



**6<sup>th</sup> Grade Week 5 Packet**

**April 27<sup>th</sup> – May 1<sup>st</sup>, 2020**

**Parent/Student Work Directions: Math**

**Paquete de la Semana 5 de Sexto Grado**

**27 de Abril - 1 de Mayo**

**Instrucciones de Trabajo para Padres/Estudiantes:**

**Matemáticas**





**Parent/Student Directions - Instrucciones para padres / estudiantes**

**Math: April 27<sup>th</sup>- May 1<sup>st</sup>, 2020**

**Monday/Lunes:**

- Today's lesson will focus on median and mode.
- Starting on p. 817, fill in the graphic organizer and answer the Real-World Link questions based on the Hurricanes description.
- Then, read and answer the questions on p. 818-820 making sure to focus on the concept box if you need help.
- After these pages have been completed, complete the Guided Practice problems on p. 820, the Independent Practice problems 1-6 on p. 821-822 and then Hot Problems #7-10 on p. 822.
- If you are having trouble, here is a link to a video explaining the topic:  
<https://www.youtube.com/watch?v=UATVHsA7aLA>

- La lección de hoy se centrará en la mediana y la moda.
- Comenzando en la pág. 817, complete el organizador gráfico y responda las preguntas de Real-World Link basadas en la descripción de Hurricanes.
- Luego, lea y responda las preguntas de la pág. 818-820 asegurándose de enfocarse en el cuadro de concepto si necesita ayuda.
- Después de completar estas páginas, complete los problemas de Práctica guiada en la pág. 820, los problemas de práctica independiente 1-6 en la p. 821-822 y luego Hot Problems # 7-10 en la pág. 822.
- Si tiene problemas, aquí hay un enlace a un video que explica el tema:  
<https://www.youtube.com/watch?v=UATVHsA7aLA>

**Tuesday/Martes:**

- Today's lesson will focus on measures of variation.
- Starting on p. 829, complete the Vocabulary Start-Up and Real-World Link questions based on the Surveys description.
- Then, read and answer the questions on p. 830-832 making sure to focus on the concept box if you need help.
- After these pages have been completed, complete the Guided Practice problems on p. 832, the Independent Practice problems 1-6 on p. 833-834 and then Hot Problems #7-11 on p. 834.
- If you are having trouble, here is a link to a video explaining the topic:  
<https://www.youtube.com/watch?v=2sWBIF4fIXg>

- La lección de hoy se centrará en medidas de variación.
- Comenzando en la pág. 829, complete las preguntas de inicio de vocabulario y enlace del mundo real según la descripción de las encuestas.
- Luego, lea y responda las preguntas de la pág. 830-832 asegurándose de enfocarse en el cuadro de concepto si necesita ayuda.
- Después de completar estas páginas, complete los problemas de Práctica guiada en la pág. 832, los problemas de práctica independiente 1-6 en la p. 833-834 y luego Hot Problems # 7-11 en la pág. 834.
- Si tiene problemas, aquí hay un enlace a un video que explica el tema:  
<https://www.youtube.com/watch?v=2sWBIF4fIXg>

### Wednesday/Miercoles:

- Today's lesson will focus on mean absolute deviation.
- Starting on p. 837, complete the Real-World Link questions based on the Basketball description.
- Then, read and answer the questions on p. 838-840 making sure to focus on the concept box if you need help.
- After these pages have been completed, complete the Guided Practice problems on p. 840, the Independent Practice problems 1-9 on p. 841-842 and then Hot Problems #10-13 on p. 842.
- If you are having trouble, here is a link to a video explaining the topic:  
<https://www.youtube.com/watch?v=oMeVxgWPh-c>

- La lección de hoy se centrará en la desviación absoluta media.
- Comenzando en la pág. 837, complete las preguntas de Real-World Link basadas en la descripción de Baloncesto.
- Luego, lea y responda las preguntas de la pág. 838-840 asegurándose de enfocarse en el cuadro de concepto si necesita ayuda.
- Después de completar estas páginas, complete los problemas de Práctica guiada en la pág. 840, los problemas de práctica independiente 1-9 en la p. 841-842 y luego Hot Problems # 10-13 en la pág. 842.
- Si tiene problemas, aquí hay un enlace a un video que explica el tema:  
<https://www.youtube.com/watch?v=oMeVxgWPh-c>

### Thursday/Jueves:

- This is a catch-up day.
- Students can use the day complete any unfinished assignments and get any questions answered they may have by their teacher.
- You can ask me questions through phone, email or Dojo. Use the rest of your day to "sharpen the saw!"

- Este es un día de recuperación.
- Los estudiantes pueden usar el día para completar cualquier tarea no terminada y obtener cualquier pregunta que su maestro pueda responder.
- Puede hacerme preguntas por teléfono, correo electrónico o Dojo. Use el resto de su día para "afilarse la sierra".

### Friday/Viernes:

- Today's lesson will focus on graphing an inequality on a number line.
- Using the ATI Galileo pages, read through the Graphing an Inequality on a Number Line slides and answering the questions that go with each slide.
- The information in the slides before the questions will help you if you are having trouble.
- Complete the Graphing an Inequality on a Number Line Test after going through the slides.

