

Today's Learning Goal(s): **Word Wall**

By the end of the class, I will be able to:

- describe the difference in meaning between the mean, median and mode for a set of data.
- calculate the mean, median and mode for a set of data.

MBF 3CI **3.4 Measures of Central Tendency**

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It is often convenient to use a central value to summarize a set of data. There are several different ways to find values around which a set of data tends to cluster; these values are known as **measures of central tendency** or **averages**. **A central tendency value (average) must represent close to a “typical” piece of data in the set.**

In statistics, the three most commonly used of these measures are the **mean, median** and **mode**.

“Mean”

The **mean** is the sum of the values of a variable divided by the number of values in the data set.

Usually the mean is what people are referring to when they use the term “average” in everyday conversation.

Ex. 1: Find the mean of the data set:

a) 6, 4, 8, 2

b) 1, 4, 8, 2, 7, 6

$$\begin{aligned} \text{Mean} &= \frac{6+4+8+2}{4} \\ &= \frac{20}{4} \\ &= 5 \end{aligned}$$

$$\begin{aligned} \text{Mean} &= \frac{1+4+8+2+7+6}{6} \\ &= \frac{28}{6} \\ &\doteq 4.66 \\ &\doteq 4.7 \end{aligned}$$

“Median”

The **median** is the middle value of the data when they are arranged in ascending (or descending) order. If there is an even number of data items, the median is the mean of the two middle values.

Ex. 2: Find the median of each data set:

a) 6, 4, 3, 8, 2

b) 6, 4, 8, 2

Median: 2, 3, 4, 6, 8

$$\text{Median} = 4$$

Median: 2, 4, 6, 8

$$\begin{aligned} \text{position} &= \frac{n+1}{2} \\ &= \frac{4+1}{2} \\ &= \frac{5}{2} \\ &= 2.5 \end{aligned} \quad \text{Median} = \frac{4+6}{2}$$

$$\begin{aligned} &= \frac{10}{2} \\ &= 5 \end{aligned}$$

There is a "formula" to find the median "position"

$$\text{position} = \frac{n+1}{2}$$

$$\begin{aligned} &= \frac{5+1}{2} \\ &= \frac{6}{2} \\ &= 3 \end{aligned} \quad \left. \begin{array}{l} \text{Median is} \\ \text{3rd number} \end{array} \right\}$$

between 2 and 3, so take the mean of the 2nd and 3rd numbers

“Mode”

The **mode** is the datum that occurs most frequently. If every data item appears as frequently as every other data item, there is no mode. It is possible to have more than one mode too, for any set of data.

Ex. 3: Find the mode for each of these data sets:

a) 5, 6, 7, 7

b) 5, 6, 7

c) 5, 5, 7, 7

Mode = 7

No Mode

Mode = 5 + 7

“Bimodal”

Some sets of data have **outliers**, which are values “distant” from the majority of the data. But how is “distant” defined?

Ex. 4: Find the outlier: 6, 99, 4, 8, 2

$$\begin{aligned} \text{Mean} &= \frac{6+99+4+8+2}{5} \\ &= \frac{119}{5} \\ &= 23.8 \end{aligned}$$

$$\begin{aligned} \text{Median: } & 2, 4, 6, 8, 99 \\ \text{Median} &= 6 \end{aligned}$$

Mode: No Mode

Entertainment: pp. 136-137 #1, 2, 7ab (Note: mean and median for 7a require a bit of work).
ARE YOU CHECKING YOUR ANSWERS?

For Help with 2 and 7ab, use next 2 screens.