Inspiring Greatness

ISD

INDEPENDENCE SCHOOL DISTRICT

Math Virtual Learning

Math 7/Pre-Algebra

Measures of Center

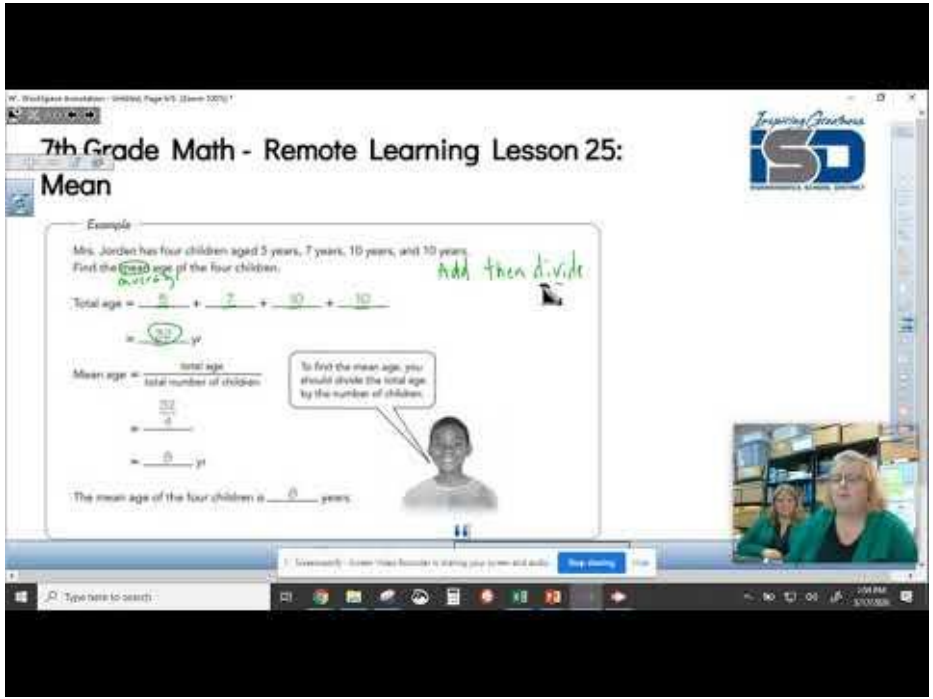
April 24, 2020

Grade 7/Measures of Center
Lesson: April 24, 2020

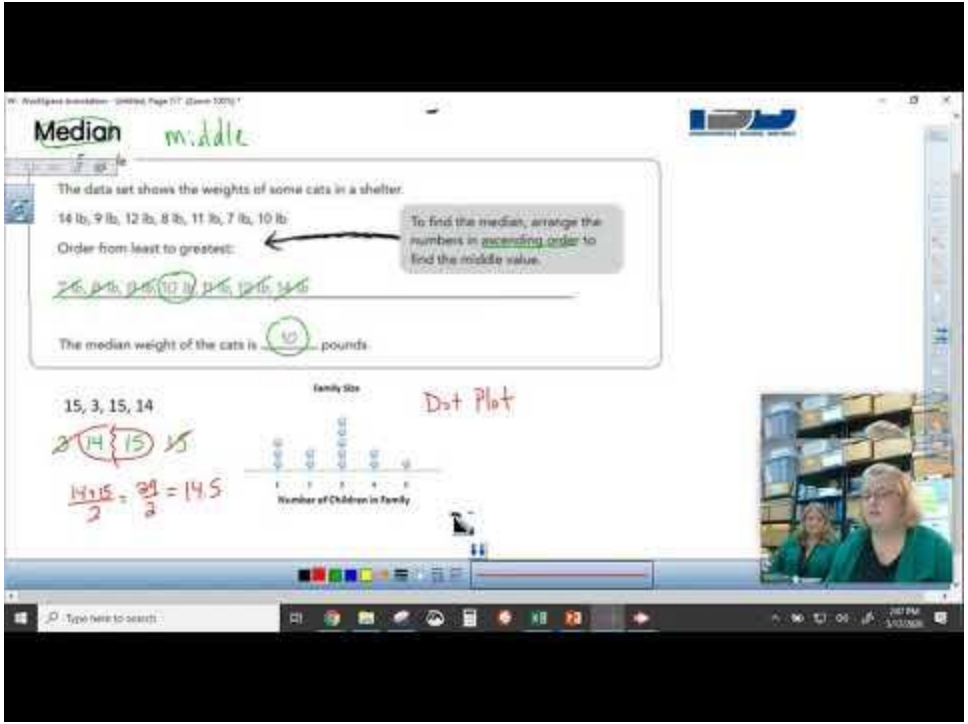
Objective/Learning Target:

Students will compare measures of center across two sets of data and use it to solve problems.

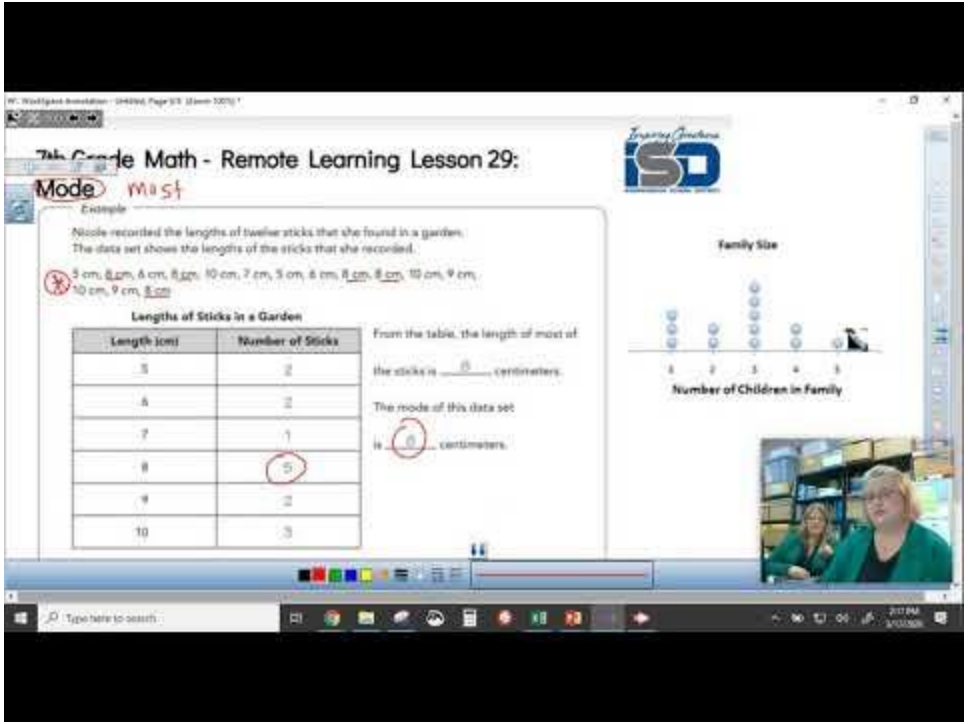
Watch the first video!



Watch the second video!



Watch the third video!



Warm-Up

Find the mean, median, mode, and range for the given data.

Data: 6, 2, 5, 1, 1

MEAN - the average of a set of numbers

$\frac{6+2+5+1+1}{5} = \frac{15}{5} = 3$

MEDIAN - the exact middle of the set

1 1 **2** 5 6

MODE - the number that appears the most often

1 1 2 5 6

RANGE - the distance between the highest and lowest values

6 - 1 = 5

A baseball field collects soft drink cans for recycling. In the last two weeks, the following numbers of cans have been collected.

84, 97, 77, 31, 84, 63, 58, 72, 47, 84, 69, 94, 43, 68

Mean: _____

Median: _____

Mode: _____

Range: _____

Warm-Up - Answer Key

A baseball field collects soft drink cans for recycling. In the last two weeks, the following numbers of cans have been collected.

