

6TH GRADE MATH

Unit 12

Representing Relationships

Date:

Extra! Extra! Read all about it!

Are you wondering how you can get some extra credit? If so, here is how. We are going to start Unit 12 (Representing Relationships). Here is a list of IXL topics, for every topic you complete you will earn some extra credit. Here are the possible points you can earn on each topic. The extra credit will be due by

Smart Score on IXL

- 100% - 5 extra points
- 95% - 4 extra points
- 90% - 3 extra points
- 85% - 2 extra points
- 80% - 1 extra point

Unit 12 Topics – You can earn up to 100 extra credit points! You got this 😊

6.EE.B.6 Use variables to represent numbers and write expressions when solving a real-world or mathematical problem; understand that a variable can represent an unknown number, or, depending on the purpose at hand, any number in a specified set.

1. Write variable expressions: word problems (6-Y.3)

6.EE.C.9.a Write an equation to express one quantity, thought of as the dependent variable, in terms of the other quantity, thought of as the independent variable.

2. Solve word problems by finding two-variable equations (6-BB.6)
3. Write a two-variable equation (6-BB.8)

6.EE.C.9.b Analyze the relationship between the dependent and independent variables using graphs and tables, and relate these to the equation.

4. Identify independent and dependent variables: word problems (6-BB.3)
5. Find a value using two-variable equations (6-BB.4)
6. Find a value using two-variable equations: word problems (6-BB.5)
7. Complete a table for a two-variable relationship (6-BB.7)
8. Identify the graph of an equation (6-BB.9)
9. Graph a two-variable equation (6-BB.10)
10. Interpret a graph: word problems (6-BB.11)
11. Write an equation from a graph using a table (6-BB.2)

6.RP.A.3.a Make tables of equivalent ratios relating quantities with whole number measurements, find missing values in the tables, and plot the pairs of values on the coordinate plane. Use tables to compare ratios.

12. Identify equivalent ratios (6-R.4)
13. Write an equivalent ratio (6-R.5)
14. Equivalent ratios: word problems (6-R.7)
15. Ratio tables (6-R.6)
16. Ratios and rates: complete a table and make a graph (6-R.)

Review these skills from Unit 1 if you are struggling.

6.NS.B.3 Fluently add, subtract, multiply, and divide multi-digit decimals using a standard algorithm for each operation.

Dependent & Independent

Name: _____

Date: _____

Daily Target: I can define and identify the dependent and independent variable of a given situation.

Dependent

A dependent variable is a _____ whose value _____ on the _____ of another variable.

Example:

How far a car can travel

Independent

An _____ variable is a variable whose value _____ another variable to _____.

Example:

The amount of gas in a car

Practice! Label whether the sentence is a dependent or an independent variable.

1) The number of customers who visit: _____

The total sales for the day: _____

2) The batches of cookies you will make: _____

The number of eggs you have: _____

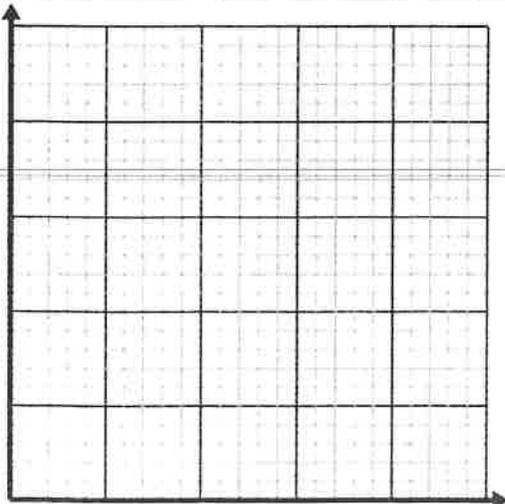
3) The number of people eating dinner: _____

The amount of chicken you will buy: _____

Graph Practice!

