlay graph helps you relate precipitation and temperature for each month.

11. Describe how the average temperature changes in the first 5 months of the year. Describe the relationship between the average temperature and the amount of precipitation.

12. The line graph shows the amount of snowfall over several days.

For 12a–12c, select True or False for each statement.



12a. There was no change in the amount of snow from Day 2 to Day 3. ○ True ○ False

12b. The greatest increase in the amount of snow between consecutive days occurred from Day 4 to Day 5. ○ True ○ False

12c. From Day 1 to Day 6, the amount of snow increased from 1 foot to 8 feet. ○ True ○ False

Name _____

Represent and Interpret Line Graphs

Go Online
Interactive Examples

Use the table for 1–7.

Hourly Temperature							
Time	10 a.m.	11 a.m.	12 noon	1 p.m.	2 p.m.	3 p.m.	4 p.m.
Temperature (˚F)	$8\frac{1}{2}$	$11\frac{1}{4}$	16	$26\frac{3}{4}$	31	$37\frac{3}{4}$	$41\frac{1}{4}$

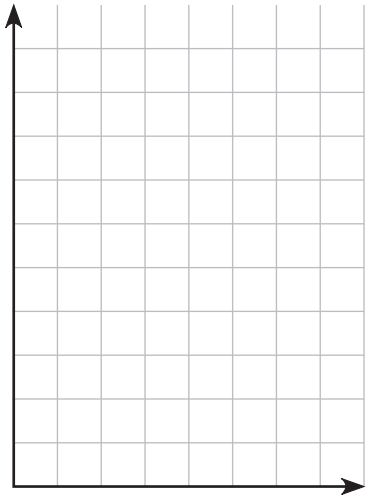
1. Write the related number pairs for the hourly temperature as ordered pairs.

$(10, 8\frac{1}{2}), (11, 11\frac{1}{4}), (12, 16), (1, 26\frac{3}{4}), (2, 31), (3, 37\frac{3}{4}), (4, 41\frac{1}{4})$

2. What scale would be appropriate to graph the data?

3. What interval would be appropriate to graph the data?

4. Make a line graph of the data.



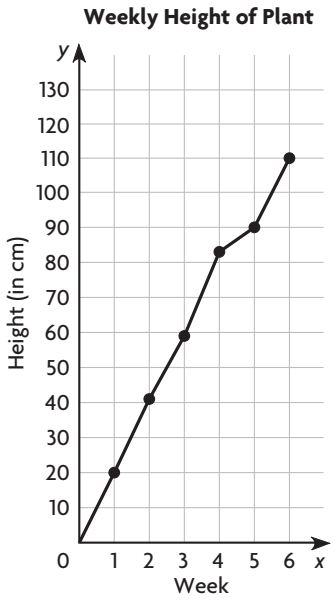
5. Use the graph to find the difference in temperature between 11 a.m. and 1 p.m.

Problem Solving Real World

6. Between which two hours did the least change in temperature occur?

7. What was the change in temperature between 12 noon and 4 p.m.?

Lesson Check



8. About how many centimeters did the plant grow in the first three weeks?

9. Between which two weeks did the plant grow the least?

Spiral Review

10. Write an expression using the Distributive Property to find the product of 7×63.

11. Seda needs to buy 105 vases for a party. Each package has 6 vases. How many packages should Seda buy?

12. A student athlete runs $3\frac{1}{3}$ miles in 30 minutes. A professional runner can run $1\frac{1}{4}$ times as far in 30 minutes. How far can the professional runner run in 30 minutes?

13. A recipe for salad dressing calls for $\frac{1}{4}$ cup of vinegar. You have 4 cups of vinegar. How many batches of salad dressing could you make with the vinegar?

Name _____

Represent Mean as Fair Share and Balance Point

Florida's B.E.S.T.
- **Data Analysis & Probability** 5.DP.1.2
- **Mathematical Thinking & Reasoning** MTR.1.1, MTR.2.1, MTR.5.1

I Can use a fair share and balance point to find the mean.

Investigate

Materials ■ counters

On an archaeological dig, five students found 1, 5, 7, 3, and 4 arrowheads. The students agreed to divide the arrowheads evenly. How many arrowheads should each student get?

