Algebra 1B Live Lesson Class

U5L6: Box and Whisker Plots
(Chapter 12-4 in textbook)

Agenda

1. Review topics and problems from Unit 5, Lesson 6 - Box-and-Whisker Plots (Chapter 12-4 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	1. Write down important details.
2. School-Wide Learner Outcomes	2. What are you going to work on this week?
3. LL Objectives	
4. Vocabulary words	4. Definitions (fill in as we go)
5. Problems	5. Steps to solving problems
6. Summary (End of class)	6. 1 or 2 sentences about the LL class.

Reminders and To – Do's

Information	What to do
1. Complete 1 math lesson per day.	1. Go to your Planner in Connexus to find the math lesson for the day
2. Check your WebMail every day	2. Go to Connexus to find WebMail
3. Be prepared to spend 4 - 6 hours per day on schoolwork.	3. Complete lessons for the day from your Planner. Do not get behind on lessons.
4. Remind your Learning Coach to take daily attendance	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. Remember: You need at least 2 phone calls with Mr. Elizondo per semester.	6. Call (559) 549 - 3244 and leave a voicemail if call is not answered. Make an appointment at: https://elizondo.youcanbook.me Send a WebMail

U5L6 – California Common Core State Standards

- HSS-ID.A.3: Interpret differences in shape, center, and spread in the context of the data sets, accounting for possible effects of extreme data points (outliers).
- HSS-ID.A.1: Represent data with plots on the real number line (dot plots, histograms, and box plots).

U5L6 - Vocabulary

- Quartile
- interquartile range
- box-and-whisker plot

U5L6 - Objectives

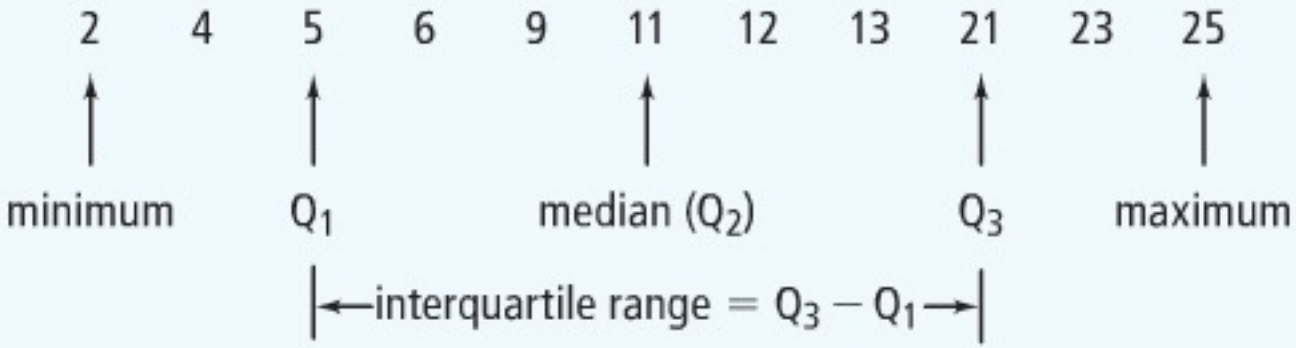
At the end of this Live Lesson class recording, students should be able to:

- Make and interpret box-and-whisker plots
- Find quartiles

U5L6 - Introduction

Essential Understanding Separating data into subsets is a useful way to summarize and compare data sets.

Quartiles are values that divide a data set into four equal parts. The median (or second quartile, Q_2) separates the data into upper and lower halves. The first quartile (Q_1) is the median of the lower half of the data. The third quartile (Q_3) is the median of the upper half of the data. The **interquartile range** is the difference between the third and first quartiles.



For a set of data that has an odd number of values, you do not include the median in either half when finding the first and third quartiles.

U5L6 - Summarizing a Data Set

What are the minimum, first quartile, median, third quartile, and maximum of the data set below?

125 80 140 135 126 140 350 75

Step 1 Arrange the data in order from least to greatest.

75 80 125 126 135 140 140 350

Step 2 Find the minimum, maximum, and median.

75 80 125 126 135 140 140 350

$$\text{median } (Q_2) = \frac{126 + 135}{2} = 130.5$$

Step 3 Find the first quartile and the third quartile.

