Algebra 1B Live Lesson Class

U5L5: Measures of Central Tendency and Dispersion
(Chapter 12-3 in textbook)

Agenda

1. Review topics and problems from Unit 5, Lesson 5 – Measures of Central Tendency and Dispersion (Chapter 12-3 in textbook)

2. Use the 2-column note system to take better notes in math class. Bring your math notebook and pen or pencil to each math LiveLesson class.

2-Column Notes Template

1. Announcements/To Do's

2. School-Wide Learner Outcomes

3. LL Objectives

4. Vocabulary words

5. Problems

6. Summary (End of class)

1. Write down important details.

2. What are you going to work on this week?

4. Definitions (fill in as we go)

5. Steps to solving problems

6. 1 or 2 sentences about the LL class.

Reminders and To – Do's

Information

1. Complete 1 math lesson per day.

2. Check your WebMail every day

3. Be prepared to spend 4 - 6 hours per day on schoolwork.

4. Remind your Learning Coach to take daily attendance

What to do

1. Go to your Planner in Connexus to find the math lesson for the day

2. Go to Connexus to find WebMail

3. Complete lessons for the day from your Planner. Do not get behind on lessons.

4. Have your Learning Coach log into Connexus daily.

Reminders and To – Do's

Information	What to do
5. Go to the Message Board first for information about our math class.	
6. Contact Mr. Elizondo for math questions.	6. Call (559) 549 - 3244 and leave a voicemail if call is not answered.
Remember: You need at least 2 phone calls with Mr. Elizondo per semester.	Make an appointment at: https://elizondo.youcanbook.me
	Send a WebMail

U5L5 – California Common Core State Standards

- HSS-ID.A.2: Use statistics appropriate to the shape of the data distribution to compare center (median, mean) and spread (interquartile range, standard deviation) of two or more different data sets.

U5L5 - Vocabulary

- measure of central tendency

- outlier

- mean

- median

- mode

- measure of dispersion

- range of a set of data

U5L5 - Objectives

- Find mean, median, mode and range

U5L5 - Introduction

- You can use different measures to interpret and compare sets of data.

- One way to summarize a set of data is to use a *measure of central tendency*. Mean, median and mode are all **measures of central tendency**.

- The measure of central tendency that best describes a data set may depend of whether the data set has an *outlier*. An **outlier** is a data value that is much greater or less than the other values in the set.

U5L5 - Mean, Median and Mode

take note

Key Concept   Mean, Median, and Mode

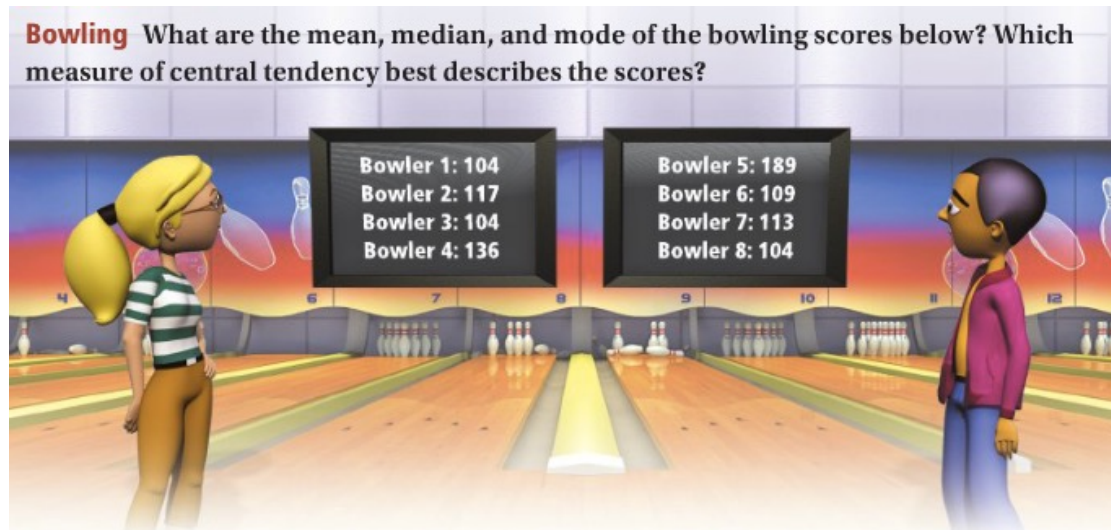| Measure	When to Use
The **mean** equals $\frac{\text{sum of the data values}}{\text{total number of data values}}$. The mean is often referred to as the *average*.	Use mean to describe the middle of a set of data that *does not* have an outlier.
The **median** is the middle value in a data set when the values are arranged in order. For a set containing an even number of data values, the median is the mean of the two middle data values.	Use median to describe the middle of a set of data that *does* have an outlier.
The **mode** is the data item that occurs the most times. A data set can have no mode, one mode, or more than one mode.	Use mode when the data are nonnumeric or when choosing the most popular item.