- La lección de hoy se centrará en graficar una desigualdad en una recta numérica.
- Utilizando las páginas de ATI Galileo, lea las diapositivas Representación gráfica de una desigualdad en una recta numérica y responda las preguntas que acompañan a cada diapositiva.
- La información en las diapositivas antes de las preguntas lo ayudará si tiene problemas.
- Complete la prueba Graficar una desigualdad en una recta numérica después de pasar por las diapositivas.

# Median and Mode

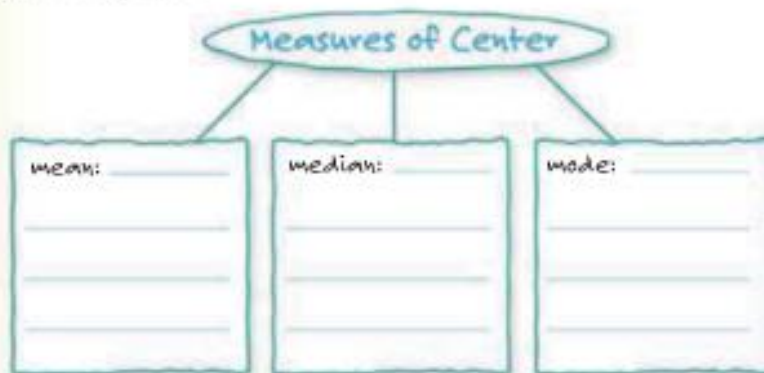


## Vocabulary Start-Up



A data set can also be described by its median or its mode. The mean, median, and mode are called **measures of center** because they describe the center of a set of data.

Find the definition of each term in the glossary. Then complete the graphic organizer.



### Essential Question

HOW are the mean, median, and mode helpful in describing data?



### Vocabulary

measures of center  
median  
mode



### Common Core State Standards

**Content Standards**  
6.SP.3, 6.SP.5, 6.SP.5b, 6.SP.5c  
**MP Mathematical Practices**  
1, 3, 4, 5, 6



## Real-World Link

**Hurricanes** The table shows the number of Atlantic hurricanes in different years.

Atlantic Hurricanes						
5	15	9	7	4	9	8

- Order the data from least to greatest. Circle the number in the middle of your list. \_\_\_\_\_
- Find the mean. Compare the middle number to the mean of the data. Round to the nearest hundredth if necessary.

Which **MP Mathematical Practices** did you use?  
Shade the circle(s) that applies.

- |  |   |
|--|---|
| <input type="checkbox"/> 1 Persevere with Problems | <input type="checkbox"/> 5 Use Math Tools         |
| <input type="checkbox"/> 2 Reason Abstractly       | <input type="checkbox"/> 6 Attend to Precision    |
| <input type="checkbox"/> 3 Construct an Argument   | <input type="checkbox"/> 7 Make Use of Structure  |
| <input type="checkbox"/> 4 Model with Mathematics  | <input type="checkbox"/> 8 Use Repeated Reasoning |





## Key Concept

## Median and Mode

The **median** of a list of values is the value appearing at the center of a sorted version of the list, or the mean of the two central values, if the list contains an even number of values.

The **mode** is the number or numbers that occur most often.

Just as mean is one value used to summarize a data set, the median and mode also summarize a data set with a single number. If there is more than one number that occurs with the same frequency, a data set may have more than one mode.

Work Zone

## Examples



1. The table shows the number of monkeys at eleven different zoos. Find the median and mode of the data.

Number of Monkeys					
28	36	18	25	12	44
18	42	34	16	30	

Order the data from least to greatest.

**Median** 12, 16, 18, 18, 25, 28, 30, 34, 36, 42, 44 *28 is in the center.*

**Mode** 12, 16, 18, 18, 25, 28, 30, 34, 36, 42, 44 *18 occurs most often.*

The median is 28 monkeys. The mode is 18 monkeys.

2. Dina recorded her scores on 7 tests in the table. Find the median and mode of the data.

Test Scores			
93	88	94	93
85	97	90	

Order the data from least to greatest.

Circle the number in the center. This is the median.

Circle the most frequently occurring numbers. This value is the mode.

The median is a score of . The mode is a score of .

## Got it? Do this problem to find out.

- a. The list shows the number of stories in the 11 tallest buildings in Springfield. Find the median and mode of the data.

40, 38, 40, 37, 33, 30, 20, 24, 21, 17, 19



a.



## Examples



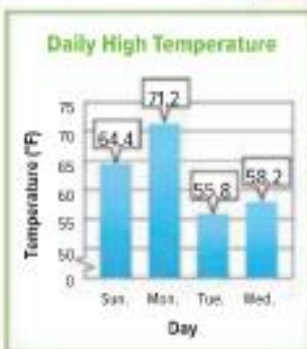
3. Find the median and mode of the temperatures displayed in the graph.

Median 55.8, 58.2, 64.4, 71.2

$$\frac{58.2 + 64.4}{2} = \frac{122.6}{2} = 61.3^\circ$$

There are an even number of data values. So, to find the median, find the mean of the two central values.

Mode There is no mode.



4. Miguel researched the average precipitation in several states. Find and compare the median and mode of the average precipitation.