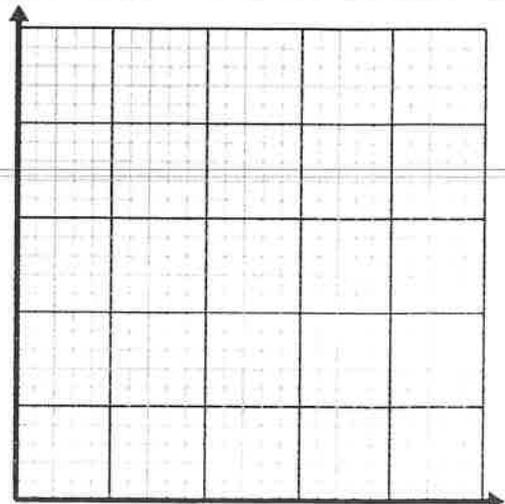
For every enemy defeated, 4 points are earned. Create a table showing the points earned for destroying up to 5 enemies, then plot the values on the coordinate plane.

| | | | | | |
|--|--|--|--|--|--|
| | | | | | |
| | | | | | |



Every minute 4 books are printed. Create a table showing the books printed over the course of 5 minutes, then plot the values on the coordinate plane.

| | | | | | |
|--|--|--|--|--|--|
| | | | | | |
| | | | | | |



Equations for Tables

Name: _____

Date: _____

Daily Target: I can find the equation of a given table and use it to find a missing value.

Function

A _____ is a rule that relates _____ quantities so that each _____ value corresponds to exactly _____ output value. In the table below, the x-values are the input and the y-values are the _____.

Step One:

Look at your _____ and _____ the x- and y-values to find a pattern.

Step Two:

Use the _____ to write a rule or _____ for the table.

Step Three:

Use the _____ to find the _____ value in the table.

Step Four:

Using the rule, _____ the x-variable to find your missing variable.

| | | | | | | | | |
|----------|---|---|---|---|---|---|----|---|
| X | 0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 |
| Y | 4 | 5 | 6 | 7 | 8 | 9 | 10 | ? |

As you go from $x \rightarrow y$

Increase:

Decrease:

Practice!

Write an equation for the table below!

| | | | | | | |
|----------|----|----|----|----|----|----|
| X | 2 | 4 | 6 | 8 | 10 | 12 |
| Y | 12 | 24 | 36 | 48 | 60 | ? |

Review!

Ms. Moss bought a season pass to the Titans football games for \$115. If she pays \$10 to park her car, p each time she attends a game, write an expression that shows how much she will pay for the season.

Equations for Tables

Name: _____

Date: _____

Daily Target: I can find the equation of a given table and use it to find a missing value.

Things to remember when writing equations from tables:

As you go from your independent (x) to your dependent (y) if you are:

- **Increasing:** using _____ or _____
- **Decreasing:** using _____ or _____

Practice!

| x | y |
|----|----|
| 18 | |
| 12 | 4 |
| 30 | 10 |
| 24 | 8 |

- **Increasing or decreasing:** _____
- **Operation being used:** _____
- **Find the number and write your equation!**

1)

| x | y |
|----|----|
| 3 | 9 |
| 9 | 27 |
| 5 | |
| 12 | 36 |

2)

| x | y |
|----|----|
| 6 | 12 |
| 12 | 18 |
| | 9 |
| 9 | 15 |

3)

| x | y |
|----|----|
| 6 | 2 |
| 15 | |
| 8 | 4 |
| 20 | 16 |

4)

| | | | | |
|---|----|----|---|----|
| x | 12 | 20 | 8 | 24 |
| y | 3 | 5 | | 6 |

5)

| | | | | |
|---|---|---|----|----|
| x | 8 | | 12 | 20 |
| y | 5 | 7 | 9 | 17 |

6)

| | | | | |
|---|---|---|---|---|
| x | 8 | | 4 | 6 |
| y | 4 | 7 | 2 | 3 |

7) At a bake sale, plates of cookies, p , are sold for \$5 each. The amount of money from the sale of cookies is expressed as dollars d . Which equation represents the earnings of the bake sale?

| Plates of Cookies (p) | Earnings (d) |
|---------------------------|------------------|
| 1 | 5 |
| 2 | 10 |
| 3 | 15 |
| 4 | 20 |

Tables and Patterns

Name _____

For each table, find the expression that finds the missing value.