75 80 125 126 135 140 140 350

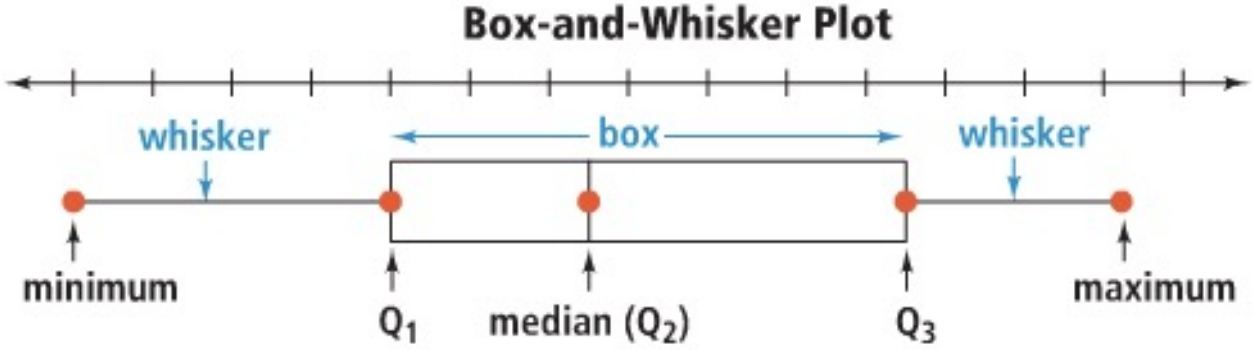
$$\text{first quartile } (Q_1) = \frac{80 + 125}{2} = 102.5$$

$$\text{third quartile } (Q_3) = \frac{140 + 140}{2} = 140$$

The first quartile is 102.5. The third quartile is 140.

U5L6 - Box and Whisker Plot

A **box-and-whisker plot** is a graph that summarizes a set of data by displaying it along a number line. It consists of three parts: a box and two whiskers.



- The left whisker extends from the minimum to the first quartile. It represents about 25% of the data.
- The box extends from the first quartile to the third quartile and has a vertical line through the median. The length of the box represents the interquartile range. It contains about 50% of the data.
- The right whisker extends from the third quartile to the maximum. It represents about 25% of the data.

U5L6 - Making a Box and Whisker Plot

Agriculture The table at the right shows the amount of crops harvested in the United States for a certain period. What box-and-whisker plot represents the data?

Crops Harvested

Year	Acres (millions)	Year	Acres (millions)
0	314	6	307
1	321	7	316
2	315	8	312
3	316	9	314
4	314	10	303
5	311		

Source: U.S. Department of Agriculture

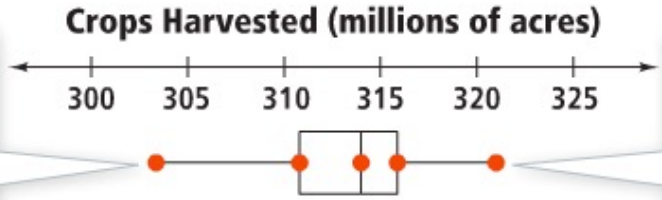
Step 1 Order the data to find the minimum, maximum, and quartiles.

303 307 311 312 314 314 314 315 316 316 321

minimum Q_1 median (Q_2) Q_3 maximum

Step 2 Draw the box-and-whisker plot.

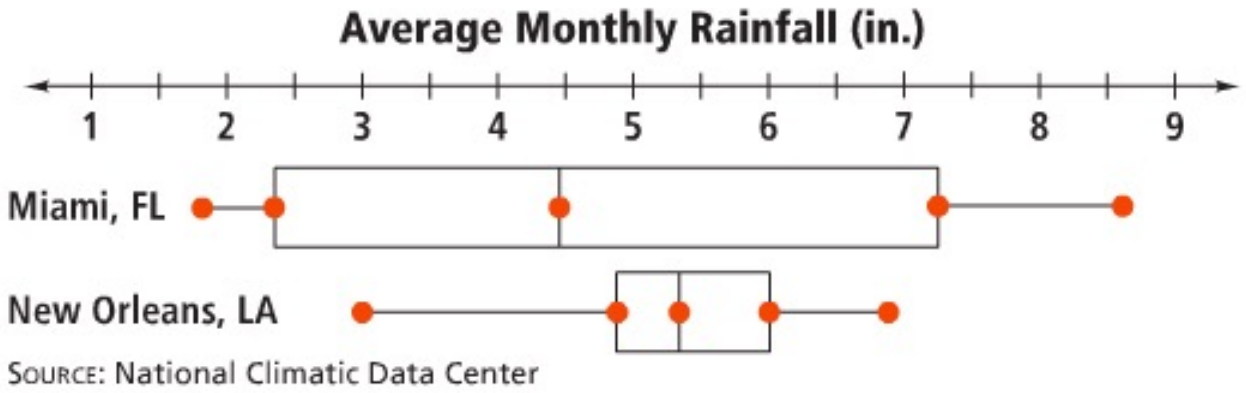
Plot the minimum, quartiles, and maximum below a number line.



Draw a box from Q_1 to Q_3. Draw a vertical line through the median. Draw line segments from the box to the minimum and maximum.

U5L6 - Interpreting Box-and-Whisker Plots

Weather Use the box-and-whisker plots below. What do the interquartile ranges tell you about the average monthly rainfall for each city?