State	Precipitation (in.)	State	Precipitation (in.)
Alabama	58.3	Louisiana	60.1
Florida	54.5	Maine	42.2
Georgia	50.7	Michigan	32.8
Kentucky	48.9	Missouri	42.2

Median 32.8, 42.2, 42.2, 48.9, 50.7, 54.5, 58.3, 60.1

$$\frac{48.9 + 50.7}{2} = \frac{99.6}{2} = 49.8$$

Mode 32.8, 42.2, 42.2, 48.9, 50.7, 54.5, 58.3, 60.1

The median is 49.8 inches and the mode is 42.2 inches. The median is 7.6 inches greater than the mode.

**Got it?** Do these problems to find out.

- b. Find the median and mode of the costs in the table.

Cost of Backpacks (\$)			
16.78	48.75	31.42	18.38
22.89	51.25	28.54	26.79

- c. Find and compare the median and mode of the costs in the table.

Cost of Juice (\$)			
1.65	1.97	2.45	2.87
2.35	3.75	2.49	2.87

Could you work?

b. \_\_\_\_\_

c. \_\_\_\_\_



### Example



5. Describe the daily high temperatures using the measures of center.

Daily High Temperature (°F)			
72	73	67	65
71	64	71	

Mean  $\frac{72 + 73 + 67 + 65 + 71 + 64 + 71}{7} = \frac{483}{7}$  or  $69^\circ$

Median 64, 65, 67, 71, 71, 72, 73

Mode 64, 65, 67, 71, 71, 72, 73

The median and mode both equal 71 degrees. They are both 2 degrees greater than the mean. The data follows the measures of center in that the temperatures are close to the measures of center.

Got it? Do this problem to find out.

d. Describe the cost of CDs using the measures of center.

Cost of CDs (\$)		
11.95	12.89	19.99
19.99	12.59	18.49

### Guided Practice



1. Find and compare the median and mode for the following set of data. monthly spending: \$46, \$62, \$62, \$57, \$50, \$42, \$56, \$40 (Examples 1-4)

2. Describe the daily high temperatures using the measures of center. (Example 5)

Daily High Temperature (°F)			
34	35	31	36
31	24	33	

3. **Building on the Essential Question** How are mean and median similar? \_\_\_\_\_

### Rate Yourself!

Are you ready to move on? Shade the section that applies.



For more help, go online to access a Personal Tutor.



**FOLDABLES** Time to update your foldable!

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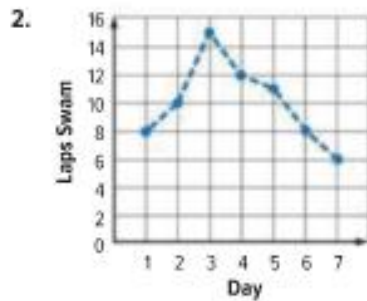


# Independent Practice

[Go online for Step-by-Step Solutions](#)


Find and compare median and mode for each set of data. (Examples 1–4)

1. math test scores: 97, 85, 92, 86 \_\_\_\_\_



3. Describe the average speeds using the measures of center. (Example 5)

Average Speeds (mph)

40	52	44	46
52	40	44	50
41	44	44	50

4. **MP Model with Mathematics** Refer to the graphic novel frame below for Exercises a–b.



a. Find the median and mode for each team's wins.

\_\_\_\_\_

\_\_\_\_\_

b. Which team had the better record? Justify your response.

\_\_\_\_\_

\_\_\_\_\_



5. A Louisville newspaper claims that during seven days, the high temperature in Lexington was typically  $6^\circ$  warmer than the high temperature in Louisville. What measure was used to make this claim?

Daily High Temperatures ( $^\circ\text{F}$ )							
Louisville				Lexington			
75	50	80	72	80	73	75	74
70	84	70		71	76	76	

Justify your answer. \_\_\_\_\_

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6. **MP Use Math Tools** Use the Internet to find the high temperatures for each of the last seven days in a city near you. Then find the median high temperature.

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### H.O.T. Problems Higher Order Thinking

7. **MP Persevere with Problems** The ticket prices for a concert series were \$12, \$37, \$45, \$18, \$8, \$25, and \$18. What was the ticket price of the eighth and final concert in this series if the set of 8 prices had a mean of \$23, a mode of \$18, a median of \$19.50? \_\_\_\_\_

8. **MP Construct an Argument** One evening at a local pizzeria, the following number of toppings were ordered on each large pizza.

3, 0, 1, 1, 2, 5, 4, 3, 1, 0, 0, 1, 1, 2, 2, 3, 6, 4, 3, 2, 0, 2, 1, 3

Determine whether each statement is *true* or *false*. Explain your reasoning.

- a. The greatest number of people ordered a pizza with 1 topping.

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- b. Half the customers ordered pizzas with 3 or more toppings, and half the customers ordered pizzas with less than 3 toppings.

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9. **MP Justify Conclusions** In the data set {3, 7, 4, 2, 31, 5, 4}, which measure best describes the set of data: mean, median, or mode? Explain your reasoning. \_\_\_\_\_

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10. **MP Model with Mathematics** Create a list of six values where the mean, median, and mode are 45, and only two of the values are the same.

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# Measures of Variation

## Vocabulary Start-Up



**Measures of variation** are used to describe the distribution, or spread, of the data. They describe how the values of a data set vary with a single number. A **quartile** is one measure of variation.

Look in a dictionary and find words that begin with *quar-*. Write two of the words and their definitions.

