Dear Family,

Throughout the next few weeks, our math class will be learning about variability and patterns in data. We will also be summarizing data by finding measures of center and variability.

You can expect to see homework with real-world problems that involve box plots.

Here is a sample of how your child was taught to make a box plot.

Vocabulary

box plot A type of graph that shows how data are distributed by using the median, quartiles, least value, and greatest value.

interquartile range The difference between the upper quartile and the lower quartile of a data set.

lower quartile The median of the lower half of a data set.

upper quartile The median of the upper half of a data set.

🔑 MODEL Make a Box Plot

Make a box plot for the numbers of tickets won at a fair:
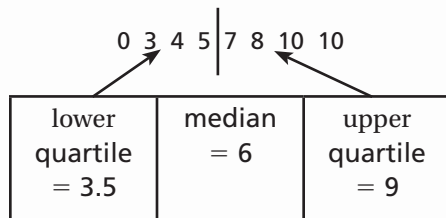
10, 5, 0, 4, 8, 7, 10, 3

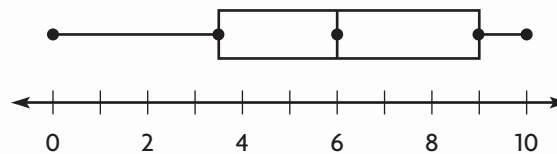**STEP 1**

Write the numbers in order from least to greatest.

0 3 4 5 7 8 10 10

STEP 2

Find the least value, lower quartile, median, upper quartile, and greatest value.

0 3 4 5 | 7 8 10 10

lower quartile = 3.5	median = 6	upper quartile = 9

STEP 3

Plot the five points. The middle three values form the box. Draw lines to extend to the two outside points.

Tips

Finding Quartiles

The median is the mean of the two middle numbers, 5 and 7. Since the median is not part of the data set, draw a line to separate the data in half. To find the lower quartile, find the median of the first four numbers. To find the upper quartile, find the median of the last four numbers.

Activity

Determine the number of shoes each person in the family has. Ask relatives and friends until you have 10 data values. Make a list of the numbers from least to greatest. Make a box plot for the 10 data values.

Carta
para la casa

Querida familia,

Durante las próximas semanas, en la clase de matemáticas aprenderemos sobre la variabilidad y los patrones en los datos. También resumiremos datos hallando las medidas del centro y la variabilidad.

Llevaré a la casa tareas con problemas de la vida real que usan diagramas de caja.

Este es un ejemplo de la manera como aprendimos a hacer un diagrama de caja.

🔑 MODELO Hacer un diagrama de caja

Haz un diagrama de caja del número de boletos ganados en una feria:
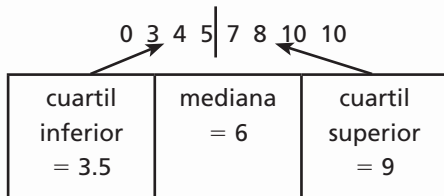
10, 5, 0, 4, 8, 7, 10, 3

PASO 1

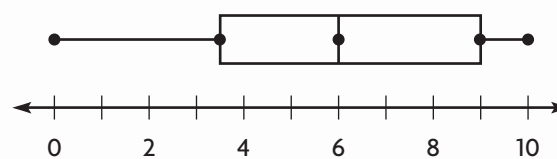Escribe los números en orden de menor a mayor.

0 3 4 5 7 8 10 10

PASO 2

Halla el valor menor, cuartil inferior, mediana, cuartil superior y valor mayor.

0 3 4 5 | 7 8 10 10

| cuartil inferior = 3.5 | mediana = 6 | cuartil superior = 9 |

PASO 3

Traza los cinco puntos. Los tres del medio forman la caja. Traza rectas para prolongar los dos puntos exteriores.

Pistas

Para hallar cuartiles

La mediana es el promedio de los dos números centrales, 5 y 7. Como la mediana no es parte del conjunto de datos, traza una recta que separe los datos en dos mitades. Para hallar el cuartil inferior, busca la mediana de los primeros cuatro números. Para hallar el cuartil superior, busca la mediana de los últimos cuatro números.

