

data in them.

Name \_\_\_\_\_

## Lesson 1: Box Plots (a.k.a. Box-and-Whisker Plots)

### LEARNING OUTCOMES



- I can create box plots, and interpret the summary data in them.

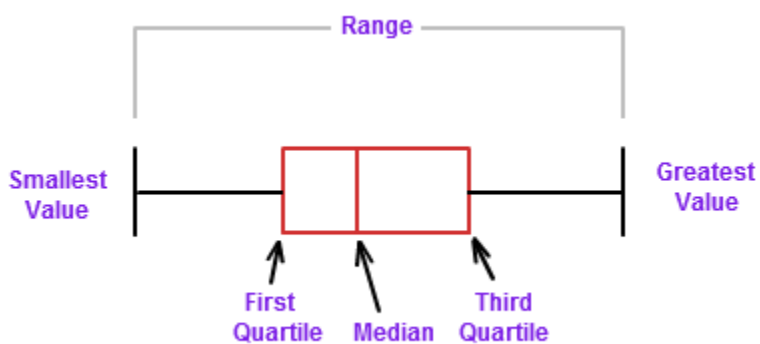
### Warm Up

Perform a linear regression to find the equation of the line whose points are represented in the table below.

x	f(x)
-2	-10
-1	-7
0	-4
1	-1
2	2
3	5

## BOX PLOTS

Box plots can be used to represent summary data for a given set of data. There are "5 statistical summary" values that make up the **five number summary**. They are:



Minimum (a.k.a min : smallest value)

First quartile (a.k.a. Q1)

Second quartile (a.k.a. Q2/commonly referred to as the median)

Third Quartile (a.k.a. Q3)

Maximum (a.k.a. max: greatest value)

data in them.

<ul style="list-style-type: none"> <li>The <b>first quartile</b> is the middle (the median) of the lower half of the data (the 25<sup>th</sup> percentile)</li> </ul>	<ul style="list-style-type: none"> <li>The <b>second quartile</b> is another name for the median of the entire set of data. (the 50<sup>th</sup> percentile)</li> </ul>	<ul style="list-style-type: none"> <li>The <b>third quartile</b> is the middle (the median) of the upper half of the data (the 75<sup>th</sup> percentile)</li> </ul>
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Construct a box-and-whisker plot for the following data:

**The data:** Math test scores 80, 75, 90, 95, 65, 65, 80, 85, 70, 100

<p>Write the data in numerical order. Find the first quartile, the median, the third quartile, the minimum (smallest value) and the maximum (largest value). These are referred to as a <b>five statistical summary</b>.</p> <p> <b>median (2nd quartile) = 80</b>  <b>first quartile = 70</b>  <b>third quartile = 90</b>  <b>minimum = 65</b>  <b>maximum = 100</b> </p>	<p style="text-align: center;"> <b>median of all data, second quartile</b>  <b>65, 65, 70, 75, 80, 80, 85, 90, 95, 100</b>  <b>median of lower part, first quartile</b>      <b>median of upper part, third quartile</b> </p>
<p>Place a circle beneath each of these values in relation to their location on an equally spaced number line.</p>	
<p>Draw a box with ends through the points for the <b>first</b> and <b>third</b> quartiles. Then draw a vertical line through the box at the median point. Now, draw the whiskers (or lines) from each end of the box to these minimum and maximum values.</p>	

data in them.

You Try.

1. Construct a Box and Whisker plot for the following set of data:

5, 6, 7, 8, 9, 9, 9, 10, 12, 14, 17, 17, 18, 19, 19

2. Construct a Box and Whisker plot for the following set of data:

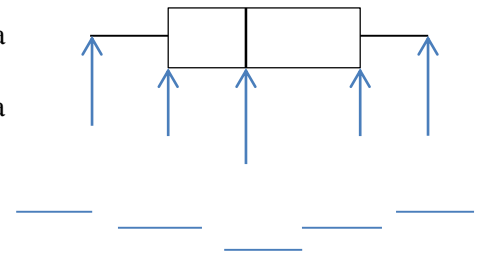
2, 5, 5, 6, 7, 8, 8, 9, 10, 11, 12, 14, 14, 17

data in them.