84, 97, 77, 31, 84, 63, 58, 72, 47, 84, 69, 94, 43, 68

Mean : **69.4** Median : **70.5** Mode : **84** Range : **66**

Mean: $\frac{31+43+47+58+63+68+69+72+77+84+84+84+94+97}{14} = \frac{971}{14} = 69.35714\ldots \approx$ **69.4**

Median: 31 43 47 58 63 68 **69** **72** 77 84 84 84 94 97 → $\frac{69+72}{2} = \frac{141}{2} =$ **70.5**

Mode: 31 43 47 58 63 68 69 72 77 **84** **84** **84** 94 97

Range: 97 - 31 = **66**

Guided Practice

Choosing the Best Measure of Center

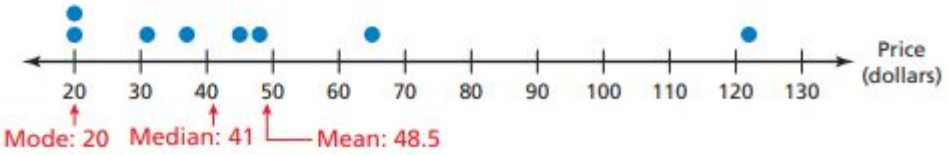
Find the mean, median, and mode of the sneaker prices. Which measure best represents the data?

Mean: $\frac{20 + 31 + 122 + 48 + 37 + 20 + 45 + 65}{8} = \frac{388}{8}$, or 48.5

Median: 20, 20, 31, 37, 45, 48, 65, 122 Order from least to greatest.

$\frac{37 + 45}{2} = \frac{82}{2}$, or 41

Mode: 20, 20, 31, 37, 45, 48, 65, 122 The value 20 occurs most often.



The median best represents the data. The mode is less than most of the data, and the mean is greater than most of the data.

https://www.bigideasmath.com/teachers/crosswalk/green_9_3.pdf

Guided Practice

WEATHER The weather forecast for a week is shown.

	Sun	Mon	Tue	Wed	Thu	Fri	Sat
							
High	90° F	91° F	89° F	97° F	101° F	99° F	91° F
Low	74° F	78° F	77° F	77° F	83° F	78° F	72° F

a. Find the mean, median, and mode(s) of the high temperatures. Which measure best represents the data? Explain your reasoning.

b. Repeat part (a) for the low temperatures.

c. **ERROR ANALYSIS**: Describe the error made in finding the median of the data set below.

https://www.bigideasmath.com/teachers/crosswalk/green_9_3.pdf

Guided Practice Answers

a.) High Temperatures

89, 90, 91, 91, 97, 99, 101

mean= 658 ÷ 7 = 94

median= 91

mode= 91

The mean best represents the data shown. The median and mode are less than the data shown.

b.) Low Temperatures

72, 74, 77, 77, 78, 78, 83

mean= 539 ÷ 7 = 77

median= 77

mode= 77 and 78

Any of the measures would best represent the data shown because 77 is included in all.

c.) Error Analysis

They forgot to put the numbers in order first.

The correct median should be 55.

Additional Practice

Click on the top link first and complete the 3 parts. Click on ***explain*** if you need help.

Next, click on the second link to compare distributions using a variety of graphs. Click on Watch a video or use a hint if you need help.

Which is the BEST measure of center - Do FIRST

Comparing Distributions from various types of graphs - Do SECOND

Practice:

Answer the questions on a piece of paper.

1. The ages of the racers in a bicycle motocross race are 14, 22, 20, 25, 26, 17, 21, 30, 27, 25, 14, and 29. The 30-year-old drops out of the race and is replaced with a 15-year-old. How are the mean, median, and mode of the ages affected?

2. The tables show the attendances at volleyball games and basketball games at a school during the year.

Basketball	181	168	151	168	179
Volleyball	112	106	115	112	132

a. Find the mean, median, and mode(s) for each.
b. Which measure best represents the data? Explain your reasoning.
c. Which sport had the largest range of attendance?