Actividad

Determine cuántos pares de zapatos tiene cada miembro de la familia. Pregunte a sus parientes y amigos hasta que tenga 10 datos. Hagan una lista de los números de menor a mayor. Hagan un diagrama de caja para los 10 datos.
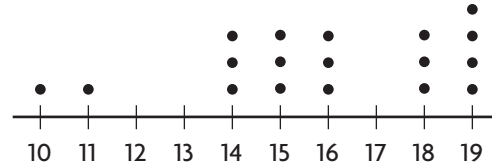
Name _____

Patterns in Data

For 1–3, use the dot plot.

1. The dot plot shows the number of omelets ordered at Paul's Restaurant each day. Does the dot plot contain any gaps?

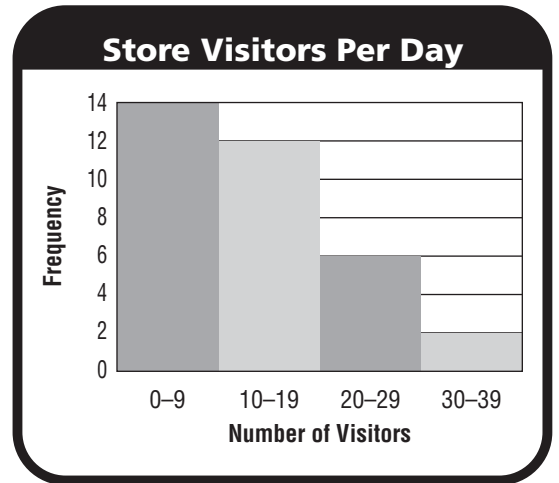   Yes; from 12 to 13, and at 17

Omelets Ordered Per Day

2. Identify any clusters in the data.

   _____

   _____

3. Summarize the information in the dot plot.

   _____

   _____

   _____

   _____

For 4–5, use the histogram.

4. The histogram shows the number of people that visited a local shop each day in January. How many peaks does the histogram have?

   _____

5. Describe how the data values change across the intervals.

   _____

   _____

   _____

Store Visitors Per Day

Problem Solving Real World

6. Look at the dot plot at the right. Does the graph have line symmetry? Explain.
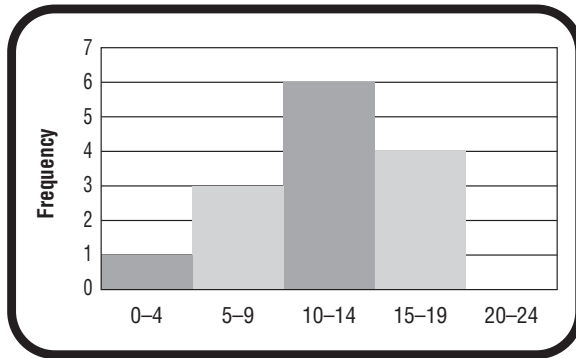
   _____

   _____

   _____
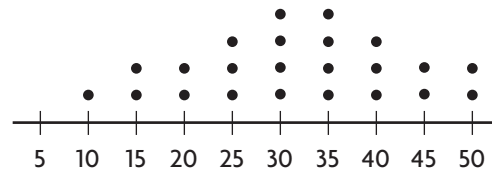
Gift Cards Purchased This Week

Lesson Check

1. What interval in the histogram has the greatest frequency?

_____

**2.** Meg makes a dot plot for the data 9, 9, 4, 5, 5, 3, 4, 5, 3, 8, 8, 5. Where does a gap occur?

_____

Spiral Review

3. A rectangular fish tank is 20 inches long, 12 inches wide, and 20 inches tall. If the tank is filled halfway with water, how much water is in the tank?

_____

5. The Little League coach uses a radar gun to measure the speed of several of Kyle's baseball pitches. The speeds, in miles per hour, are 52, 48, 63, 47, 47. What is the median of Kyle's pitch speeds?

_____

4. Look at the histogram below. How many students scored an 81 or higher on the math test?
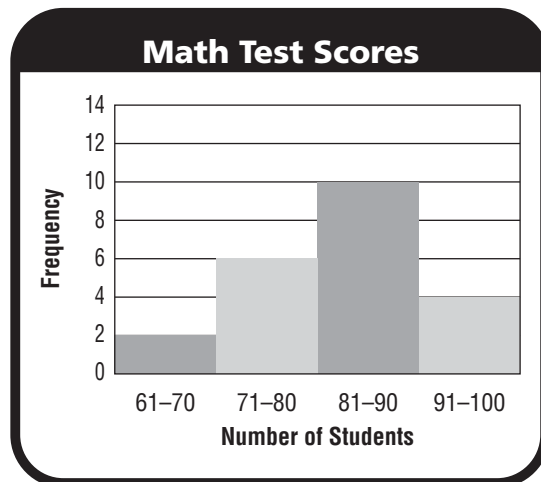
Math Test Scores

Number of Students

_____

Name _____

Box Plots

Find the median, lower quartile, and upper quartile of the data.