1)

| | | | | | |
|----------|---|---|----|----|---|
| x | 1 | 3 | 5 | 7 | x |
| y | 2 | 6 | 10 | 14 | |

- a. $x \div 2$ b. $x + 2$ c. $2x$ d. $x - 2$

2)

| | | | | | |
|----------|----|----|----|----|---|
| x | 3 | 6 | 9 | 12 | x |
| y | 10 | 19 | 28 | 37 | |

- a. $x + 7$ b. $3x$ c. $x + 19$ d. $3x + 1$

3)

| | | | | | |
|----------|---|----|----|----|---|
| x | 8 | 16 | 24 | 28 | x |
| y | 2 | 4 | 6 | 7 | |

- a. $4x$ b. $x + 6$ c. $x \div 4$ d. $x - 6$

4)

| | | | | | |
|----------|----|----|----|----|----|
| x | 10 | 25 | 50 | 60 | 75 |
| y | | | | | |

Use $x + 15$ to complete the table

5)

| | | | | | |
|----------|----|----|----|----|----|
| x | | | | | |
| y | 96 | 73 | 65 | 48 | 82 |

Use $y + 12$ to complete the table

Write an expression that best represents the amount of ribbon needed for the bows (b).

6)

| Bows (b) | Ribbon |
|-----------------|---------------|
| 3 | 18 |
| 5 | 30 |
| 8 | 48 |
| 12 | 72 |
| 16 | 96 |
| b | |

7)

| x | y |
|----------|----------|
| 2 | 26 |
| 4 | 52 |
| 6 | 78 |
| 8 | 104 |
| 11 | 143 |

y =

Write an expression that best represents the number of clay pots needed for plants (p).

8)

| Plants (p) | Clay pots |
|-------------------|------------------|
| 32 | 8 |
| 48 | 12 |
| 60 | 15 |
| 96 | 24 |
| 120 | 30 |
| p | |

9)

| x | y |
|----------|----------|
| 5 | 9 |
| 12 | 16 |
| 15 | 19 |
| 24 | 28 |

y =

Box and Whisker Plots

Name: _____

Date: _____

Daily Target: I can draw a box and whisker plot from the given data.

Box and Whisker Plots

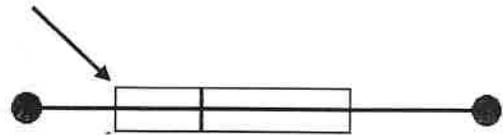
A way to _____ the median, quartiles and extremes of a data set on a _____ to show the distribution of data.

They are help in _____ the distribution of data. Make sure to arrange the numbers in increasing order _____ completing any _____ to draw a box and whisker plot.

Terms to Know:

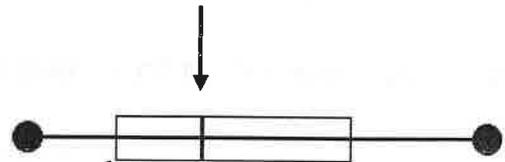
Lower Quartile:

The _____ quartile is the median of the _____ or bottom half.



Median:

The _____ value or _____ of the middle value of a given set of numbers.



Upper Quartile:

The _____ quartile is the median of the upper or _____ half.



Lower Extreme:

The _____ or lowest number in the given _____.



Higher Extreme:

The maximum or _____ number in the _____ data.



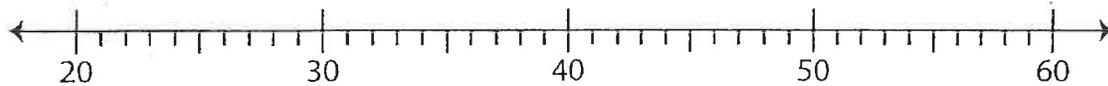
Make and Interpret the Plot

Sheet 1

1) The below tabulation shows the length of eight bones (in inches) in human beings.

| Bone | Femur | Ulna | Humerus | 8th rib | Radius | Tibia | 7th rib | Fibula |
|-----------------------|-------|------|---------|---------|--------|-------|---------|--------|
| Length (in inches) | 50.5 | 27.5 | 36.5 | 23 | 26 | 49 | 24 | 40 |

Make a box-and-whisker plot.



