

**UNIT 7 • WORKING WITH DATA****Day 61****Day 61 Guided Practice****Outliers at Lunch**

The table below lists what's on the menu for lunch in a school cafeteria, along with the calories for each item. Follow along with your teacher to fill out the five-number summary for the data. Then, calculate any outliers for the data.

**Lunchtime Calories**

Menu item	Calories
Veggie sub with oil, vinegar, Italian spices and cheese	258
Whole-grain ham sub with veggies	310
Pasta with marinara sauce	290
Vegetarian salad, light dressing	42
Whole-grain turkey sub with veggies	290
Cheeseburger	515
Salad with chicken, cheese and light dressing	237

- List the numbers from the table in order from least to greatest:

\_\_\_\_\_

- Fill out the five-number summary for the data.

Minimum (min)	
Lower quartile ( $Q_1$ )	
Median (M or $Q_2$ )	
Upper quartile ( $Q_3$ )	
Maximum	

- Determine the interquartile range.

$$\text{IQR} = Q_3 - Q_1 = \underline{\hspace{2cm}} - \underline{\hspace{2cm}} = \underline{\hspace{2cm}}$$

- Multiply the interquartile range by 1.5.

$$\text{IQR} \cdot 1.5 = \underline{\hspace{2cm}} \cdot 1.5 = \underline{\hspace{2cm}}$$

- Subtract** the answer from problem 4 from the lower quartile.

$$Q_1 - \underline{\hspace{2cm}} = \underline{\hspace{2cm}}$$

Any number(s) from the five-number summary that is **less than** this answer is an **outlier**.

Outlier: \_\_\_\_\_

**continued**

NAME: \_\_\_\_\_

**UNIT 7 • WORKING WITH DATA**

**Day 61**

---

6. **Add** the answer from problem 4 to the upper quartile.

$$Q_3 + \underline{\hspace{2cm}} = \underline{\hspace{2cm}}$$

Any number(s) from the five-number summary that is **greater than** this answer is an **outlier**.

Outlier: \_\_\_\_\_

7. What are your outliers, if any?
-

**UNIT 7 • WORKING WITH DATA****Day 61****Day 61 Practice****Find the Outliers**

For each problem, the data set to fill out the five-number summary. Then, calculate any outliers. Use a calculator. Show your work. Use the Day 61 Guided Practice: Outliers at Lunch worksheet to help you if needed.

1. Data set:

11, 15, 32, 33, 33, 35, 38, 40, 42, 45, 45, 47, 48, 55, 56, 65, 67, 123

a. Fill out the five-number summary:

Minimum (min)	
Lower quartile ( $Q_1$ )	
Median (M or $Q_2$ )	
Upper quartile ( $Q_3$ )	
Maximum	

b. What's the interquartile range?

$$\text{IQR} = Q_3 - Q_1 = \underline{\hspace{2cm}} - \underline{\hspace{2cm}} = \underline{\hspace{2cm}}$$

c. Multiply the interquartile range by 1.5.

$$\text{IQR} \cdot 1.5 = \underline{\hspace{2cm}} \cdot 1.5 = \underline{\hspace{2cm}}$$

d. **Subtract** this answer from the **lower quartile**.

$$Q_1 - \underline{\hspace{2cm}} = \underline{\hspace{2cm}}$$

e. **Add** the answer from part c to the **upper quartile**.

$$Q_3 + \underline{\hspace{2cm}} = \underline{\hspace{2cm}}$$

f. What are your outliers, if any? \_\_\_\_\_

2. Data set:

63, 95, 97, 100, 101, 105, 108, 110, 110, 112, 115, 117, 119, 120

a. Fill out the five-number summary:

Minimum (min)	
Lower quartile ( $Q_1$ )	
Median (M or $Q_2$ )	
Upper quartile ( $Q_3$ )	
Maximum	

**continued**

NAME: \_\_\_\_\_

**UNIT 7 • WORKING WITH DATA**

**Day 61**

b. What's the interquartile range?