1. the amounts of juice in 12 glasses, in fluid ounces:

   11, 8, 4, 9, 12, 14, 9, 16, 15, 11, 10, 7

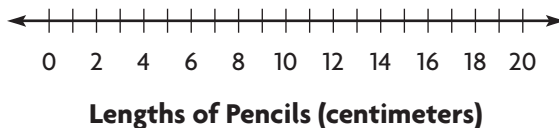   Order the data from least to greatest: 4, 7, 8, 9, 9, 10, 11, 11, 12, 14, 15, 16

   median: __**10.5**__   lower quartile: __**8.5**__   upper quartile: __**13**__

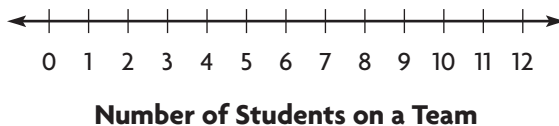**2.** the lengths of 10 pencils, in centimeters:

   18, 15, 4, 9, 14, 17, 16, 6, 8, 10

   median: _____   lower quartile: _____   upper quartile: _____

3. Make a box plot to display the data set in Exercise 2.

Lengths of Pencils (centimeters)

4. The numbers of students on several teams are 9, 4, 5, 10, 11, 9, 8, and 6. Make a box plot for the data.

Number of Students on a Team

Problem Solving `Real World`

5. The amounts spent at a gift shop today are $19, $30, $28, $22, $20, $26, and $26. What is the median? What is the lower quartile?

6. The weights of six puppies in ounces are 8, 5, 7, 5, 6, and 9. What is the upper quartile of the data?

_____   _____

Lesson Check (6.SP.4)

1. The values in a data set are 15, 7, 11, 12, 6, 3, 10, and 6. Where would you draw the box in a box plot for the data?

**2.** What is the lower quartile of the following data set?

$$22, 27, 14, 21, 22, 26, 18$$

Spiral Review (6.SP.1, 6.SP.5c, 6.SP.5d)

3. Jenn says that "What is the average number of school lunches bought per day?" is a statistical question. Lisa says that "How many lunches did Mark buy this week?" is a statistical question. Who is NOT correct?

4. The prices of several chairs are $89, $76, $81, $91, $88, and $70. What is the mean of the chair prices?

5. By how much does the mean of the following data set change if the outlier is removed?

$$13, 19, 16, 40, 12$$

6. Where in the dot plot does a cluster occur?
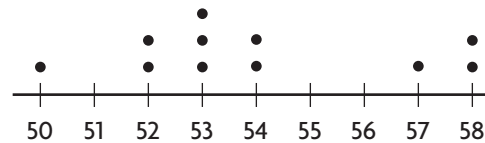
Name _____

Mean Absolute Deviation

Use counters and a dot plot to find the mean absolute deviation of the data.

1. the number of hours Maggie spent practicing soccer for 4 different weeks:

9, 6, 6, 7

mean = 7 hours

$$\frac{2 + 1 + 1 + 0}{4} = \frac{4}{4} = 1$$

mean absolute deviation = _____**1 hour**_____
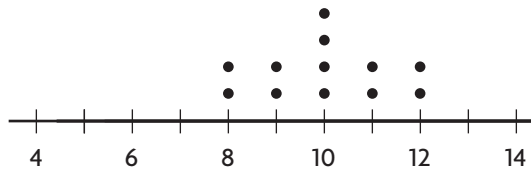
2. the heights of 7 people in inches:

60, 64, 58, 60, 70, 71, 65

mean = 64 inches

mean absolute deviation = _____

Use the dot plot to find the mean absolute deviation of the data.

3. mean = 10

Ages of Students in Dance Class

mean absolute deviation = _____

4. mean = 8

Weekly Hours Spent Doing Homework

mean absolute deviation = _____

Problem Solving `Real World`

5. In science class, Troy found the mass, in grams, of 6 samples to be 10, 12, 7, 8, 5, and 6. What is the mean absolute deviation?