Word beginning with <i>quar-</i>	Definition

Based on the definitions you found, fill in the blank below.

*Quartiles* are values that divide a set of data into \_\_\_\_\_ equal parts.

## Essential Question

HOW are the mean, median, and mode helpful in describing data?

## Vocabulary

measures of variation  
quartiles  
first quartile  
third quartile  
interquartile range  
range  
outliers

## Common Core State Standards

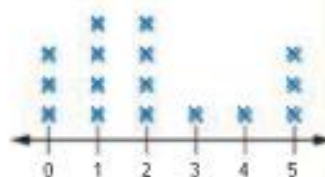
**Content Standards**  
6.SP.3, 6.SP.5, 6.SP.5c

**MP Mathematical Practices**  
1, 2, 3, 4, 5

## Real-World Link

**Surveys** James asked his classmates how many hours of TV they watch on a typical day.

Hours of TV Watched



- Divide the data into 4 equal parts. Draw a circle around each part.
- How many data values are in each group? \_\_\_\_\_

Which **MP Mathematical Practices** did you use?

Shade the circle(s) that applies.

- |  |   |
|--|---|
| <input type="checkbox"/> 1 Persevere with Problems | <input type="checkbox"/> 5 Use Math Tools         |
| <input type="checkbox"/> 2 Reason Abstractly       | <input type="checkbox"/> 6 Attend to Precision    |
| <input type="checkbox"/> 3 Construct an Argument   | <input type="checkbox"/> 7 Make Use of Structure  |
| <input type="checkbox"/> 4 Model with Mathematics  | <input type="checkbox"/> 8 Use Repeated Reasoning |





## Key Concept

## Measures of Variation

Work Zone

**Quartiles** are values that divide the data set into four equal parts.

### First and Third Quartiles

The first and third quartiles are the medians of the data values less than the median and the data values greater than the median, respectively.

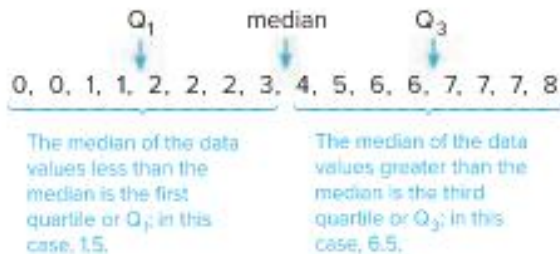
### Interquartile Range (IQR)

The distance between the first and third quartiles of the data set.

### Range

The difference between the greatest and least data values.

Measures of variation of a data set are shown below.



One fourth of the data lie below the first quartile and one fourth of the data lie above the third quartile. So, one half of the data lie between the first quartile and third quartile.

## Example

Tutor

### 1. Find the measures of variation for the data.

**Range**  $70 - 1$  or 69 mph

**Quartiles** Order the numbers.



**Interquartile Range**  $50 - 8$  or 42     $Q_3 - Q_1$

The range is 69, the median is 27.5, the first quartile is 8, the third quartile is 50, and the IQR is 42.

Animal	Speed (mph)
cheetah	70
lion	50
cat	30
elephant	25
mouse	8
spider	1

### Interquartile Range

If the interquartile range is low, the middle data are grouped closely together.

Show your work.

### Got it? Do this problem to find out.

- a. Determine the measures of variation for the data 64, 61, 67, 59, 60, 58, 57, 71, 56, and 62.



## Find Outliers and Analyze Data

An **outlier** is a data value that is either much *greater* or much *less* than the other values in a data set. If a data value is more than 1.5 times the value of the interquartile range beyond the quartiles, it is an outlier.

### Example



2. The ages of candidates in an election are 23, 48, 49, 55, 57, 63, and 72. Name any outliers in the data.

Find the interquartile range:  $63 - 48 = 15$

Multiply the interquartile range by 1.5:  $15 \times 1.5 = 22.5$

Subtract 22.5 from the first quartile and add 22.5 to the third quartile to find the limits for the outliers.

$$48 - 22.5 = 25.5 \qquad 63 + 22.5 = 85.5$$

The only age beyond the limits is 23. So, it is the only outlier.

**Got it?** Do this problem to find out.

- b. The lengths, in feet, of various bridges are 88, 251, 275, 354, and 1,121. Name any outliers in the data set.

Show your work.

b. \_\_\_\_\_



### Example



3. The table shows a set of scores on a science test in two different classrooms. Compare and contrast their measures of variation.

Find the measures of variation for both rooms.

	Room A	Room B
Range	$100 - 65 = 35$	$98 - 63 = 35$
Median	80	81
$Q_3$	$\frac{87 + 92}{2} = 89.5$	$\frac{87 + 93}{2} = 90$
$Q_1$	$\frac{67 + 72}{2} = 69.5$	$\frac{65 + 73}{2} = 69$
IQR	$89.5 - 69.5 = 20$	$90 - 69 = 21$

Room A	Room B
72	63
100	93
67	79
84	83
65	98
78	87
92	73
87	81
80	65

Both classrooms have a range of 35 points, but Room B has an interquartile range of 21 points while Room A's interquartile range is 20 points. There are slight differences in the medians as well as the third and first quartiles.