Answer the following questions.

- 1) Which is the longest bone? _____
- 2) What is the first quartile of the given data? _____
- 3) What is the median of the given data? _____
- 4) What is the length of the shortest bone? _____
- 5) What is the third quartile? _____

Box and Whisker Plots

Name: _____

Date: _____

Daily Target: I can draw a box and whisker plot from the given data.

Step One:

_____ your numbers from least to greatest and _____ the median of the data set.

Step Two:

Find the _____ of the lower half.

Step Three:

Find the median of the _____ half.

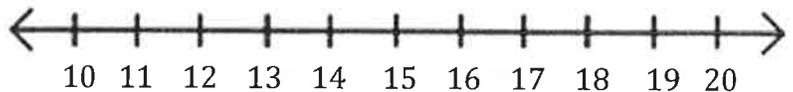
Step Four:

_____ a line segment from the low extreme to the high extreme with a cross segment at the _____.

Step Five:

Draw a _____ around the median cross segment that has its _____ and _____ bounds at the lower and upper quartiles.

Quiz Scores: 12, 14, 14, 12, 16, 13, 11, 14, 18



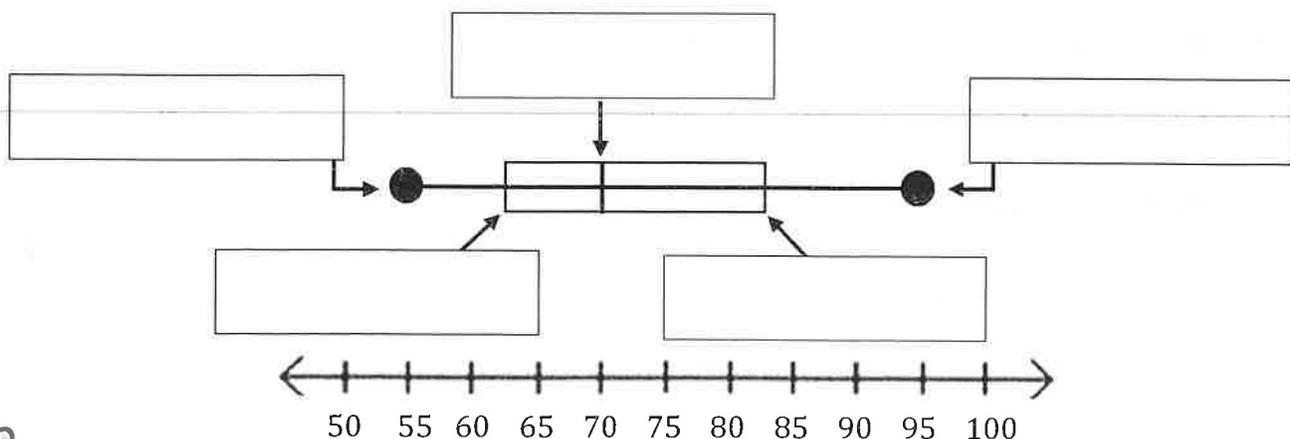
Answer the questions based on the box-and-whisker plot above.

1. Most students scored between _____ on the quiz.
2. What is the interquartile range? _____
3. The range of the scores on the test is _____

Interquartile range is the finding the range between the _____ and _____ quartiles.

Q3 - Q1

Label the box and whisker plot with the correct terms: median, lower extreme, upper extreme, lower quartile, upper quartile



Box-and-Whisker Plot

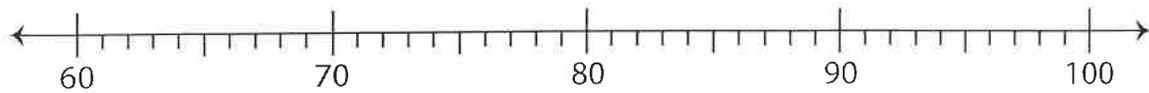
Sheet 1

- 1) The teacher recorded the math scores of top ten students in grade V. Their scores are as follows.