6. Five recorded temperatures are 71°F, 64°F, 72°F, 81°F, and 67°F. What is the mean absolute deviation?

Lesson Check (6.SP.5c)

1. Six test grades are 86, 88, 92, 90, 82, and 84. The mean of the data is 87. What is the mean absolute deviation?

2. Eight heights in inches are 42, 36, 44, 46, 48, 42, 48, and 46. The mean of the data is 44. What is the mean absolute deviation?

Spiral Review (6.G.2, 6.SP.4)

3. What is the volume of a rectangular prism with dimensions 4 meters, $1\frac{1}{2}$ meters, and 5 meters?

4. Carrie is making a frequency table showing the number of miles she walked each day during the 30 days of September. What value should she write in the Frequency column for 9 to 11 miles?

Carrie's Daily Walks	
Number of Miles	Frequency
0–2	17
3–5	8
6–8	4
9–11	?

5. The following data shows the number of laps each student completed. What number of laps is the mode?

9, 6, 7, 8, 5, 1, 8, 10

6. What is the upper quartile of the following data?
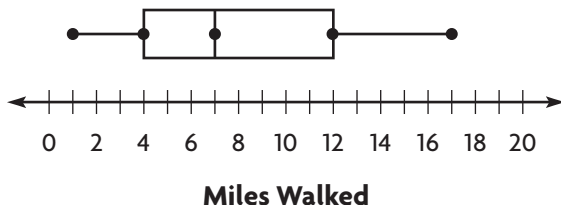
43, 48, 55, 50, 58, 49, 38, 42, 50

Measures of Variability

1. Find the range and interquartile range of the data in the box plot.

```
        0   2   4   6   8   10  12  14  16  18  20
```

Miles Walked

For the range, find the difference between the greatest and least values.

__17__ – __1__ = __16__

range: _____**16 miles**_____

For the interquartile range, find the difference between the upper and lower quartiles.

__12__ – __4__ = __8__
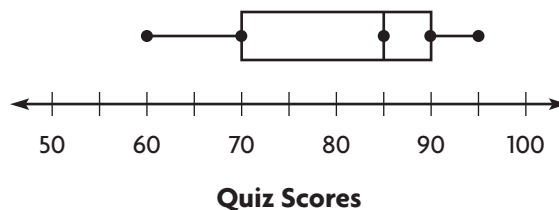
interquartile range: _____**8 miles**_____

Use the box plot for 2 and 3.

2. What is the range of the data?

_____

3. What is the interquartile range of the data?

_____

```
    50    60    70    80    90   100
```

Quiz Scores

Find the mean absolute deviation for the set.

4. heights in centimeters of several flowers:

14, 7, 6, 5, 13

mean absolute deviation: _____

5. ages of several children:

5, 7, 4, 6, 3, 5, 3, 7

mean absolute deviation: _____

Problem Solving *Real World*

6. The following data set gives the amount of time, in minutes, it took five people to cook a recipe. What is the mean absolute deviation for the data?

33, 38, 31, 36, 37

_____

7. The prices of six food processors are $63, $59, $72, $68, $61, and $67. What is the mean absolute deviation for the data?

_____

Lesson Check

1. Daily high temperatures recorded in a certain city are 65°F, 66°F, 70°F, 58°F, and 61°F. What is the mean absolute deviation for the data?

2. Eight different cereals have 120, 160, 135, 144, 153, 122, 118, and 134 calories per serving. What is the interquartile range for the data?

Spiral Review

3. Look at the histogram. How many days did the restaurant sell more than 59 pizzas?

Pizzas Sold Per Day
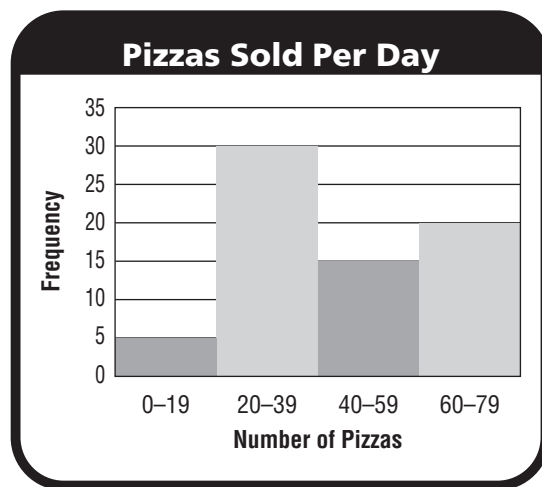
4. Look at the histogram. Where does a peak in the data occur?