### Got it? Do this problem to find out.

c. \_\_\_\_\_

- c. Temperatures for the first half of the year are given for Antelope, Montana, and Augusta, Maine. Compare and contrast the measures of variation of the two cities.

Month	Antelope, MT	Augusta, ME
January	21	28
February	30	32
March	42	41
April	58	53
May	70	66
June	79	75

## Guided Practice



- The average wind speeds for several cities in Pennsylvania are given in the table. (Examples 1 and 2)
  - Find the range of the data. \_\_\_\_\_
  - Find the median and the first and third quartiles. \_\_\_\_\_
  - Find the interquartile range. \_\_\_\_\_
  - Identify any outliers in the data. \_\_\_\_\_
- The heights of several types of palm trees, in feet, are 40, 25, 15, 22, 50, and 30. The heights of several types of pine trees, in feet, are 60, 75, 45, 80, 75, and 70. Compare and contrast the measures of variation of both kinds of trees. (Example 3)

Wind Speed	
Pennsylvania City	Speed (mph)
Allentown	8.9
Erie	11.0
Harrisburg	7.5
Middletown	7.7
Philadelphia	9.5
Pittsburgh	9.0
Williamsport	7.6

- Building on the Essential Question** Describe the difference between measure of center and measure of variation. \_\_\_\_\_

### Rate Yourself!

Are you ready to move on?  
Shade the section that applies.



For more help, go online to access a **Personal Tutor**.



**FOLDABLES** Time to update your foldable!

# Independent Practice

[Go online for Step-by-Step Solutions](#)


**1** The table shows the number of golf courses in various states. (Examples 1 and 2)

- Find the range of the data. \_\_\_\_\_
- Find the median and the first and third quartiles.  
\_\_\_\_\_
- Find the interquartile range. \_\_\_\_\_
- Name any outliers in the data. \_\_\_\_\_

Number of Golf Courses			
California	1,117	New York	954
Florida	1,465	North Carolina	650
Georgia	513	Ohio	893
Iowa	437	South Carolina	456
Michigan	1,038	Texas	1,018

For each data set, find the median, the first and third quartiles, and the interquartile range. (Example 1)

**2.** texts per day: 24, 53, 38, 12, 31, 19, 26

\_\_\_\_\_

\_\_\_\_\_

**3** daily attendance at the water park: 346, 250, 433, 369, 422, 298

\_\_\_\_\_

\_\_\_\_\_

**4.** The table shows the number of minutes of exercise for each person. Compare and contrast the measures of variation for both weeks. (Example 3)

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

Minutes of Exercise		
	Week 1	Week 2
Tanika	45	30
Tasha	40	55
Tyrone	45	35
Uniqua	55	60
Videl	60	45
Wesley	90	75

**5. STEM** The table shows the number of known moons for each planet in our solar system. Use the measures of variation to describe the data.

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

Known Moons of Planets			
Mercury	0	Jupiter	63
Venus	0	Saturn	34
Earth	1	Uranus	27
Mars	2	Neptune	13



6. **MI Use Math Tools** The *double stem-and-leaf plot*, where the stem is in the middle and the leaves are on either side, shows the high temperatures for two cities in the same week. Use the measures of variation to describe the data in the stem-and-leaf plot.

Minneapolis		Columbus
5 3 1 0	2	5 7 9 9
6 4	3	7
3	4	8
	5	
	6	2
63 = 36°		25 = 25°

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### H.O.T. Problems Higher Order Thinking

7. **MF Find the Error** Hiroshi was finding the measures of variation of the following set of data: 89, 93, 99, 110, 128, 135, 144, 152, and 159. Find his mistake and correct it.

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median = 128  
 first quartile = 99  
 third quartile = 144  
 interquartile range = 45  
 range = 70



8. **MI Reason Abstractly** Create a list of data with at least six numbers that has an interquartile range of 15 and two outliers.

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9. **MF Persevere with Problems** How is finding the first and third quartiles similar to finding the median? \_\_\_\_\_

---

10. **MF Reason Inductively** Explain why the median is not affected by very high or very low values in the data. \_\_\_\_\_

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11. **MI Reason Inductively** Determine the range and IQR of each data set. Which measure of variation tells you more about the distribution of the data values? Explain.

Data Set A	Data Set B
1, 2, 2, 2, 3, 3, 4, 5, 5, 5, 6, 6, 17, 19, 21	1, 2, 9, 17, 17, 17, 17, 17, 17, 18, 18, 18, 19, 20, 21

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# Mean Absolute Deviation



## Real-World Link

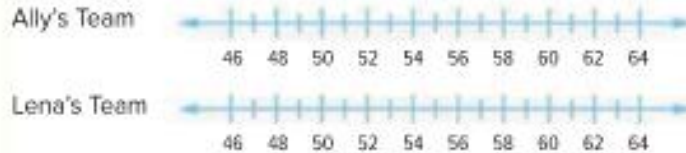


**Basketball** The tables show the number of points two teams scored.

Ally's Team			
52	48	60	50
56	54	58	62

Lena's Team			
51	48	60	49
59	50	62	61

- Plot each set of data on a number line.



- Find the mean of each set of data. Plot the means on the number lines with a star.
- Find the range of each set of data. \_\_\_\_\_  
\_\_\_\_\_
- Refer to the number lines. Compare and contrast each set of data.  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_



### Essential Question

HOW are the mean, median, and mode helpful in describing data?



