

Statistics is a field of mathematics that deals with the collecting and summarizing of data.

There are three measures of central tendency:

1. **Mean** - average  
– Computed by adding a set of values and dividing by the number of values.
2. **Median** – center or middle value  
– Computed by ordering the values from least to greatest, then taking the middle value or the average of the two middle values.
3. **Mode** - most frequent.  
– Computed by taking the value that occurs the most often.

**Example 1:** For the set of values: 1, 6, 3, 8, 9, 3, 6, 1, 6 determine the:

a. mean (Average)

$$(1 + 6 + 3 + 8 + 9 + 3 + 6 + 1 + 6) \div 9 = 4.78$$

b. median (middle)

$$1, 1, 3, 3, \underline{6}, 6, 6, 8, 9$$

Median = 6

c. mode (most common)

mode = 6

$x$  = number removed

**Example 2:** Ten numbers have a mean of 37. If one is removed, the mean is 38. What number was removed?

$$\begin{aligned} \text{Sum of 10 \#s} &= 37 \times 10 \\ &= 370 \end{aligned}$$

$$342 + x = 370$$

$$x = \underline{28}$$

$$\begin{aligned} \text{Sum of 9 \#s} &= 38 \times 9 \\ &= 342 \end{aligned}$$

**Example 3:** The following table gives the frequency distribution of the number of orders received each day during the past 50 days at the office of a publishing company.

# of Orders	# of Days
10-12	7
13-15	12
16-18	17
19-21	14

Mean Orders	# of Days
11	7
14	12
17	17
20	14

Total Days: 50

Calculate the mean, median, and mode.

Mean  $\frac{7(11) + 12(14) + 17(17) + 14(20)}{50} = 16.28$

Mean = 16 orders

Median

11, 11, 11, 11 ... (7 terms), 14, 14, 14 ... (12 terms), 17, ... (17 terms), 20, 20, ... (14 terms)

Average of 25th & 26th term.

Median = 17

Mode = 17 orders



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**Example 4:** Paulo needs a new battery for his car. He is trying to decide between two different brands. Both brands are the same price. He obtains data for the lifespan, in years, of 30 batteries of each brand, as shown below.

Measured Lifespans of 30 Car Batteries (years)										
Brand X					Brand Y					
5.1	7.3	6.9	4.7	5.0	5.4	6.3	4.8	5.9	5.5	
6.2	6.4	5.5	5.7	6.8	4.7	6.0	4.5	6.6	6.0	
6.0	4.8	4.1	5.2	8.1	5.0	6.5	5.8	5.4	5.1	
6.3	7.5	5.0	5.7	8.2	5.7	6.8	5.6	4.9	6.1	
3.3	3.1	4.3	5.9	6.6	4.9	5.7	6.2	7.0	5.8	
5.8	6.4	6.1	4.6	5.7	6.8	5.9	5.3	5.6	5.9	

a. Describe how the data in each set is distributed. Describe any similarities or differences between the two sets of data.

Brand X

$$\text{Mean} = \frac{172.3}{30} = 5.74$$

$$\text{Median} = \frac{15^{\text{th}} + 16^{\text{th}}}{2} = \frac{5.7 + 5.8}{2} = 5.75$$

$$\text{Mode} = 5.7$$

Brand Y

$$\text{Mean} = \frac{171.7}{30} = 5.72$$

$$\text{Median} = \frac{15^{\text{th}} + 16^{\text{th}}}{2} = \frac{5.7 + 5.8}{2} = 5.75$$

$$\text{Mode} = 5.9$$

b. Explain why the mean and median don't fully describe the difference between these two brands of batteries. Why can additional information be learned from the **range** of the data?

Median is just middle data term. Mean is average which is good indication, but you get better idea of data.

Range: how spread out the data is. Range = highest - lowest. Smaller range = more consistent

c. Is the mode useful in this situation?

The difference between the two modes is small.  
 $\therefore$  Not very useful in this situation.

$$\text{Range X} = 8.2 - 3.1 = 5.1$$

$$\text{Range Y} = 7.0 - 4.5 = 2.5$$

$\therefore$  Brand Y is more consistent.

Assignment: Pg. 211 #1-3