5. What is the mode of the data set?

14, 14, 18, 20

6. The data set below lists the ages of people on a soccer team. The mean of the data is 23. What is the mean absolute deviation?

24, 22, 19, 19, 23, 23, 26, 27, 24

Name _____

Choose Appropriate Measures
of Center and Variability

1. The distances, in miles, that 6 people travel to get to work are 14, 12, 2, 16, 16, and 18. Decide which measure(s) of center best describes the data set. Explain your reasoning.

mean = ___**13 miles**___

median = ___**15 miles**___

mode = ___**16 miles**___

The _____ is less than 4 of the data points, and the _____ describes only 2 of the data points. So, the _____ best describes the data.

2. The numbers of pets that several children have are 2, 1, 2, 3, 4, 3, 10, 0, 1, and 0. Make a box plot of the data and find the range and interquartile range. Decide which measure better describes the data set and explain your reasoning.

```
←――――――――――――――――――――→
  0  1  2  3  4  5  6  7  8  9  10  11  12
```

range = _____

interquartile range = _____

_____

_____

_____

Problem Solving Real World

3. Brett's history quiz scores are 84, 78, 92, 90, 85, 91, and 0. Decide which measure(s) of center best describes the data set. Explain your reasoning.

mean = _____ median = _____

mode = _____

_____

_____

_____

_____

4. Eight students were absent the following number of days in a year: 4, 8, 0, 1, 7, 2, 6, and 3. Decide if the range or interquartile range better describes the data set, and explain your reasoning.

range = _____ interquartile range = _____

_____

_____

_____

Lesson Check

1. Chloe used two box plots to display some data. The box in the plot for the first data set is wider than the box for the second data set. What does this say about the data?

_____

_____

_____

2. Hector recorded the temperature at noon for 7 days in a row. The temperatures are 20°F, 20°F, 20°F, 23°F, 23°F, 23°F, and 55°F. Which measure of center would best describe the data?

_____

_____

_____

Spiral Review

3. By how much does the median of the following data set change if the outlier is removed?

$$13, 20, 15, 19, 22, 26, 42$$

4. What percent of the people surveyed spent at least an hour watching television?

Daily Minutes Spent Watching TV
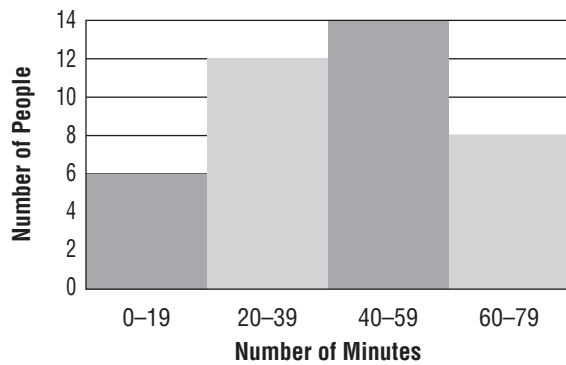
_____

_____

5. What is the lower quartile of the following data?

12, 9, 10, 8, 7, 12

6. What is the interquartile range of the data shown in the box plot?

_____

_____
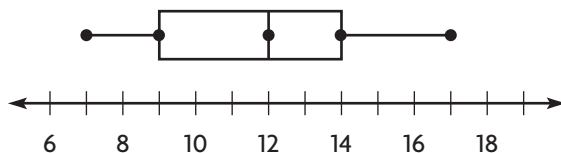
Name _____

Apply Measures of Center and Variability

COMMON CORE STANDARD—6.SP.3
Develop understanding of statistical variability.

Solve.

1. The table shows temperature data for two cities. Use the information in the table to compare the data.

Daily High Temperatures (°F)		
	Mean	Interquartile Range
City 1	60	7
City 2	70	15

The mean of City 1's temperatures is **less than** the mean of City 2's temperatures.

The **interquartile range** of City 1's temperatures is **less than** the **interquartile range** of City 2's temperatures.

So, City 2 is typically **warmer than** City 1, but City 2's temperatures vary **more than** City 1's temperatures.

2. The table shows weights of fish that were caught in two different lakes. Find the median and range of each data set, and use these measures to compare the data.