86, 92, 75, 81, 93, 99, 89, 90, 84, 93

Make a box-and-whisker plot.

Min: _____, Q_1 : _____, Q_2 : _____, Q_3 : _____, Max: _____



- 2) Eleven staff from a university visited a museum. The below given data shows their ages noted by a volunteer of the museum to issue tickets.

42, 46, 50, 52, 53, 50, 51, 38, 48, 47, 43

Make a box-and-whisker plot.

Min: _____, Q_1 : _____, Q_2 : _____, Q_3 : _____, Max: _____

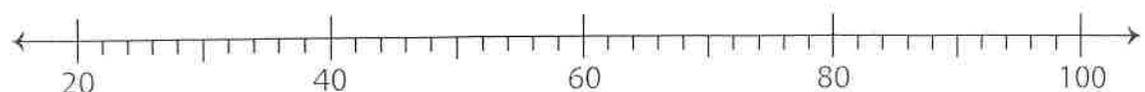


- 3) The figures shown below are the sales of twelve vegetables (in pounds) at a supermarket in a day.

24, 34, 98, 44, 72, 56, 52, 50, 38, 22, 20, 60

Make a box-and-whisker plot.

Min: _____, Q_1 : _____, Q_2 : _____, Q_3 : _____, Max: _____



Stem-and-Leaf Plots

Name: _____

Date: _____

Daily Target: I can draw a stem-and-leaf plot from the given data.

Stem-and-leaf plot

A set of data can be _____ into a stem-and-leaf plot by using _____.

The _____ digits are usually the stems and the _____ digits are the leaves.

| Stem | Leaves |
|------|---------|
| 3 | 5 8 |
| 4 | 4 8 9 |
| 5 | 7 |
| 6 | 3 3 5 8 |
| 7 | 1 6 |
| 8 | 7 |

This allows you to see the _____ (35), the largest (87), the _____ (52), the median (63), and the _____ (63).

Key: 3 | 5 = 35

Step One:

Start by ordering the given numbers from _____ to _____.

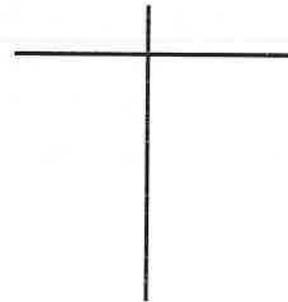
Step Two:

_____ the digits needed in the _____ category (these are typically the lowest to highest digits in your tens place).

Step Three:

Write the digits in your _____ category and make sure to write a _____!

14, 31, 34, 21, 13, 28, 33



Key:

Practice!

1) 19, 25, 38, 17, 24, 33, 13

3) 88, 96, 99, 75, 87, 93, 81, 84, 91, 73

2) 63, 38, 72, 54, 50, 79, 64, 39, 57, 49

4) 26, 37, 25, 33, 35, 65, 27, 55, 23, 51

Stem and Leaf Plots

| | | | | | |
|--|--|-------|--------|------|------|
| <p>Billy Bob's Grades</p> <p>78 75 83 85 77 90 78 87 68 79</p> | <p>Make a Stem and Leaf Plot to Organize Billy Bob's Grades.</p> <p>Find the Range, Median, Mode, and Mean of Billy Bob's Grades.</p> <table border="1" data-bbox="508 814 1507 919"> <tr> <td data-bbox="508 814 760 919">Range</td> <td data-bbox="760 814 1011 919">Median</td> <td data-bbox="1011 814 1263 919">Mode</td> <td data-bbox="1263 814 1507 919">Mean</td> </tr> </table> | Range | Median | Mode | Mean |
| Range | Median | Mode | Mean | | |
| <p>Lucy Sue's Grades</p> <p>91 95 90 85 87 90 88 77 48 49</p> | <p>Make a Stem and Leaf Plot to Organize Lucy Sue's Grades.</p> <p>Find the Range, Median, Mode, and Mean of Lucy Sue's Grades.</p> <table border="1" data-bbox="508 1476 1507 1581"> <tr> <td data-bbox="508 1476 760 1581">Range</td> <td data-bbox="760 1476 1011 1581">Median</td> <td data-bbox="1011 1476 1263 1581">Mode</td> <td data-bbox="1263 1476 1507 1581">Mean</td> </tr> </table> | Range | Median | Mode | Mean |
| Range | Median | Mode | Mean | | |

