

Hey diddle diddle,
the median's the middle;
YOU ADD AND DIVIDE FOR THE MEAN.
The mode is the one that appears the most,
and the range is the difference between.

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12-3 Analyzing Data

Statistics is the study of data analysis and interpretation.

Measures of Central Tendency

Measures of Center

1. **Mean** – Add all of the numbers and divide by how many there are.
2. **Median** – The middle value or the mean of the two middle values. The data must be in order first.
3. **Mode** – The most frequently occurring value. There can be more than one or none.
(**Bimodal** – has two modes)

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Example 1: Find the mean, median, and mode for these values:

78, 87, 84, 75, 80, 98, 78, 95, 72.

$$\frac{72 + 75 + 78 + 78 + 80 + 84 + 87 + 95 + 98}{9}$$

$$\frac{747}{9} = 83 = \text{mean} = \bar{x}$$

$$80 = \text{median}$$

$$78 = \text{mode}$$

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Example 2: Find the mean, median, and mode for the water temperature in Dauphin Island, AL using your graphing calculator.

Gulf of Mexico Eastern Coast Water Temperatures (°F)

Location	J	F	M	A	M	J	J	A	S	O	N	D
Pensacola, Florida	56	58	63	71	78	84	85	86	82	74	65	58
St. Petersburg, Florida	62	64	68	74	80	84	86	86	84	78	70	64
Key West, Florida	69	70	75	78	82	85	87	87	86	82	76	72
Dauphin Island, Alabama	51	53	60	70	75	82	84	84	80	72	62	56
Grand Isle, Louisiana	61	61	64	70	77	83	85	85	83	77	70	65

$$\text{mode} = 84$$

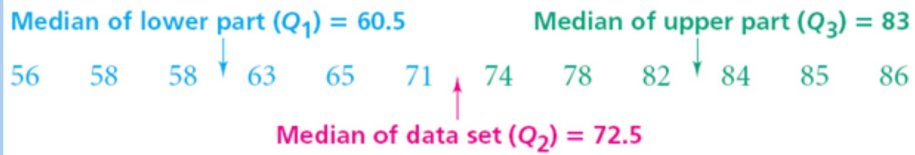
$$\text{median} = 71$$

$$\bar{x} = 69.08$$

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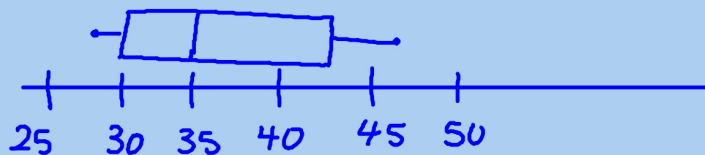
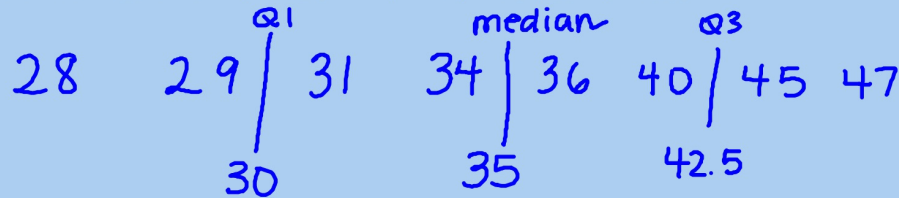
The median divides the data into two equal sets.

Quartiles – You can find the median of the two halves and divide it into four equal parts, the quartiles. Normally called the lower quartile and the upper quartile. Here first, second, and third quartiles.



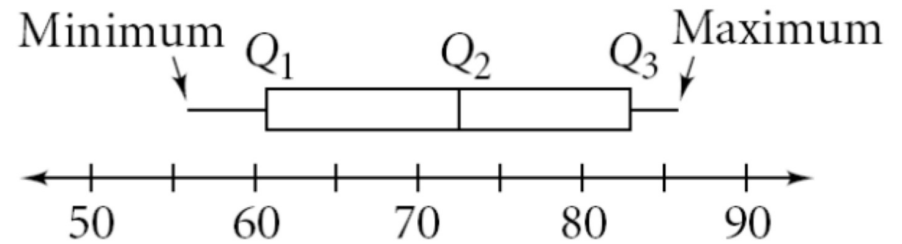
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Example 3: Make a box-and-whisker plot for these values: 34, 36, 47, 45, 28, 31, 29, 40.



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Box-and-Whisker Plot – A method of displaying data that uses quartiles to form the center box and the minimum and maximum values to form the whiskers.



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Percentile – A value that divides the range of a data into two parts such that the part below the percentile contains a given percent of the data.

If a number x is at the 63rd percentile in a data set, then about 63% of the data are less than x .

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Example 5: Find the value at each percentile for the data below.

54 98 45 87 98 64 21 61 71 82 93 65 62

98 87 24 65 97 31 47

these 9 below
 { 21, 24, 31, 45, 47, 54, 61, 62, 64, } **65**, 65, **71**, 82,
 87, 87, 93, 97, 98, 98, 98
20 items

A. 0th percentile

21
 nothing (0%) below

C. 55th percentile

$(.55)(20) = 11$ items
 71

B. 45th percentile **65**

$(.45)(20) = 9$ items

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Example 7: A news program reports on a proposed school dress code. The purpose of the program is to find out what percent of the population in its viewing area favors the dress code. Identify any bias in each sampling method.

A. Viewers are invited to call the program and express their preferences.

Voluntary

B. A reporter interviews people on the street near the local high school.

Undercoverage
 or Convenience

C. During the program, 300 people are selected at random from the viewing area. Then each person is contacted.

No bias

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Outlier – An item of data with a value substantially different from the rest of the items in the data set. (*accurate formula given later)

Example 6: Identify an outlier for this set of values: 15 34 28 32 30 26 34

15, 26, 28, 30, 32, 34, 34
 ✓ ✓ ✓ ✓ ✓ ✓
 11 2 2 2 2 0

outlier = 15

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homework

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