$$IQR = Q_3 - Q_1 = \underline{\hspace{2cm}} - \underline{\hspace{2cm}} = \underline{\hspace{2cm}}$$

c. Multiply the interquartile range by 1.5.

$$IQR \cdot 1.5 = \underline{\hspace{2cm}} \cdot 1.5 = \underline{\hspace{2cm}}$$

d. **Subtract** this answer from the **lower quartile**.

$$Q_1 - \underline{\hspace{2cm}} = \underline{\hspace{2cm}}$$

e. **Add** the answer from problem 4 to the **upper quartile**.

$$Q_3 + \underline{\hspace{2cm}} = \underline{\hspace{2cm}}$$

f. What are your outliers, if any? \_\_\_\_\_

3. Data set:

16, 19, 24, 25, 25, 33, 33, 34, 34, 37, 37, 40, 42, 46, 49, 73

a. Fill out the five-number summary:

Minimum (min)	_____
Lower quartile ( $Q_1$ )	_____
Median (M or $Q_2$ )	_____
Upper quartile ( $Q_3$ )	_____
Maximum	_____

b. What's the interquartile range?

$$IQR = Q_3 - Q_1 = \underline{\hspace{2cm}} - \underline{\hspace{2cm}} = \underline{\hspace{2cm}}$$

c. Multiply the interquartile range by 1.5.

$$IQR \cdot 1.5 = \underline{\hspace{2cm}} \cdot 1.5 = \underline{\hspace{2cm}}$$

d. **Subtract** this answer from the **lower quartile**.

$$Q_1 - \underline{\hspace{2cm}} = \underline{\hspace{2cm}}$$

e. **Add** the answer from problem 4 to the **upper quartile**.

$$Q_3 + \underline{\hspace{2cm}} = \underline{\hspace{2cm}}$$

f. What are your outliers, if any? \_\_\_\_\_

**continued**

NAME: \_\_\_\_\_

## UNIT 7 • WORKING WITH DATA

### Day 62

#### Day 62 Guided Practice

#### Grades

Below are 9 test grades from Jack's language arts class. Follow along with your teacher to fill out the five-number summary for the data. Then, calculate any outliers for the data.

#### Jack's test grades

75, 40, 91, 96, 80, 68, 81, 93, 85

1. List the numbers from the table in order from least to greatest:  
\_\_\_\_\_

2. Fill out the five-number summary for the data.

Minimum (min)	
Lower quartile ( $Q_1$ )	
Median (M or $Q_2$ )	
Upper quartile ( $Q_3$ )	
Maximum	

3. Determine the interquartile range.

$$\text{IQR} = Q_3 - Q_1 = \underline{\hspace{2cm}} - \underline{\hspace{2cm}} = \underline{\hspace{2cm}}$$

4. Multiply the interquartile range by 1.5.

$$\text{IQR} \cdot 1.5 = \underline{\hspace{2cm}} \cdot 1.5 = \underline{\hspace{2cm}}$$

5. **Subtract** the answer from problem 4 from the lower quartile.

$$Q_1 - \underline{\hspace{2cm}} = \underline{\hspace{2cm}}$$

Any number(s) from the five-number summary that is **less than** this answer is an **outlier**.

Outlier: \_\_\_\_\_

**continued**

NAME: \_\_\_\_\_

**UNIT 7 • WORKING WITH DATA**

**Day 62**

6. Add the answer from problem 4 to the upper quartile.

$$Q_3 + \underline{\hspace{2cm}} = \underline{\hspace{2cm}}$$

Any number(s) from the five-number summary that is **greater than** this answer is an **outlier**.

Outlier: \_\_\_\_\_

7. What are your outliers, if any? \_\_\_\_\_

8. What is the mean of the data set? \_\_\_\_\_

9. What is the mean of the data set without the outlier? \_\_\_\_\_

8. What do you notice about the means in problems 8 and 9? \_\_\_\_\_

10. What is the median of the data set? \_\_\_\_\_

11. What is the mean of the data set without the outlier? \_\_\_\_\_

12. Can we take out the outlier and report that mean as the measure of center? Explain.

\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

13. Which more accurately represents the measure of center for the data set: mean or median? Explain.

\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

8-2a Measures of Variation

Low(15)

1.) What is the range of the data given below?