A. Use counters to show how many arrowheads each of the five students found. Use one stack of counters for each student.

B. Remove a counter from the tallest stack and move it to the shortest. Keep moving counters from taller stacks to shorter stacks until each stack has the same height.

C. Count the number of counters in each stack.

The number of counters in each stack is the *mean*, or average, of the data. The mean represents the number of arrowheads each student should get if the arrowheads are shared equally.

There are 5 stacks of _____ counters.

So, each student should get _____ arrowheads.

Math Talk

MTR 4.1 Engage in discussions on mathematical thinking.

What is the mean of the data set 3, 3, 3, 3, 3? Explain how you know.

Draw Conclusions

1. Explain what is "fair" about a fair share of a group of items.

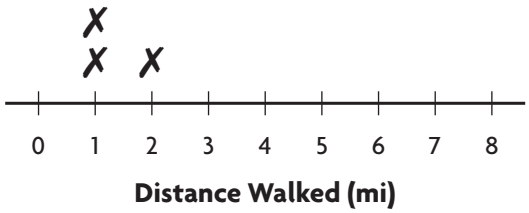
2. How could you find the fair share of arrowheads using the total number of arrowheads and division?

Make Connections

The mean can also be seen as a kind of balance point.

Ms. Burnham's class holds a walk-a-thon to help raise money to update the computer lab. Five of the students walked 1, 1, 2, 4, and 7 miles. The mean distance walked is 3 miles.

Complete the line plot of the data set.



Circle the number that represents the mean.

Complete the table to find the distances of the data points from the mean.

	Values Less than the Mean			Values Greater than the Mean	
Data point	1 mi	1 mi	mi	4 mi	mi
Distance from the mean	2 mi	mi	mi	mi	mi

The total distance from the mean for values less than the mean is:

2 miles + 2 miles + 1 mile = _____ miles

The total distance from the mean for values greater than the mean is:

_____ mile + _____ miles = _____ miles

The total distance of the data values less than the mean is _____ the total distance of the data values greater than the mean. The mean represents a balance point for data values less than the mean and greater than the mean.

3. Explain how you found the distance of each data value from the mean.

_____

_____

4. MTR Can all of the values in a data set be greater than the mean? Explain why or why not.

_____

_____

Name _____

Share and Show Math Board

Use counters to find the mean of the data set.

1. On the first day of a school fundraiser, five students sell 1, 1, 2, 2, and 4 gift boxes of candy.

Make _____ stacks of counters with heights 1, 1, 2, 2, and 4.

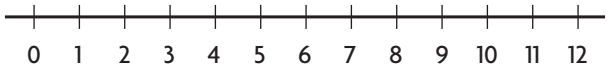
Rearrange the counters so that all _____ stacks have the same height.

After rearranging, each stack has _____ counters.

So, the mean of the data set is _____ .

Make a line plot for the data set and use it to check whether the given value is a balance point for the data set.

2. Rosanna's friends have 0, 1, 1, 2, 2, and 12 pets at home. Rosanna says the mean of the data is 3. Is Rosanna correct?



Number of Pets

The total distance from 3 for data values less than 3 is _____ .

The total distance from 3 for data values greater than 3 is _____ .

The mean of 3 _____ a balance point.

So, Rosanna _____ correct.

On Your Own

3. Four people go to lunch, and the costs of their orders are $6, $9, $10, and $11. They want to split the bill evenly. Find each person's fair share. Explain your work.

_____

_____

_____

Use the table for 4–6.

Fruit Baskets			
Basket	Apples	Oranges	Pears
A	4	2	2
B	1	2	1
C	4	2	5

4. A grocer is preparing fruit baskets to sell as holiday presents. If the grocer rearranges the apples in baskets A, B, and C so that each has the same number, how many apples will be in each basket? Use counters to find the fair share.

5. MTR Can the pears be rearranged so that there is an equal whole number of pears in each basket? Explain why or why not.

6. Use counters to find the mean of the number of pears originally in baskets B and C. Draw a line plot of the data set. Use your plot to explain why the mean you found is a balance point.

MATH on the Spot

7. Four friends go to breakfast and the costs of their breakfasts are $5, $8, $9, and $10. Select True or False for each statement.