### Vocabulary

mean absolute deviation



### Common Core State Standards

**Content Standards**  
6.SP.5, 6.SP.5b, 6.SP.5c

**MP Mathematical Practices**  
1, 2, 3, 4, 5, 6



Which **MP Mathematical Practices** did you use?  
Shade the circle(s) that applies.

- |  |   |
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| <input type="checkbox"/> 2 Reason Abstractly       | <input type="checkbox"/> 6 Attend to Precision    |
| <input type="checkbox"/> 3 Construct an Argument   | <input type="checkbox"/> 7 Make Use of Structure  |
| <input type="checkbox"/> 4 Model with Mathematics  | <input type="checkbox"/> 8 Use Repeated Reasoning |



Work Zone

## Find Mean Absolute Deviation

You have used the interquartile range to describe the spread of a set of data. You can also use the mean absolute deviation. The **mean absolute deviation** of a set of data is the average distance between each data value and the mean.



### Example



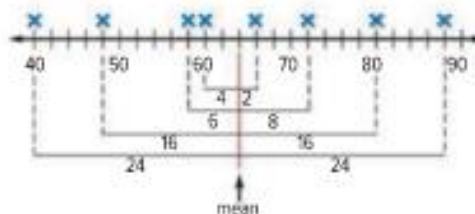
1. The table shows the maximum speeds of eight roller coasters. Find the mean absolute deviation of the set of data. Describe what the mean absolute deviation represents.

Maximum Speeds of Roller Coasters (mph)			
58	88	40	60
72	66	80	48

- Step 1** Find the mean.

$$\frac{58 + 88 + 40 + 60 + 72 + 66 + 80 + 48}{8} = 64$$

- Step 2** Find the absolute value of the differences between each value in the data set and the mean. Each data value is represented by an "x".



- Step 3** Find the average of the absolute values of the differences between each value in the data set and the mean.

$$\frac{24 + 16 + 6 + 4 + 2 + 8 + 16 + 24}{8} = 12.5$$

The mean absolute deviation is 12.5. This means that the average distance each data value is from the mean is 12.5 miles per hour.

**Got it?** Do this problem to find out.

- a. The table shows speeds of ten birds. Find the mean absolute deviation of the data. Round to the nearest hundredth. Describe what the mean absolute deviation represents.

Speeds of Top Ten Fastest Birds (mph)				
88	77	65	70	65
72	95	80	106	68

## Compare Variation

You can compare the mean absolute deviations for two data sets. A data set with a smaller mean absolute deviation has data values that are closer to the mean than a data set with a greater mean absolute deviation.



### Example



2. The top five salaries and the bottom five salaries for the 2010 New York Yankees are shown in the table below. Salaries are in millions of dollars and are rounded to the nearest hundredth.

2010 New York Yankees Salaries (millions of \$)									
Top Five Salaries					Bottom Five Salaries				
33.00	24.29	22.60	20.63	16.50	0.45	0.44	0.43	0.41	0.41

- a. Find the mean absolute deviation for each set of data. Round to the nearest hundredth.

Find the mean of the top five salaries.

$$\frac{33.00 + 24.29 + 22.60 + 20.63 + 16.50}{5} \approx 23.40$$

The mean is about \$23.40 million.

Find the mean absolute deviation of the top five salaries.

$$\frac{9.60 + 0.89 + 0.80 + 2.77 + 6.90}{5} \approx 4.19$$

The mean absolute deviation is about \$4.19 million.

Find the mean of the bottom five salaries.

$$\frac{0.45 + 0.44 + 0.43 + 0.41 + 0.41}{5} \approx 0.43$$

The mean is about \$0.43 million.

Find the mean absolute deviation of the bottom five salaries.

$$\frac{0.02 + 0.01 + 0 + 0.02 + 0.02}{5} \approx 0.01$$

The mean absolute deviation is about \$0.01 million.

- b. Write a few sentences comparing their variation.

The mean absolute deviation for the bottom five salaries is much less than that for the top five salaries. The data for the bottom five salaries are closer together than the data for the top five salaries.

### Mean Absolute Deviation

The absolute values of the differences between each data value and the mean for the top five salaries are calculated below.

$$|33.00 - 23.40| = 9.60$$

$$|24.29 - 23.40| = 0.89$$

$$|22.60 - 23.40| = 0.80$$

$$|20.63 - 23.40| = 2.77$$

$$|16.50 - 23.40| = 6.90$$



Show your work

b. \_\_\_\_\_

### Got it? Do this problem to find out.

- b. The table shows the running time in minutes for two kinds of movies. Find the mean absolute deviation for each set of data. Round to the nearest hundredth. Then write a few sentences comparing their variation.

Running Time for Movies (min)										
Comedy					Drama					
90	95	88	100	98	115	120	150	135	144	

## Guided Practice



1. Find the mean absolute deviation for the set of data. Round to the nearest hundredth if necessary. Then describe what the mean absolute deviation represents. (Example 1)

Number of Daily Visitors to a Web Site				
112	145	108	160	122

\_\_\_\_\_

\_\_\_\_\_

2. The table shows the height of waterslides at two different water parks. Find the mean absolute deviation for each set of data. Round to the nearest hundredth. Then write a few sentences comparing their variation. (Example 2)

Height of Waterslides (ft)										
Splash Lagoon					Wild Water Bay					
75	95	80	110	88	120	108	94	135	126	

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

3. **Building on the Essential Question** What does the mean absolute deviation tell you about a set of data?