U5L5 - Finding Measures of Central Tendency

Bowling What are the mean, median, and mode of the bowling scores below? Which measure of central tendency best describes the scores?

Bowler 1: 104
Bowler 2: 117
Bowler 3: 104
Bowler 4: 136

Bowler 5: 189
Bowler 6: 109
Bowler 7: 113
Bowler 8: 104

Mode: 104

The mode is the data item that occurs the most times.

Median: 104 104 104 109 113 117 136 189

List the data in order.

$$\frac{109 + 113}{2} = 111$$

The median of an even number of data values is the mean of the two middle data values.

Mean: $\frac{104 + 117 + 104 + 136 + 189 + 109 + 113 + 104}{8} = 122$

The mean is the sum of the scores divided by the number of scores.

U5L5 - Finding a Data Value

Grades Your grades on three exams are 80, 93, and 91. What grade do you need on the next exam to have an average of 90 on the four exams?

$$\frac{80 + 93 + 91 + x}{4} = 90$$ Use the formula for the mean. Let $x =$ the grade on the fourth exam.

$$\frac{264 + x}{4} = 90$$ Simplify the numerator.

$$264 + x = 360$$ Multiply each side by 4.

$$x = 96$$ Subtract 264 from each side.

Your grade on the next exam must be 96 for you to have an average of 90.

U5L5 - Finding the Range

A **measure of dispersion** describes how *dispersed*, or spread out, the values in a data set are. One measure of dispersion is *range*. The **range of a set of data** is the difference between the greatest and least data values.

Finance The closing prices, in dollars, of two stocks for the first five days in February are shown below. What are the range and mean of each set of data? Use the results to compare the data sets.

Stock A: 25 30 30 47 28

range: $47 - 25 = 22$

mean: $\dfrac{25 + 30 + 30 + 47 + 28}{5}$

$= \dfrac{160}{5} = 32$

Stock B: 34 28 31 36 31

range: $36 - 28 = 8$

mean: $\dfrac{34 + 28 + 31 + 36 + 31}{5}$

$= \dfrac{160}{5} = 32$

Both sets of stock prices have a mean of 32. The range of the prices for Stock A is 22, and the range of the prices for Stock B is 8. Both stocks had the same average price during the 5-day period, but the prices for Stock A were more spread out.

U5L5 - Adding a Constant to Data Values

Athletics The table shows the times several athletes spend on a treadmill each day during the first week of training. The athletes add 5 min to their training times during the second week. What are the mean, median, mode, and range of the times for the second week?

Time on Treadmill

Athlete	Time (min)
Bob	50
Carlota	20
Juan	41
Manuel	20
Rosita	30
Sonia	20
Xavier	50

Step 1 Find the mean, median, mode, and range for the first week.

$$\text{mean: } \frac{20 + 20 + 20 + 30 + 41 + 50 + 50}{7} = 33$$

median: 30   mode: 20   range: $50 - 20 = 30$

Step 2 Find the mean, median, mode, and range for the second week.

mean: $33 + 5 = 38$
median: $30 + 5 = 35$ — Add 5 to each measure of central tendency.
mode: $20 + 5 = 25$
range: 30   The range does not change.

U5L5 - Multiplying Data Values by a Constant

Shopping A store sells seven models of televisions. The regular prices are $144, $479, $379, $1299, $171, $479, and $269. This week the store offers a 30% discount on all televisions. What are the mean, median, mode, and range of the discounted prices?