7a. The mean of the cost of the breakfasts can be found by adding each of the costs and dividing that total by 4. ○ True ○ False

7b. The mean cost of the four breakfasts is $10. ○ True ○ False

7c. The difference between the greatest cost and the mean is $2. ○ True ○ False

7d. The difference between the least cost and the mean is $2. ○ True ○ False

Name _____

Represent Mean as Fair Share and Balance Point

Go Online
Interactive Examples

Use counters to find the mean of the data set.

1. Six students count the number of buttons on their shirts. The students have 0, 4, 5, 2, 3, and 4 buttons.

   Make 6 stacks of counters with heights 0, 4, 5, 2, 3, and 4.

   Rearrange the counters so that all 6 stacks have the same height.

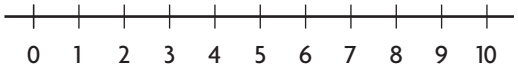
   After rearranging, each stack has 3 counters.

   So, the mean of the data set is 3.

2. Four students completed 1, 2, 2, and 3 chin-ups. _____

Make a line plot for the data set and use it to check whether the given value is a balance point for the data set.

3. Ishi's friends ate 0, 2, 3, 4, 6, 6, and 7 pretzels. Ishi says the mean of the data is 4. Is Ishi correct?



The total distance from 4 for values less than 4 is _____. The total distance from 4 for values greater than 4 is _____. The mean of 4 _____ a balance point.

So, Ishi _____ correct.

Problem Solving Real World

4. Three baskets contain 8, 8, and 11 soaps. Can the soaps be rearranged so that there is an equal whole number of soaps in each basket? Explain why or why not.

_____

_____

_____

_____

5. Five pages contain 6, 6, 9, 10, and 11 stickers. Can the stickers be rearranged so that there is an equal whole number of stickers on each page? Explain why or why not.

_____

_____

_____

_____

6. WRITE Math Describe how to use counters to find the mean of a set of data. Give a data set and list the steps to find the mean.

_____

_____

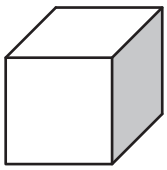
Lesson Check

7. What is the mean of 9, 12, and 15 stamps?

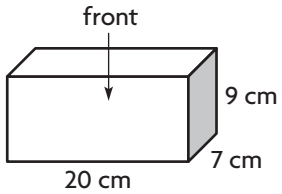
8. Four friends spent $9, $11, $11, and $17 on dinner. If they split the bill equally, how much does each person owe?

Spiral Review

9. What is the name of the figure?

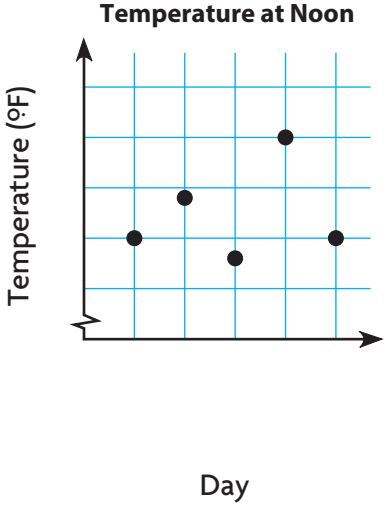


10. Kisho fills a box with packing peanuts. What is the volume of the box?



11. Vailea collected data and then displayed her results in the table to the right. Make a line graph to display the data.

Temperature at Noon	
Monday	80°F
Tuesday	84°F
Wednesday	78°F
Thursday	90°F
Friday	80°F



Name _____

Interpret Data Using Mean, Median, Mode, and Range

Florida's B.E.S.T.
- **Data Analysis & Probability** 5.DP.1.2
- **Mathematical Thinking & Reasoning** MTR.1.1, MTR.2.1, MTR.5.1

I Can describe a set of data using mean, median, mode, and range.

A **measure of center** is a single value used to describe the middle of a data set. A measure of center can be a useful way to summarize a data set, especially when the data set is large.

UNLOCK the Problem Real World

Kara made a paper airplane. She flew her airplane 6 times and recorded how long it stayed in the air during each flight. The times in seconds for the flights are 5.8, 2.9, 6.7, 1.6, 2.9, and 4.7. What are the mean, median, mode, and range of the data?