**Box-and- whisker plot** - shows how the numbers in a data set are grouped together or spread apart

Uses 5 statistics ( data must be put in order from least to greatest) :

- Minimum
- Lower quartile (1<sup>st</sup> quartile) it is the median of the lower half of the data
- Median (2<sup>nd</sup> quartile) the middle of the data
- Upper quartile (3<sup>rd</sup> quartile) it is the median of the upper half of the data
- Maximum



**Calculator Hint:**

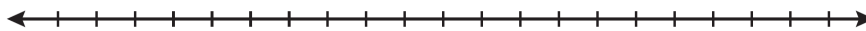
1. Press STAT key, then 1: Edit and enter data into L<sub>1</sub>
2. Press STAT key, then arrow right to CALC, then 1: 1 – Var Stats.  
Use down arrow to get the 5 statistics.

**Ex 1a)** The number of songs fifteen students have on their phones is:

120, 124, 132, 145, 200, 255, 260, 292, 308, 314, 342, 407, 421, 435, 452

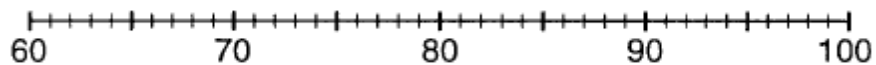
State the values of the minimum, 1st quartile, median, 3rd quartile, and maximum.

Using these values, construct a box-and-whisker plot using an appropriate scale on the line below.



b) The test scores for 14 students are given: 82, 95, 86, 77, 89, 69, 84, 98, 78, 95, 82, 63, 92, 73

Construct a box-and-whisker plot to display these data.

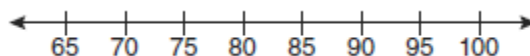


**You Try** 😊

The test scores from Mrs. Gray’s math class are shown below.

72, 73, 66, 71, 82, 85, 95, 85, 86, 89, 91, 92

Construct a box-and-whisker plot to display these data.



data in them.

ALGEBRA I

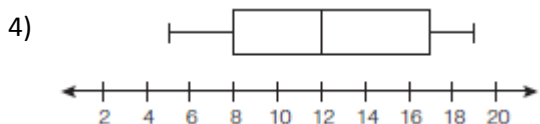
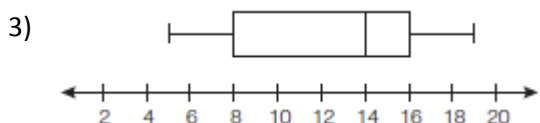
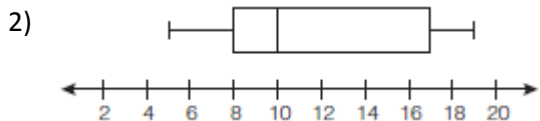
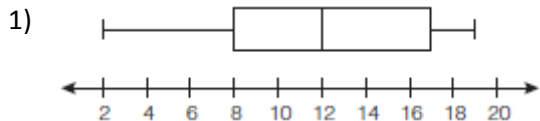
Name \_\_\_\_\_

CW/Homework



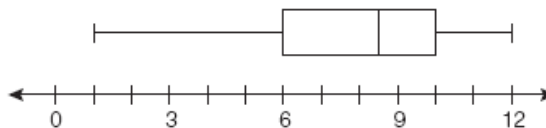
### Lesson 1 Box Plots

1. The data set 5, 6, 7, 8, 9, 9, 9, 10, 12, 14, 17, 17, 18, 19, 19 represents the number of hours spent on Facebook in a week by students in an Algebra class. Which box-and-whisker plot represents the data?