Fish Weight (pounds)
Lake A: 7, 9, 10, 4, 6, 12
Lake B: 6, 7, 4, 5, 6, 4

_____

_____

_____

_____

Problem Solving Real World

3. Mrs. Mack measured the heights of her students in two classes. Class 1 has a median height of 130 cm and an interquartile range of 5 cm. Class 2 has a median height of 134 cm and an interquartile range of 8 cm. Write a statement that compares the data.

_____

_____

_____

_____

4. Richard's science test scores are 76, 80, 78, 84, and 80. His math test scores are 100, 80, 73, 94, and 71. Compare the medians and interquartile ranges.

_____

_____

_____

_____

Lesson Check (6.SP.3)

1. Team A has a mean of 35 points and a range of 8 points. Team B has a mean of 30 points and a range of 7 points. Write a statement that compares the data.

_____

_____

_____

2. Jean's test scores have a mean of 83 and an interquartile range of 4. Ben's test scores have a mean of 87 and an interquartile range of 9. Compare the students' scores.

_____

_____

_____

Spiral Review (6.SP.3, 6.SP.4, 6.SP.5d)

3. Look at the box plots below. What is the difference between the medians for the two groups of data?

School A

18   20   22   24   26   28   30

Number of Students in a Class

School B

18   20   22   24   26   28   30

Number of Students in a Class

4. The distances in miles that 6 people drive to get to work are 10, 11, 9, 12, 9, and 27. What measure of center best describes the data set?

_____
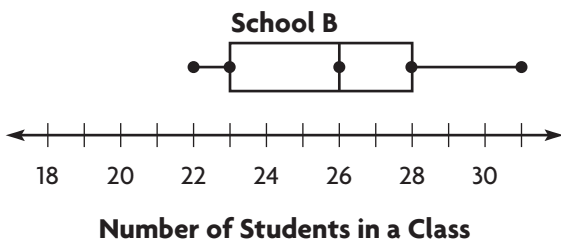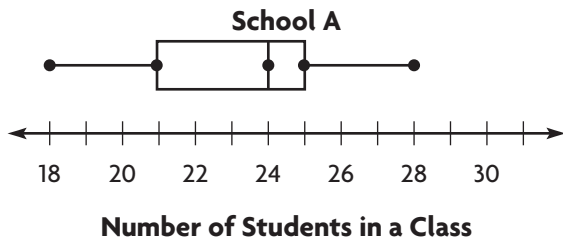
5. Which two teams typically practice the same number of hours, but have very different variations in their practice times?

Hours of Practice Per Week		
Team	Mean	Range
A	7	1.5
B	10.5	1.5
C	7.5	5
D	10	2

_____

Describe Distributions

Chase asked people how many songs they have bought online in the past month. Use the histogram of the data he collected for 1–6**.**
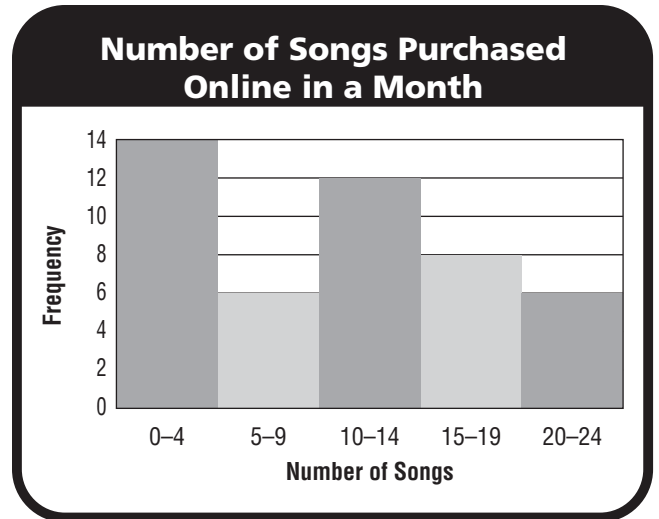
1. What statistical question could Chase ask about the data?

   Possible answer: What is the median number of songs purchased?

Number of Songs Purchased Online in a Month

2. Describe any peaks in the data.

   _____

   _____

3. Describe any gaps in the data.

   _____

   _____

4. Does the graph have symmetry? Explain your reasoning.

   _____

   _____

Problem Solving · Real World

5. Mr. Carpenter teaches five classes each day. For several days in a row, he kept track of the number of students who were late to class and displayed the results in a dot plot. Describe the data.