What unit of time is used in the problem?

_____

How many flight times are given?

_____

Find the mean, median, mode, and range.

The **mean** is the sum of the data items divided by the number of data items.

$$\text{Mean} = \frac{5.8 + 2.9 + 6.7 + 1.6 + 2.9 + 4.7}{\square} = \frac{\square}{\square} = \square$$

The **median** is the middle value when the data are written in order. If the number of data items is even, the median is the mean of the two middle values.

Order the values from least to greatest.

1.6, 2.9, 2.9, 4.7, 5.8, 6.7

The data set has an _____ number of values, so the median is the mean of the two middle values. Circle the two middle values of the data set.

Now find the mean of the two middle values.

$$\frac{\square + \square}{\square} = \frac{\square}{\square} = \square$$

The **mode** is the data value or values that occur most often.

_____ occurs twice, and all the other values occur once.

_____ is the mode.

The **range** is the difference between the greatest and the least values.

_____ − 1.6 = _____

The range is _____.

Math Talk

MTR 4.1 Engage in discussions on mathematical thinking.

How could you use a line plot and the idea of a balance point to check your answer for the mean? Explain.

Example 1 Mrs. O'Donnell's class has a fundraiser for a field trip to a wildlife preservation. Five of the donations are $15, $25, $30, $28, and $27. Find the mean, median, and mode of the donations.

Mean = $\frac{\square + \square + \square + \square + \square}{\square}$

$= \frac{\square}{\square} = \square$

Order the data from least to greatest to find the median.

_____, _____, _____, _____, _____

Median = _____

If all of the values in a data set occur with equal frequency, then the data set has no mode. What is the mode of this data set? _____

Subtract to find the range. _____ − _____ = _____

The range is _____.

Example 2 Keith surveys his classmates about how many brothers and sisters they have. Six of the responses were 1, 3, 1, 2, 2, and 0. Find the mean, median, and mode of the data.

Mean = $\frac{\square + \square + \square + \square + \square + \square}{\square} = \frac{\square}{\square} = \square$

Order the data from least to greatest to find the median.

_____, _____, _____, _____, _____, _____

The number of data values is even, so find the mean of the two middle values.

Median = $\frac{\square + \square}{\square} = \frac{\square}{\square} = \square$

The data values _____ and _____ both appear twice in the set. So, the data set has two modes.

Modes = _____ and _____

The range of the data set is _____.

Name _____

Try This! In 2009, an engineer named Takuo Toda set a world record for flight time for a paper airplane. His plane flew for 27.9 sec. If Toda's time was included in Kara's set of times, what would the median be?

_____

Share and Show

Math Board

1. Terrence records the number of e-mails he receives per day. During one week, he receives 7, 3, 10, 5, 5, 6, and 6 e-mails. What are the mean, median, mode, and range of the data?

Mean = _____ Median = _____ Mode(s) = _____ Range = _____

2. Iva goes to several grocery stores and researches the price of a 12 oz bottle of juice. Find the mean, median, mode, and range of the prices shown.

Juice Prices		
$0.95	$1.09	$0.99
$1.25	$0.99	$1.99

Mean = _____ Median = _____ Mode(s) = _____ Range = _____

Math Talk

MTR 4.1 Engage in discussions on mathematical thinking.

Explain how you can find the median of a set of data with an even number of values.

On Your Own

3. T.J. is training for the 200-meter dash event for his school's track team. Find the mean, median, mode, and range of the times shown in the table.

T.J.'s Times (sec)		
22.3	22.4	23.3
24.5	22.5	

Mean = _____ Median = _____ Mode(s) = _____ Range = _____

4. In the last six months, Cho's family used 456, 398, 655, 508, 1,186, and 625 minutes on their cell phone plan. In an effort to spend less time on the phone each month, Cho's family wants to try and keep the mean cell phone usage at 600 minutes or less. Over the last 6 months, by how many minutes did the mean number of minutes exceed their goal?

_____

Problem Solving · Applications

5. Jeremy scored 85, 90, 72, 88, and 92 on five math tests, for a mean of 85.4. On the sixth test he scored a 95. He calculates his mean score for all 6 tests as shown below, but Deronda says he is incorrect. Whose answer makes sense? Whose answer is nonsense? Explain your reasoning.

