

The mean, median, mode, range, and outlier(s) give you additional information about a set of data (set of numbers).

Mean

The **mean** of a set of numbers **is the average of the numbers in the set**. To find the mean of a set of numbers :

1. Add the numbers together.
2. Divide the sum by the number of numbers in the set.

To find the mean of {60, 20, 40, 70, 50, 10, 30}

1. Find the sum.
 $60+20+40+70+50+10+30 = 280$
2. Divide the sum by the number of numbers in the set.
 $280/7 = 40$
3. The mean is 40.

The **mean**, **median**, **mode**, **range**, and **outlier(s)** give you additional information about a set of data (set of numbers).

Median

List the numbers from smallest to largest and find the middle of the list.

- If there is an **odd number of numbers** in the set **the median is the number in the middle**.
- If there is an **even number of numbers** in the set **the median is the average of the two numbers on both sides of the middle**. (add the two numbers together and divide by 2).

Odd number of data values

Find the median of {60, 20, 40, 70, 50, 10, 30}

List the numbers from smallest to largest and find the **middle**:

10, 20, 30, **40**, 50, 60, 70

Since **40** is in the middle the median is **40**.

Even number of data values

Find the median of {60, 20, 40, 70, 50, 10, 30, 80}

List the numbers from smallest to largest and find the **middle**:

10, 20, 30, 40, (**middle**) 50, 60, 70, 80.

The middle is between the 40 and 50. Add the numbers on both sides of the middle and divide the sum by 2.

$$40 + 50 = 90$$

$$90/2 = 45$$

The median is **45**.

The mean, median, mode, range, and outlier(s) give you additional information about a set of data (set of numbers).

Mode

List the numbers from smallest to largest and find the number(s) that occur(s) the most.

- if no number occurs the most then there is no mode. (a common mistake is to say the mode is zero in this case. The mode is not zero, it does not exist, there is no mode.)
- If there is one number that occurs the most then that number is the mode.
- if more than one number occurs the most then each of those numbers are the mode. (There can be no mode, one mode, or many modes for a set of data.)

No mode, no number occurs the most

After arranging the numbers from smallest to largest it is easy to see which number occurs the most.

10, 20, 30, 40, 50, 60, 70

There is no number that occurs the most, no mode.

One mode, one number occurs the most

After arranging the numbers from smallest to largest it is easy to see which number occurs the most.

10, 20, 30, 40, 40, 40, 50, 60, 70

There is one number that occurs the most, the mode is 40.

Several modes, more than one number occurs the most

After arranging the numbers from smallest to largest it is easy to see which numbers occur the most.

10, 20, 20, 30, 30, 30, 40, 40, 40, 50, 60, 70

There are two numbers that occur the most, 30 and 40. Even though 20 also occurs more times than the rest of the numbers it does not occur the most like 30 and 40 do. The modes are 30 and 40.

The **mean**, **median**, **mode**, **range**, and **outlier(s)** give you additional information about a set of data (set of numbers).

Range

The **range** of a set of numbers is the difference between the largest and smallest numbers in the set. To find the range of a set of numbers :

1. Subtract the smallest number from the largest.

To find the range of {60, 20, 40, 70, 50, 10, 30}

1. Find the largest and smallest numbers:
70 and 10
2. Subtract the smallest from the largest:
 $70 - 10 = 60$
3. The range is 60.

Outliers

The **outlier** of a set of numbers **does not always exist** . An outlier is a data value that is either so large or so small compared to the other numbers that it pulls the mean significantly away from where it would be if the outlier was not in the set.

For the set {0, 1, 2, 1, 3, 1, 2, 1, 3, 1, 75}, the mean would be 1.5 without 75 being part of the set. Because 75 is in the set the mean is 8.18 (rounded to 2 decimal places). This makes 75 an outlier for this set of data.