1.) If Lucy Sue did not have the two low grades (outliers) what would her average have been?

2.) What is the best measure of central tendency to describe Lucy Sue's grades? The mean or median? Why?

Lesson 7.12 Plotting Data: Stem-and-Leaf Plots

A set of data can be organized into a **stem-and-leaf plot** by using place values.

87, 38, 35, 76, 48, 57, 68, 44, 63, 49, 63, 64, 71

The tens digits are the stems and the ones digits are the leaves.

| Stem | Leaves |
|------|---------|
| 3 | 5 8 |
| 4 | 4 8 9 |
| 5 | 7 |
| 6 | 3 3 4 8 |
| 7 | 1 6 |
| 8 | 7 |

This allows you to see the least (35), the largest (87), the range (52), the median (63), and the mode (63).

Key: 3 | 5 = 35

Create a stem-and-leaf plot for each set of data. Include a key for each plot.

a

1. 14, 31, 34, 21, 13, 28, 33

b

63, 38, 72, 54, 50, 79, 64, 39, 57, 49

2. 48, 38, 34, 25, 27, 37, 49

88, 96, 99, 75, 87, 93, 81, 84, 91, 73

3. 19, 25, 38, 17, 24, 33, 13

26, 37, 25, 33, 35, 46, 27, 45, 23, 41

Circle Graphs & Pie Charts

Name: _____

Name: _____

Daily Target: I can read and interpret given information on a circle graph or pie chart.

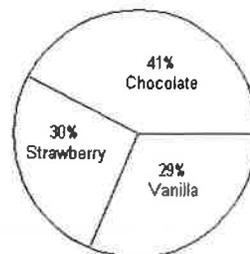
Circle Graphs/Pie Charts

A circular chart _____ into sections that each represents a _____ of the total.

The total is _____ out of _____ %

Yummy Ice Cream Profits in 2002

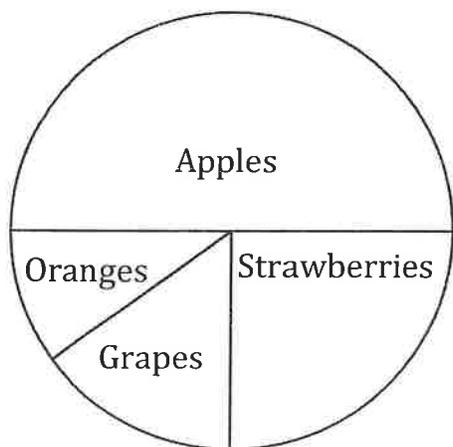
Total Profit: \$105 million



Example:

A) The circle graph directly below shows the results of a survey of 50 teens. They were asked about their favorite fruits.

Favorite Fruits



1. Did more teens pick apples or grapes?

2. About what percent of teens picked strawberries?

3. According to the survey, 10% of teens chose oranges. How many teens chose oranges?

Review!

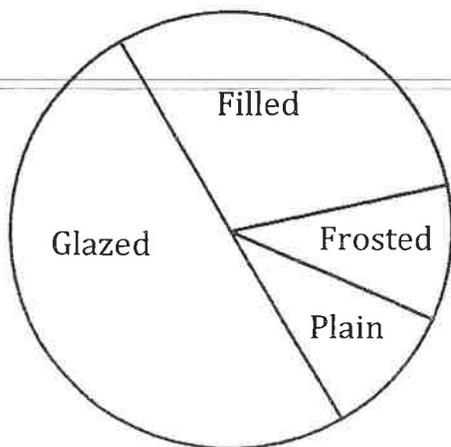
Remember, when finding the amount, we use the percent to help us find the answer!