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Practice Answers

1. **With 30:**

14, 14, 17, 20, 21, 22, 25, 25, 26, 27, 29, 30

mean= 270 ÷ 12 = 22.5

median= 22 + 25 = 47 47 ÷ 2 = 23.5

mode= 14 and 25

Removing 30 and putting in 15:

14, 14, 15, 17, 20, 21, 22, 25, 25, 26, 27, 29

mean= 255 ÷ 12 = 21.25

median= 21 + 22 = 43 43 ÷ 2 = 21.5

mode= 14 and 25

When the age was decreased, the mean and median also decrease.

2.

a. **Basketball:** 151, 168, 168, 179, 181

mean= 847 ÷ 5 = 169.4
median= 168
mode= 168

Volleyball: 106, 112, 112, 115, 132

mean= 577 ÷ 5 = 115.4
median= 112
mode= 112

b. **For basketball and volleyball, the measure that best represents the attendance is the median and mode. The mean is greater than most of the data.**

c. **Basketball range → 181-151 = 30**
Volleyball range → 132 - 106 = 26

Additional Links

[Averages - ThatQuiz]

Start at level 3
Increase the level for a challenge

[Averages with graphs - ThatQuiz]

Start at level 2
Increase the level for a challenge

[IXL - Using Graphs to interpret measures of center]

[Best Measure of Center and REVIEW - Quizziz]

Challenge Problems

Challenge #1

Consider the algebraic expressions 3x, 9x, 4x, 23x, 6x, and 3x. Assume $x > 0$.

a.) Find the mean, median, and mode.

b.) Is there an outlier? If so, what is it?

Challenge #2

The prices of six video games are shown in the table. The price of each game increases by $4.98 when a shipping charge is included. How does this increase affect the mean, median, and mode?

Video Game Prices	
$53.42	$35.69
$18.99	$25.13
$27.97	$53.42

https://www.bigideasmath.com/teachers/crosswalk/green_9_3.pdf

Challenge #3 with example

Example:

Identify the outlier for the price of shoes. Find the mean, median, and mode with and without the outlier. Which measure does the outlier affect the most?

The price of $122 is much greater than any other price. So, it is the outlier.

	Mean	Median	Mode
With Outlier	48.5	41	20
Without Outlier	38	37	20

∴ The mean is affected the most by the outlier.

On Your Own

Challenge #3

The time (in minutes) it takes six students to travel to school are 8, 10, 10, 15, 20, and 45. Identify the outlier. Find the mean, median, and mode with and without the outlier. Which measure does the outlier affect the most?

https://www.bigideasmath.com/teachers/crosswalk/green_9_3.pdf

Challenge Answers

Challenge #1

Consider the algebraic expressions 3x, 9x, 4x, 23x, 6x, and 3x. Assume x > 0.

a.) Find the mean, median, and mode. Mean: $\frac{48x}{6}$ = **8x** Median: **5x** Mode: **3x**

b.) Is there an outlier? If so, what is it? **Yes, 23x is the outlier.**

Challenge #2

	Mean	Median	Mode
Original Price	35.77	31.83	53.42
Price with Shipping Charge	40.75	36.81	58.4

Compare:

Mean: 40.75 − 35.77 = 4.98

Median: 36.81 − 31.83 = 4.98

Mode: 58.4 − 53.42 = 4.98

∴ By increasing each video game price by $4.98 for shipping, the mean, median, and mode all increase by $4.98.

Original $

Video Game Prices	
$53.42	$35.69
$18.99	$25.13
$27.97	$53.42

$ with shipping

Video Game Prices with Shipping Charge	
$58.40	$40.67
$23.97	$30.11
$32.95	$58.40

Challenge #3	Mean	Median	Mode
With outlier	18	12.5	10
Without outlier	12.6	10	10

The **mean** was affected the most.