MATH on the Spot

Jeremy's Work

The mean of my first 5 test scores was 85.4, so to find the mean of all 6 test scores, I just need to find the mean of 85.4 and 95.

$$\text{Mean} = \frac{85.4 + 95}{2} = \frac{180.4}{2} = 90.2$$

So, my mean score for all 6 tests is 90.2.

Deronda's Work

To find the mean of all 6 test scores, you need to add up all 6 scores and divide by 6.

$$\text{Mean} = \frac{85 + 90 + 72 + 88 + 92 + 95}{6}$$

$$= \frac{522}{6} = 87$$

So, Jeremy's mean score for all 6 tests is 87.

6. Alex took a standardized test 4 times. His test scores were 16, 28, 24, and 32.

The mean of the test scores is [24. / 25. / 26.]

The median of the test scores is [24. / 26. / 28.]

The mode of the test scores is [16. / 32. / no mode.]

Name _____

Interpret Data Using Mean, Median, Mode, and Range

Go Online
Interactive Examples

Use the table for 1–5.

Number of Points Blaine Scored in Five Basketball Games	
Game	Points Scored
1	10
2	8
3	11
4	12
5	6

1. What is the mean of the data?

$$\frac{10 + 8 + 11 + 12 + 6}{5} = \frac{47}{5} = 9.4$$

9.4 points

2. What is the median of the data?

3. What is the mode(s) of the data?

4. What is the range of the data?

5. Suppose Blaine played a sixth game and scored 10 points during the game. Find the new mean, median, and mode.

Problem Solving Real World

6. An auto manufacturer wants their line of cars to have a median gas mileage of 25 miles per gallon or higher. The gas mileage for their five models are 23, 25, 26, 32, and 19. Do their cars meet their goal? Explain.

7. A sporting goods store is featuring several new bicycles, priced at $300, $250, $325, $780, and $350. They advertise that the average price of their bicycles is under $400. Is their ad correct? Explain.

8. WRITE Math Explain how to find the mean of a set of data.

Lesson Check

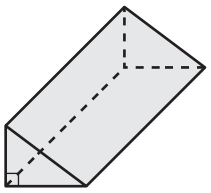
9. The prices for a video game at 5 different stores are $39.99, $44.99, $29.99, $35.99, and $31.99. What is the mode(s) of the data?

10. Manuel is keeping track of how long he practices the saxophone each day. The table gives his practice times for the past five days. What is the mean of his practice times?

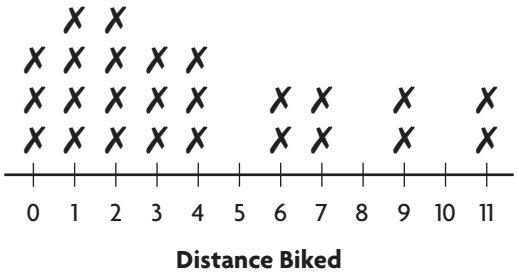
Manuel's Practice Time	
Day	**Minutes Practiced**
Monday	25
Tuesday	45
Wednesday	30
Thursday	65
Friday	30

Spiral Review

11. Name the figure shown.



12. Fuyo records the number of miles that she bikes each day. She displayed the number of daily miles in the line plot below. How many days did she bike 4–7 miles?



13. Six people eat breakfast together at a restaurant. The costs of their orders are $4, $5, $9, $8, $6, and $10. If they want to split the check evenly, how much should each person pay?

Name _____

Chapter 18

Chapter Review

1. For problems 1a–1d, choose Yes or No to indicate whether the survey question or observation is good.

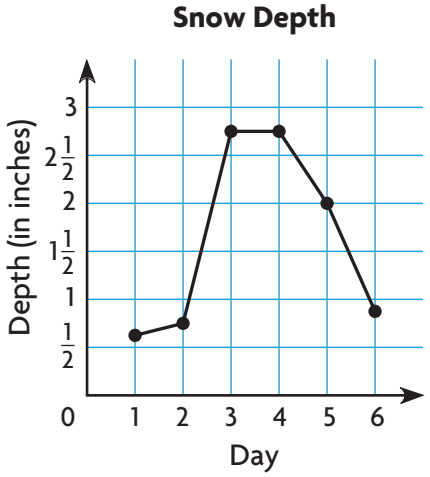
1a.	What are the heights of the trees in the park?	○ Yes	○ No
1b.	How old are the trees in the park?	○ Yes	○ No
1c.	How tall is the cypress tree on the north side of the lake this morning?	○ Yes	○ No
1d.	Which is the prettiest tree in the park?	○ Yes	○ No