Example: 20% of 200 = 20% x 200

$$= 0.20 \times 200 = 40$$

B) The circle graph below shows the results of a survey of 100 people. They were asked about their favorite doughnut flavors.

Favorite Doughnut Flavors



1. Did more teens pick frosted or filled?

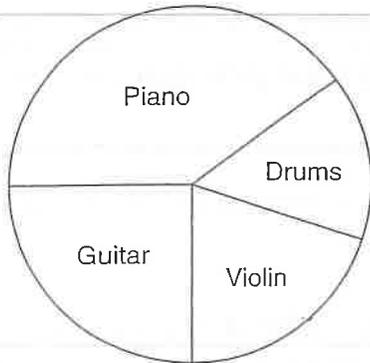
2. About what percent of people picked glazed?

3. According to the survey, 30% of the people chose filled doughnuts. How many teens chose filled?

LESSON 1-5 Practice B
Reading and Interpreting Circle Graphs

The circle graph directly below shows the results of a survey of 80 teens who were asked about their favorite musical instruments. Use the graph for Exercises 1–3.

Favorite Musical Instruments



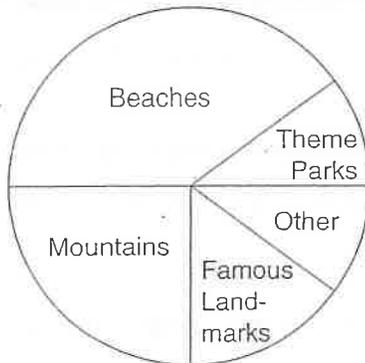
1. Did more teens pick piano or drums?

2. About what percent of teens picked guitar?

3. According to the survey, 20% of teens chose violin. How many teens chose violin?

The circle graph below shows the results of a survey of 100 people who were asked about their favorite vacation destinations. Use the graph for Exercises 4–6.

Favorite Vacation Destinations



4. Did more people pick mountains or beaches?

5. About what percent of people picked mountains?

6. According to the survey, 15% of the people chose famous landmarks. How many people chose famous landmarks?

Decide whether a bar graph or a circle graph would best display the information. Explain.

7. number of tornadoes in each state during one year

8. the number of pounds of Macintosh apples sold compared with the total number of pounds of apples sold at a market in one day

Line Plots & Frequency Tables

Name: _____

Date: _____

Daily Target: I can read and interpret given information on a frequency table or dot plot.

Frequency Table

A _____ that shows the _____ of times the data occurs and often represented by _____ marks or _____.

| Mark | Tally | Frequency |
|------|-------|-----------|
| 4 | | 2 |
| 5 | | 2 |
| 6 | | 4 |
| 7 | | 5 |
| 8 | | 4 |
| 9 | | 2 |
| 10 | | 1 |

Practice!

Students voted for a day to not have homework. The results are shown in the box. Which day got the most votes?

| | | | | | |
|--------|----------|-----------|--------|---------|--------|
| Monday | Friday | Thursday | Friday | Tuesday | Friday |
| Friday | Thursday | Wednesday | Monday | Friday | Monday |

Fill in the Frequency Table:

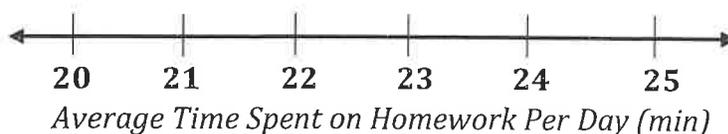
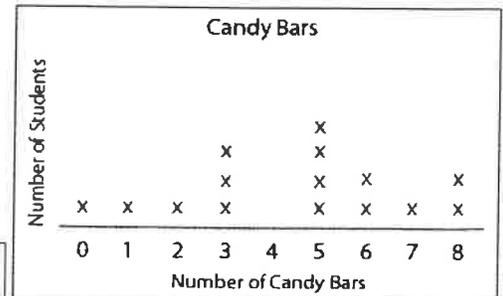
Frequency Table for Homework Votes

| Day | | | | | |
|-----------|--|--|--|--|--|
| Frequency | | | | | |
| Tally | | | | | |