SOURCE: National Climatic Data Center

The box for Miami is longer, so Miami has the greater interquartile range.
This greater range means the middle 50% of Miami's monthly rainfalls vary more widely than those of New Orleans.

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.

U5L6 - Review (What we learned from this LL)

- How to Summarize a Data Set
- How to Make a Box-and-Whisker Plot
- How to Interpret a Box-and-Whisker Plot

U5L6 - Review Problems

Find the minimum, first quartile, median, third quartile, and maximum of each data set.

1.) 220 150 200 180 320 330 300

Arrange data from last to greatest: 150 180 200 220 300 320 330

minimum = 150

maximum = 330

median (Q_2) = 220

first quartile (Q_1) = $\frac{180+200}{2} = \frac{380}{2} = 190$

third quartile (Q_3) = $\frac{300+320}{2} = \frac{620}{2} = 310$

U5L6 - Review Problems

Find the minimum, first quartile, median, third quartile, and maximum of each data set.

2.) 14 18 12 17 14 19 18

Arrange data from last to greatest: 12 14 14 17 18 18 19

minimum = 12

maximum = 19

median (Q_2) = 17

first quartile (Q_1) = $\frac{14+14}{2} = \frac{28}{2} = 14$

third quartile (Q_3) = $\frac{18+18}{2} = \frac{36}{2} = 18$

U5L6 - Review Problems

Make a box-and-whisker plot to represent each set of data.

3.) snack prices: \$0.99 \$0.85 \$1.05 \$3.25 \$1.49 \$1.35 \$2.79 \$1.99

In order: \$0.85 \$0.99 \$1.05 \$1.35 \$1.49 \$1.99 \$2.79 \$3.25

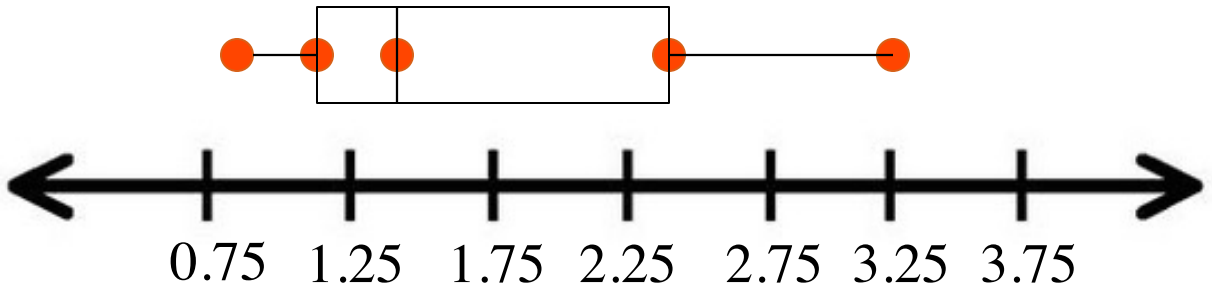
minimum = \$0.85

maximum = \$3.25

1st quartile (Q_1) = $\frac{1.05+1.35}{2} = \frac{2.40}{2} = 1.20$

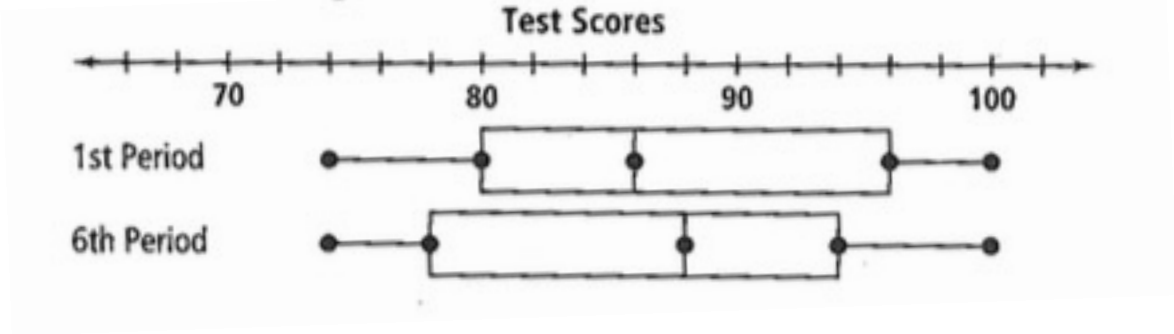
median (Q_2) = $\frac{1.35+1.49}{2} = \frac{2.84}{2} = 1.42$

3rd quartile (Q_3) = $\frac{1.99+2.79}{2} = \frac{4.78}{2} = 2.39$



U5L6 - Review Problems

4.) Use the box-and-whisker plot below. What does it tell you about the test scores in each class?



1st period has a high range of scores than 6th period.
The 6th period median is higher than 1st period.
The medians for both classes were very high (86 and 88).
Both classes scored well (range 78 to 96) overall.