2. A builder is buying property to build new houses. The sizes of the lots are $\frac{1}{6}$, $\frac{1}{2}$, $\frac{1}{3}$, $\frac{1}{2}$, $\frac{1}{6}$, $\frac{1}{2}$, $\frac{1}{2}$, $\frac{1}{3}$, $\frac{1}{6}$, $\frac{1}{2}$, $\frac{1}{6}$, $\frac{1}{2}$, $\frac{1}{6}$, $\frac{1}{6}$, and $\frac{1}{3}$ acre. Organize the information in a line plot.

What is the average size of the lots?

_____ acre

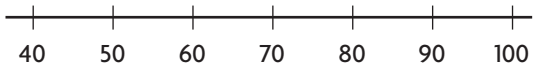
3. For 6 days in a row, Julia measured the depth of the snow in a shaded area of her backyard. The line graph shows her data. Between which two days did the depth of the snow decrease the most?



between Day ☐ and Day ☐

4. Mr. Jones gave a quiz to his math class. The students' scores are listed in the table. Make a line plot of the data.

Math Test Scores				
100	90	40	70	70
90	80	50	70	60
90	70	60	80	100
70	50	80	90	90
80	70	80	90	70



Math Test Scores

5. Melanie scored 10, 10, 11, and 13 points in her last 4 basketball games.

The mean of the test points scored is [10 / 11 / 13].

The median of the test points scored is [10 / 10.5 / 11].

The mode of the test points scored is [10 / 11 / no mode].

6. The frequency table shows the height, in inches, of basketball players. What fraction of the players are 70 inches or taller?

Heights of Basketball Players	
Inches	Frequency
60–69	III
70–79	𝍸 I
80–89	III

Name _____

7. The Martin family goes out for frozen yogurt to celebrate the last day of school. The costs of their frozen yogurts are $1, $1, $2, and $4. For problems 7a–7d, select True or False for each statement.

7a. The mean cost for the frozen yogurts can be found by adding each cost and dividing that total by 4. ○ True ○ False

7b. The mean cost of the four frozen yogurts is $2. ○ True ○ False

7c. The difference between the greatest cost and the mean is $1. ○ True ○ False

7d. The difference between the least cost and the mean is $1. ○ True ○ False

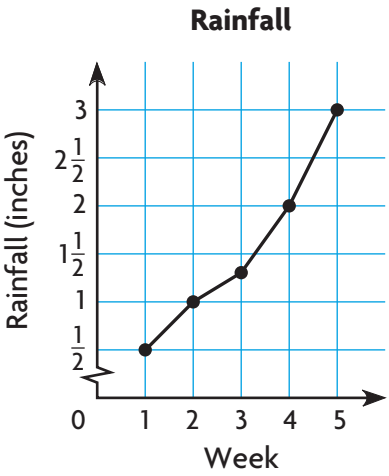
8. The data set shows the total number of sandwiches sold each day for 28 days. What is the most common number of sandwiches sold in a day?

Number of sandwiches sold each day						
10	14	11	12	19	13	24
12	12	18	9	17	15	20
20	21	10	13	13	16	19
21	22	18	13	15	14	10

_____

9. Michael's teacher asks, "How many items were sold on the first day of the fundraiser?" Explain why this is not a good survey question.

10. Each week, Maria measures the amount of rainfall at her home. The line graph shows the amount of rainfall for the first 5 weeks of the year.

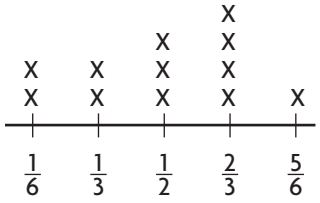


For problems 10a–10b, select True or False for each statement.