   _____

   _____

   _____

   _____

   _____

**Number of Students
Late to Class Each Day**
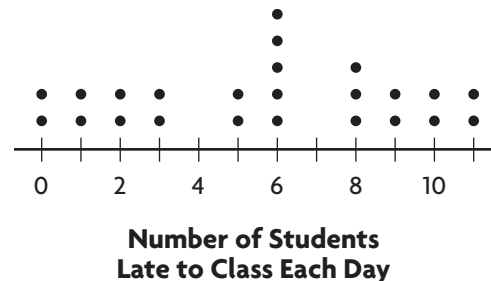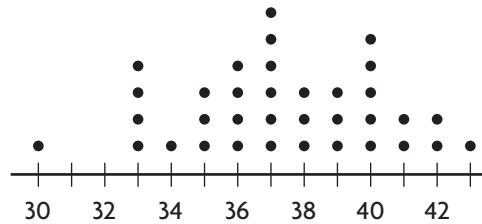
Lesson Check (6.SP.2)

1. The ages of people in a restaurant are 28, 10, 44, 25, 18, 8, 47, and 30. What is the median age of the people in the restaurant?

2. What is the median in the dot plot?
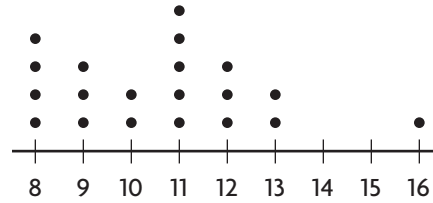
**Cost (in dollars) of Dinners
Ordered on Friday**

Spiral Review (6.SP.2, 6.SP.3, 6.SP.5c, 6.SP.5d)

3. Look at the dot plot. Where does a gap occur in the data?

Number of Movies Ordered Per Day

4. Look at the dot plot. Where does a peak occur in the data?

5. Which two teams had similar variations in points earned, but typically earned a different number of points per game?

Points Earned Per Game		
Team	Mean	Range
Red	20	8
Blue	28	8
Green	29	4
Orange	28	4

6. Manny's monthly electric bills for the past 6 months are $140, $165, $145, $32, $125, and $135. What measure of center best represents the data?

Name _____

Problem Solving • Misleading Statistics

COMMON CORE STANDARD—6.SP.2
Develop understanding of statistical variability.

Mr. Jackson wants to make dinner reservations at a restaurant that has most meals costing less than $16. The Waterside Inn advertises that they have meals that average $15. The table shows the menu items.

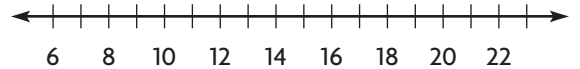| Menu Items	
Meal	**Price**
Potato Soup	$6
Chicken	$16
Steak	$18
Pasta	$16
Shrimp	$18
Crab Cake	$19

1. What is the minimum price and maximum price?

min = ___$6___

max = ___$19___

2. What is the mean of the prices?

_____

3. Construct a box plot for the data.

```
  <—+—+—+—+—+—+—+—+—+—+—+—+—+—+—+—+—+—>
    6   8   10  12   14  16   18  20   22
```

4. What is the range of the prices?

_____

5. What is the interquartile range of the prices?

_____

6. What is the median of the prices?

_____

7. Does the menu match Mr. Jackson's requirements? Explain your reasoning.

_____

_____

_____

Lesson Check

1. Mary's science test scores are 66, 94, 73, 81, 70, 84, and 88. What is the range of Mary's science test scores?

2. The heights in inches of students on a team are 64, 66, 60, 68, 69, 59, 60, and 70. What is the interquartile range?

Spiral Review

3. By how much does the median of the following data set change if the outlier is removed?

26, 21, 25, 18, 0, 28

4. Look at the box plot. What is the interquartile range of the data?

40   42   44   46   48   50   52
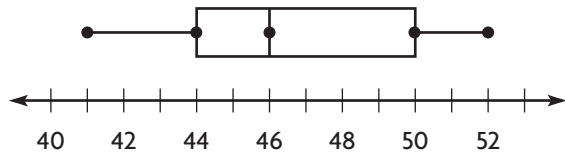
5. Erin is on the school trivia team. The table shows the team's scores in the last 8 games. Erin wants to build confidence in her team so that they will do well in the last game. What measure of center would be best for Erin to use to motivate her teammates?

Trivia Game Results	
Game	**Score**
Game 1	20
Game 2	20
Game 3	18
Game 4	19
Game 5	23
Game 6	40
Game 7	22
Game 8	19