Line Plot

A graph that shows _____ of data along a _____.

| Average Time Spent on Homework Per Day (min) | | | | | | | | | |
|--|----|----|----|----|----|----|----|----|----|
| 20 | 21 | 24 | 20 | 21 | 20 | 20 | 22 | 25 | 20 |
| 22 | 20 | 24 | 25 | 24 | 25 | 21 | 25 | 25 | 24 |



LESSON
6-5

Practice B
Line Plots, Frequency Tables, and Histograms

Fill in the frequency table.

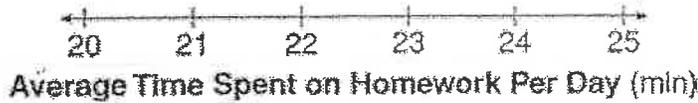
1. Students voted for a day not to have homework. The results are shown in the box. Which day got the most votes?

| | | | | | |
|--------|----------|-----------|--------|---------|--------|
| Monday | Friday | Thursday | Friday | Tuesday | Friday |
| Friday | Thursday | Wednesday | Monday | Friday | Monday |

| Frequency Table for Homework Votes | | | | | |
|------------------------------------|--|--|--|--|--|
| Day | | | | | |
| Frequency | | | | | |

2. Make a line plot of the data.

| Average Time Spent on Homework Per Day (min) | | | | | | | | | |
|--|----|----|----|----|----|----|----|----|----|
| 20 | 21 | 24 | 20 | 21 | 20 | 20 | 22 | 25 | 20 |
| 22 | 20 | 24 | 25 | 24 | 25 | 25 | 21 | 25 | 24 |



3. Use the data in the box below to make a frequency table with intervals.

| Class Social Studies Test Scores | | | | | | | | | |
|----------------------------------|----|----|----|----|----|-----|----|----|----|
| 78 | 95 | 81 | 83 | 75 | 68 | 100 | 73 | 92 | 85 |
| 59 | 70 | 88 | 92 | 99 | 87 | 75 | 67 | 89 | 84 |

| Class Social Studies Test Scores | | | | | |
|----------------------------------|-------|-------|-------|-------|--------|
| Scores | 51-60 | 61-70 | 71-80 | 81-90 | 91-100 |
| Frequency | | | | | |

4. In which range of scores did most of the students' tests fall? _____

| | | |
|---|-------------|-------------|
| Best Measure of Center | Name: _____ | Date: _____ |
| Daily Target: I can find the best measure of center based on the given data. | | |

Best Measure of Center

The best measure of center (measure of _____) depends on whether or not the data is considered numerical or categorical.

Categorical Data

_____ data are things that can be put into categories. The best measure of center is considered the _____.

Examples: colors, shoe size, clothing size, yes or no questions

Numerical Data

_____ data is data collected in number form. The best measure of center depends on if there is an _____:

Outlier - _____

No Outlier - _____

Examples: temperature, rainfall amount, grades, height, age, etc.

Practice! Identify the best measure of center!

1) Ms. Hedrick is looking at the grades for the unit 10 test and saw that most students scored between a 60 and 70 except for 3 students who received a 100. Which measure of center would be best to use for this set of data and why?

2) Ms. Grubb surveyed her coworkers to see if they were going on a trip during spring break. Which measure of center is most appropriate?

| Teachers | Went on a trip? |
|----------|-----------------|
| 1 | Yes |
| 2 | Yes |
| 3 | No |
| 4 | No |
| 5 | Yes |
| 6 | No |

3) The age of students in middle school are recorded in the frequency table.

| Age of Students | Number of students |
|-----------------|--------------------|
| 12 | |
| 13 | |
| 14 | |
| 15 | |