Step 1 Find the mean, median, mode, and range of the regular prices.

$$\text{mean:} \frac{144 + 171 + 269 + 379 + 479 + 479 + 1299}{7} = 460$$

median: 379   mode: 479   range: $1299 - 144 = 1155$

Step 2 Multiply the mean, median, mode, and range in Step 1 by 0.7 to find the mean, median, mode, and range of the discounted prices.

mean: $460(0.7) = 322$ mode: $479(0.7) = 335.30$

median: $379(0.7) = 265.30$ range: $1155(0.7) = 808.50$

Questions?

- Check the Message Board first

- Send a WebMail

- You can also make an appointment at
  https://elizondo.youcanbook.me

- You can also call me at (559) 549-3244. If I'm not available to answer your call, please leave a voicemail with your full name and phone number.

U5L5 - Review (What we learned from this LL)

- How to find Measures of Central Tendency

- How to find a Data Value

- How to find the Range

- How to Add a Constant to Data Values

- How to Multiply Data Values by a Constant

U5L5 - Review Problems

Find the mean, median and mode of the data set.

1.) touchdowns scored: 1 3 4 4 3

Mode(s): 3, 4

Median: 1, 3, 3, 4, 4 Put numbers in order from least to greatest.
The median in an odd number of data values in the
middle number.
The Median is 3

Mean: Add the numbers together, then divide by the number of data values

$$\frac{1+3+3+4+4}{5} = \frac{15}{5} = 3 \qquad \text{The mean is 3.}$$

U5L5 - Review Problems

Find the mean, median and mode of the data set

2.) average speed (mi/hr): 36 59 47 56 67

   Mode(s): None

   Median: 36, 47, 56, 59, 67 Put numbers in order from least to greatest
          The median in a odd number of data values in the middle number
          The Median is 56

   Mean: Add the numbers together, then divide by the number of data values

$$\frac{36+47+56+59+67}{5} = \frac{265}{5} = 53 \qquad \text{The mean is 53.}$$

U5L5 - Review Problems

Find the value of x such that the data set has the given mean.

3.) 11, 12, 5, 3, x; mean 7.4

$$\frac{11+12+5+3+x}{5} = 7.4$$

$$31-31+x = 37-31$$

$$\frac{31+x}{5} = 7.4$$

$$x = 6$$

$$(5)\frac{31+x}{5} = 7.4(5)$$

$$31+x = 37$$

U5L5 - Review Problems

Find the value of x such that the data set has the given mean.

4.) 6.5, 4.3, 9.8, 2.2, x; mean 4.8

$$\frac{6.5 + 4.3 + 9.8 + 2.2 + x}{5} = 4.8$$

$$22.8 - 22.8 + x = 24 - 22.8$$

$$\frac{22.8 + x}{5} = 4.8$$

$$x = 1.2$$

$$(5)\frac{22.8 + x}{5} = 4.8(5)$$

$$22.8 + x = 24$$

U5L5 - Review Problems

Find the range and mean of each data set. Use your results to compare the two data sets.

5.) Set A: 5 4 7 2 8
    Set B: 3 8 9 2 0

Set A: 5 4 7 2 8

Put in order: 2 4 5 7 8

Range: 6 (subtract high and low in data set)

Mean: $\dfrac{2+4+5+7+8}{5} = \dfrac{26}{5} = 5.2$

The mean is 5.2

Set B: 3 8 9 2 0

Put in order: 0 2 3 8 9

Range: 9 (subtract high and low in data set)

Mean: $\dfrac{0+2+3+8+9}{5} = \dfrac{22}{5} = 4.4$

The mean is 4.4

The average for Set A was higher than Set B, but Set B had the wider range of data values.

U5L5 - Review Problems

Find the mean, median, mode and range of each data set after you perform the given operation on each data value.

6.) 1.1, 2.6, 5.6, 5, 6.7, 6; add 4.1

Put numbers in order: 1.1 2.6 5 5.6 6 6.7

median: $\dfrac{5+5.6}{2} = \dfrac{10.6}{2} = 5.3$

mean: $\dfrac{1.1+2.6+5+5.6+6+6.7}{6} = \dfrac{27}{6} = 4.5$

mode(s): None

range: 6.7 – 1.1 = 5.6

Add 4.1 to the mean and median. Since there were no modes to begin with, there are still no modes. The range does not change.

mean: 4.5 + 4.1 = 8.6
median: 5.3 + 4.1 = 9.4
mode(s): None
range: 5.6