10a. The amount of rainfall increased from $\frac{1}{2}$ to 3 inches over the 5-week period. ○ True ○ False

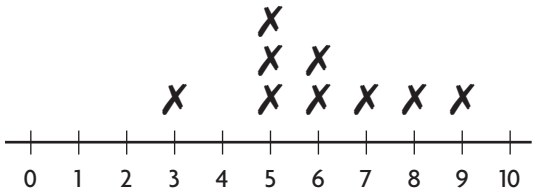
10b. The greatest increase in rainfall occurred from Week 1 to Week 2. ○ True ○ False

11. The line plot shows the weights of bags of beans. What is the average weight of the bags? Show your work.



Weights of Bags of Beans (in lb)

12. The dot plot shows how many games of chess 9 different members of the chess club played in one month. What is the median number of games of chess played? Explain how the line plot helped you find the answer.



Number of Games Played in One Month

13. Larry is training for a bicycle race. He records how far he rides each day. Next week Larry plans to ride the same total number of miles. However, he wants to ride the same number of miles each day. How many miles will he ride each day?

Miles Larry Rides each Day					
Monday	Tuesday	Wednesday	Thursday	Friday	Saturday
17	14	13	16	15	15

Name _____

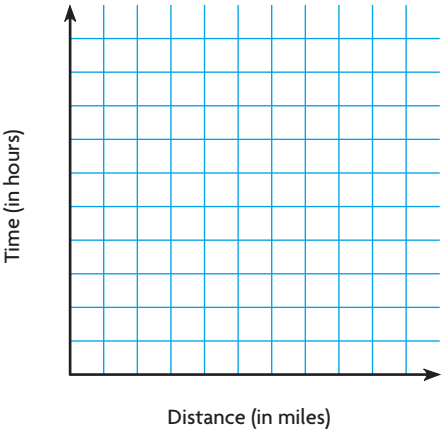
14. Randy is training for a race. She makes a table that shows how long it takes her to run different distances.

Running Time and Distance				
Distance (in miles)	1	2	4	6
Time (in hours)	0.2	0.5	0.9	1.4

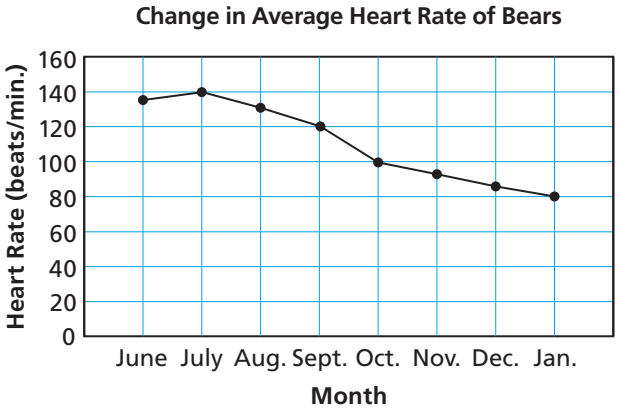
14a. What scale and interval would be appropriate to graph the data?

14b. Write the related pairs as ordered pairs.

14c. Make a line graph of the data.



15. A scientist made a line graph that shows how a bear's average heart rate changes over time.



For problems 15a–15c, select True or False for each statement.

15a. The bear's average heart rate is at its highest in July. ○ True ○ False

15b. The bear's average heart rate increases by 10 beats per minute from July to August. ○ True ○ False

15c. The bear's average heart rate is at its lowest in January. ○ True ○ False

16. The band director kept a record of the number of concert tickets sold by band members. Complete the frequency table of the data. How many people sold tickets?

Number of Concert Tickets Sold				
4	6	6	7	7
8	8	9	9	9
8	8	10	4	10

Number of Concert Tickets Sold	
Number of Tickets Sold	Frequency
4	||
5	0
6	
7	
8	
9	
10	

_____ people sold tickets.

17. Five friends have 8, 6, 5, 2, and 4 baseball cards to divide equally among themselves.

Each friend will get [4 / 5 / 6] cards.

18. The data set shows the ages of the members of the cheerleading squad. What is the range of ages of the members of the squad? Explain how to find the answer using a line plot.

Ages of Cheerleaders (years)				
8	11	13	12	14
12	10	11	9	11