25, 42, 23, 12, 30, 18, 23

2.) The interquartile range is the \_\_\_\_\_ minus the \_\_\_\_\_, whereas, the range is the \_\_\_\_\_ minus the \_\_\_\_\_.

Medium(70)

2.) Given the ordered data set, identify the lower quartile, median, and upper quartile. Then give the overall range and the interquartile range of the data set. **SHOW YOUR WORK!!!!**

25, 28, 28, 32, 44, 58, 88, 125

lower quartile: \_\_\_\_\_

median: \_\_\_\_\_

upper quartile: \_\_\_\_\_

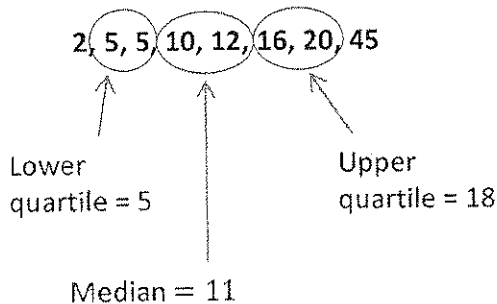
Range: \_\_\_\_\_

Interquartile range: \_\_\_\_\_

3.) Identify any outliers in the data given for problem 2. **SHOW YOUR WORK** regardless of whether an outlier does or does not exist.

High(15)

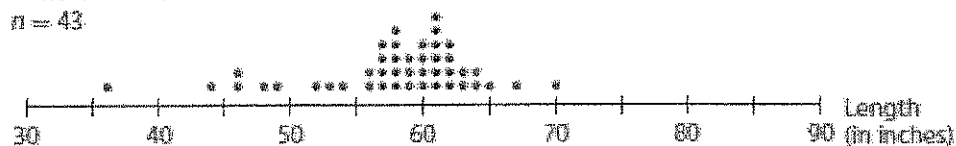
Bubba found the lower quartile, median, and upper quartile of a data set. He then went on to find the outlier. Did he make any mistakes? If so, what was the mistake? What would be correct?



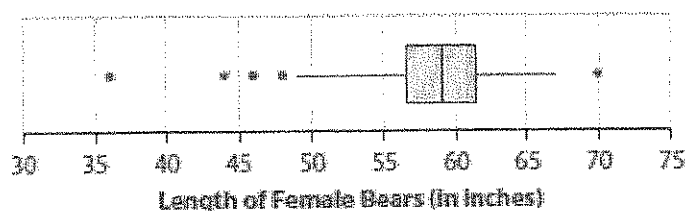
- 1.) The outlier can be found from the range  $18 - 5 = 13$
- 2.) Subtract 13 from 5 and add it to 18
- 3.) Based on step 2, the minimum limit is -8 and the maximum limit is 31, therefore the outlier is 45

- 2 Reproduced below is the dot plot of lengths of female bears from Lesson 1.

Female Bears  
 $n = 43$



- Do there appear to be any outliers in the data?
- The five-number summary for the lengths of female bears is:  
 minimum = 36,  $Q_1 = 56.5$ , median = 59,  $Q_3 = 61.5$ , maximum = 70.
  - Use the steps above to identify any outliers on the high end.
  - Are there any outliers on the low end?
- The box plot below (often referred to as a modified box plot) shows how the outliers in the distribution of the lengths of female bears may be indicated by a dot. The whiskers end at the last length that is not an outlier. What lengths of female bears are outliers?



- 2 Find the range and interquartile range of the following set of values.

1, 2, 3, 4, 5, 6, 70

- Remove the outlier of 70. Find the range and interquartile range of the new set of values. Which changed more, the range or the interquartile range?
- In general, is the range or interquartile range more resistant to outliers? In other words, which measure of spread tends to change less if an outlier is removed from a set of values? Explain your reasoning.
- Why is the interquartile range more informative than the range as a measure of variability for many sets of data?