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

### Rate Yourself!

I understand how to find the mean absolute deviation.

Great! You're ready to move on!

I still have questions about finding the mean absolute deviation.

No Problem! Go online to access a Personal Tutor.



**FOLDABLES** Time to update your Foldable!

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# Independent Practice

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Find the mean absolute deviation for each set of data. Round to the nearest hundredth if necessary. Then describe what the mean absolute deviation represents. (Example  $\%$ )



Known Moons of Planets			
0	0	1	2
63	34	27	13

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2.

Hard Drive (gigabytes)			
640	250	500	640
720	640	250	720

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3. The table shows the lengths of the longest bridges in the United States and in Europe. Find the mean absolute deviation for each set of data. Round to the nearest hundredth if necessary. Then write a few sentences comparing their variation.

Longest Bridges (kilometers)									
United States					Europe				
38.4	36.7	29.3	24.1	17.7	17.2	11.7	7.8	6.8	6.6
12.9	11.3	10.9	8.9	8.9	6.1	5.1	5.0	4.3	3.9

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For Exercises 4–7, refer to the table that shows the recent population, in millions, of the ten largest U.S. cities.

4. Find the mean absolute deviation. Round to the nearest hundredth.

---

Population of Largest U.S. Cities (millions)				
1.5	3.8	1.3	1.6	2.9
1.4	0.9	2.3	8.4	1.3

5. How many data values are closer than one mean absolute deviation away from the mean? \_\_\_\_\_

6. Which population is farthest from the mean? How far away from the mean is that population? Round to the nearest hundredth.

---

7. Are there any populations that are more than twice the mean absolute deviation from the mean? Explain. \_\_\_\_\_

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**MF Be Precise** For Exercises 8 and 9, look up the word *deviate* in a dictionary or online.

8. What does the word *deviate* mean? How can it help you remember what the mean absolute deviation refers to? \_\_\_\_\_
9. How does the word *absolute* help you to remember how to calculate the mean absolute deviation? \_\_\_\_\_



### H.O.T. Problems Higher Order Thinking

10. **MF Reason Abstractly** Create two sets of data, each with five values, that satisfy the following conditions.

*The mean absolute deviation of Set A is less than the mean absolute deviation of Set B.*

*The mean of Set A is greater than the mean of Set B.*

**MF Persevere with Problems** For Exercises 11 and 12, refer to the table that shows the recorded speeds of several cars on a busy street.

Recorded Speeds (mph)					
35	38	41	35	36	55

11. Calculate the mean absolute deviation both with and without the data value of 55. Round to the nearest hundredth if necessary.

12. Explain how including the value of 55 affects the mean absolute deviation.

13. **MF Construct an Argument** Explain why the mean absolute deviation is calculated using absolute value.

14. **MF Persevere with Problems** The table shows the high temperatures for 6 days. If the high temperature for day 7 is 61°F, how does the mean absolute deviation change?

High Temperature (°F)					
75	58	72	68	69	66

## Graphing an Inequality on a Number Line

### Slide 1

### What You Will Learn

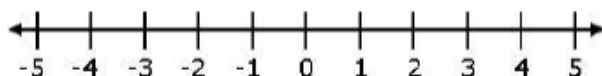
You will learn how to graph an inequality on a number line.

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### Slide 2

### Key Words

number line - a graphic showing numbers evenly distributed along a line



### Slide 3

### Race Times

There was a 5-kilometer race on Saturday. The winner finished in 25 minutes.

What inequality would represent the times of the racers?

How would you graph it on a number line?

Answer:

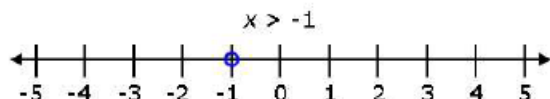
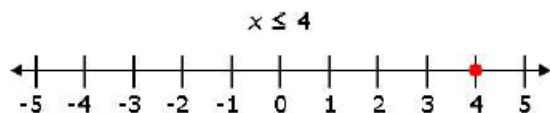
### How to Graph an Inequality on a Number Line - Part 1

The number in the inequality tells us where the point will go on the number line. The inequality sign determines what kind of point we will place on a number line.

When an inequality uses the greater than or less than symbols ( $>$  or  $<$ ), the number is not included in the set of numbers that are valid for the inequality. We use an open point in this case.

When "or equal to" is added to the inequality symbols ( $\geq$  or  $\leq$ ), the number is now included in the set of valid numbers. We use a closed point in this case.

Looking at the first example below, we see that there is a less than or equal to sign, so we must use a closed point. In the second example, we have a greater than sign, so we use an open point.