2. What is the value of the third quartile shown on the box-and-whisker plot below?

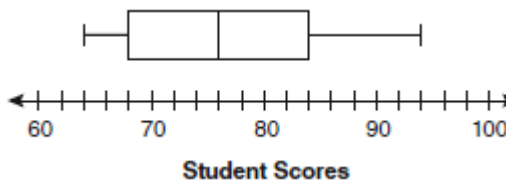
- (1) 6
- (2) 8.5
- (3) 10
- (4) 12



3. The box-and-whisker plot below represents students' scores on a recent English test.

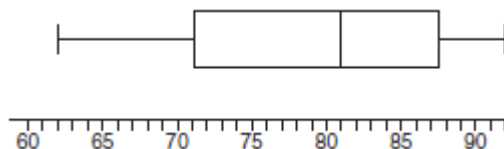
What is the value of the upper quartile?

- (1) 68
- (2) 76
- (3) 84
- (4) 94



4. The accompanying diagram shows a box-and-whisker plot of student test scores on last year's Algebra I midterm examination. What is the median score?

- (1) 62
- (2) 71
- (3) 81
- (4) 92

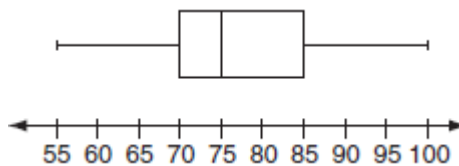


data in them.

5. The accompanying box-and-whisker plot represents the scores earned on a science test.

What is the median score?

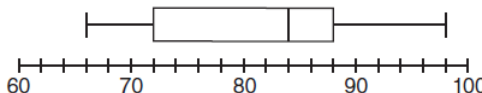
- (1) 70
- (2) 75
- (3) 77
- (4) 85



6. The box-and-whisker plot below represents the math test scores of 20 students.

What percentage of the test scores are less than 72?

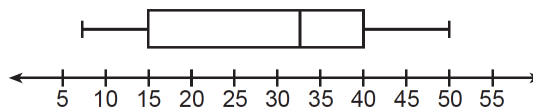
- (1) 25
- (2) 50
- (3) 75
- (4) 100



7. The box-and-whisker plot below represents the ages of 12 people.

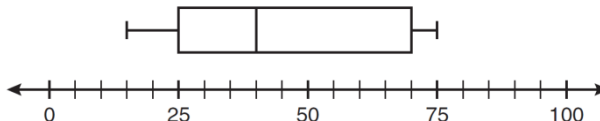
What percentage of these people are age 15 or older?

- (1) 25
- (2) 35
- (3) 75
- (4) 85



8. What is the range of the data represented in the box-and-whisker plot shown below?

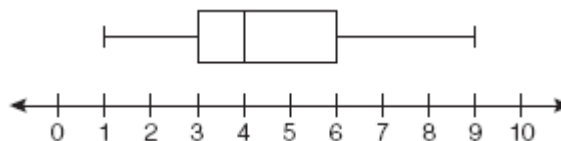
- (1) 40
- (2) 45
- (3) 60
- (4) 100

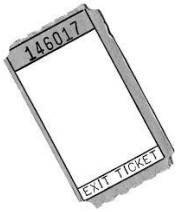


9. A movie theater recorded the number of tickets sold daily for a popular movie during the month of March. The box-and-whisker plot shown below represents the data for the number of tickets sold, in hundreds.

Which conclusion can be made using this plot?

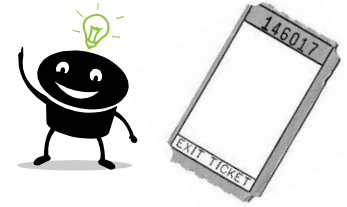
- 1) The second quartile is 600.
- 2) The mean of the attendance is 400.
- 3) The range of the attendance is 300 to 600.
- 4) Twenty-five percent of the attendance is between 300 and 400.





Name \_\_\_\_\_

Lesson 1: Box Plots  
Exit Ticket



Sam said that 50% of the twenty-two juniors at River City High School who participated in the walkathon walked at least ten miles. Do you agree? Why or why not?

Boxplot of Miles Walked for Juniors