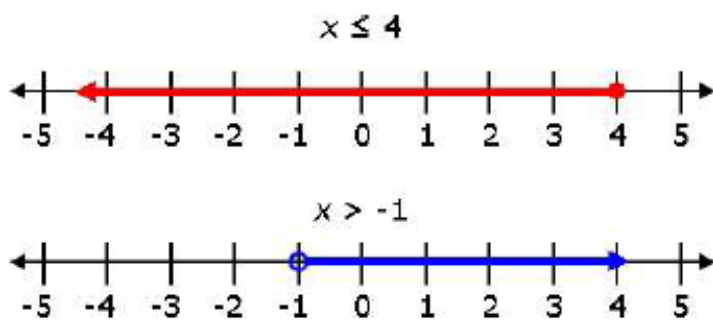
## How to Graph an Inequality on a Number Line - Part 2

With the point labeled on the number line, now we must focus on the other numbers that are valid for the inequality.

If the variable is greater than the number, then the arrow should go off to the right on the number line.


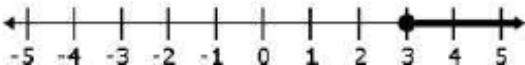
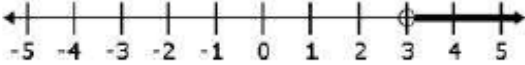
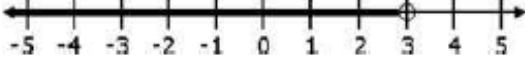
If the variable is less than the number, then the arrow should go off to the left on the number line.

Looking at the first example below, we see that  $x$  is less than 4 and the arrow extends to the left. In the second example,  $x$  is greater than -1, so the arrow extends to the right.



### Slide 6

Which number line represents  $x \geq 3$ ?

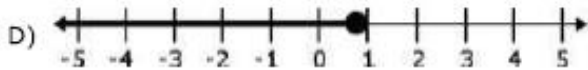
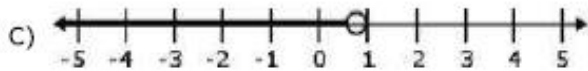
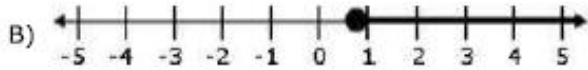
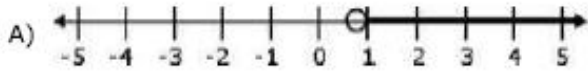
- A) 
- B) 
- C) 
- D) 

b



**Slide 7**

Which number line represents the inequality  $x < 0.75$ ?



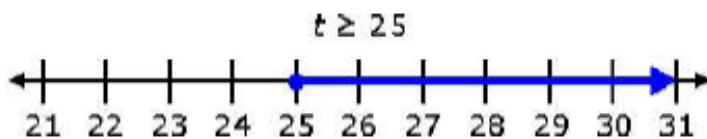
**Slide 8**

**What You Learned**

You learned how to graph an inequality on a number line.

In our original example, the winner of the race finished in 25 minutes. That means that every other runner had a time greater than 25 minutes. From this information, the inequality would be  $t \geq 25$ .

Graphing the inequality, we will place a closed point on 25 since the sign is greater than or equal to. The variable is greater than the other value, so the arrow will go off to the right.



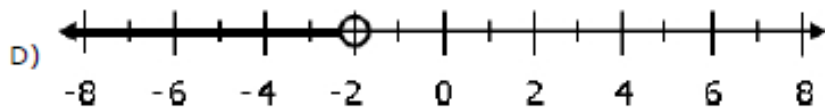
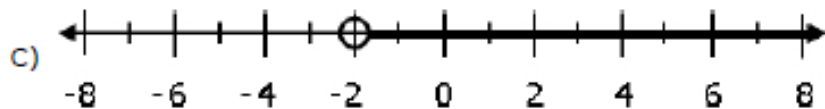
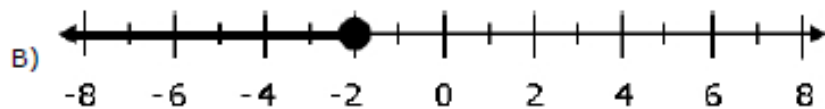
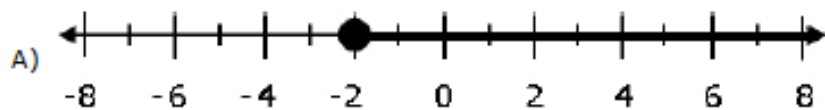
## Graphing an Inequality on a Number Line Test

- 1) Which inequality is represented by the number line shown?



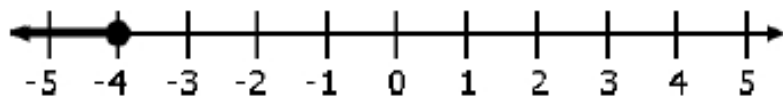
- A)  $x < 0$
  - B)  $x > 0$
  - C)  $x \leq 0$
  - D)  $x \geq 0$
- 

- 2) Which number line represents  $x > -2$ ?



### Graphing an Inequality on a Number Line Test

3) Which inequality is represented by the number line shown?



A)  $x < -4$

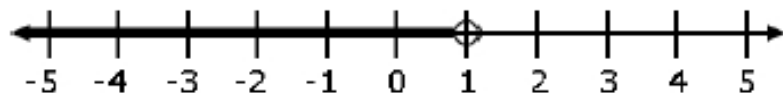
B)  $x \geq -4$

C)  $x > -4$

D)  $x \leq -4$

---

4) Which inequality is represented by the number line shown?



A)  $x < 1$

B)  $x > 1$

C)  $x \geq 1$

D)  $x \leq 1$

---