TOPIC NAME:

Mean, median, and mode

Mean, median, and mode are different measures of center in a numerical data set. They each try to summarize a dataset with a single number to represent a "typical" data point from the dataset.

Mean: The "average" number; found by adding all data points and dividing by the number of data points.

Example: The mean of 444, 111, and 777 is (4+1+7)/3 = 12/3 = 4(4+1+7)/3=12/3=4left parenthesis, 4, plus, 1, plus, 7, right parenthesis, slash, 3, equals, 12, slash, 3, equals, 4.

Median: The middle number; found by ordering all data points and picking out the one in the middle (or if there are two middle numbers, taking the mean of those two numbers).

Example: The median of 444, 111, and 777 is 444 because when the numbers are put in order (1(1left parenthesis, 1, 444, 7)7)7, right parenthesis, the number 444 is in the middle.

Mode: The most frequent number—that is, the number that occurs the highest number of times.

Example: The mode of \{4{4left brace, 4, 222, 444, 333, 222, 2\}2}2, right brace is 222 because it occurs three times, which is more than any other number.

Want to learn more about mean, median, and mode? Check out the more in-depth examples below, or check out [this video](#) explanation.

Calculating the mean

There are many different types of mean, but usually when people say mean, they are talking about the arithmetic mean.

The arithmetic mean is the sum of all of the data points divided by the number of data points.

mean=sum of data# of data points

Here's the same formula written more formally:

$\text{mean}=\dfrac{\sum{x_i}}{n}$ mean=$\frac{\sum x_i}{n}$ start text, m, e, a, n, end text, equals, start fraction, sum, x, start subscript, i, end subscript, divided by, n, end fraction

Example

Find the mean of this data:

111, 222, 444, 555

Start by adding the data:

$1+2+4+5=12$, plus, 2, plus, 4, plus, 5, equals, 12

There are 4 data points.

$\text{mean}=\dfrac{12}{4}=3$ start text, m, e, a, n, end text, equals, start fraction, 12, divided by, 4, end fraction, equals, 3

The mean is 3.

Practice problems

PROBLEM A

What is the arithmetic mean of the following numbers?

$10, 6, 4, 4, 6, 4, 1$ comma, 6, comma, 4, comma, 4, comma, 6, comma, 4, comma, 1

mean =

CheckExplain

Want to practice more of these? Check out this exercise on [calculating the mean](#).

Finding the median

The median is the middle point in a dataset—half of the data points are smaller than the median and half of the data points are larger.

To find the median:

- Arrange the data points from smallest to largest.
- If the number of data points is odd, the median is the middle data point in the list.
- If the number of data points is even, the median is the average of the two middle data points in the list.

Example 1

Find the median of this data:
111, 444, 222, 555, 000

Put the data in order first:
000, 111, 222, 444, 555

There is an odd number of data points, so the median is the middle data point.

000, 111, \large2$22$, 444, 555

The median is 222.

Example 2

Find the median of this data:
101010, 404040, 202020, 505050

Put the data in order first:
101010, 202020, 404040, 505050

There is an even number of data points, so the median is the average of the middle two data points.

101010, \large{20}2020, \large{40}4040, 505050

\text{median} = \dfrac{20+40}{2}=\dfrac{60}{2}=30median=220+40=260=30start text, m, e, d, i, a, n, end text, equals, start fraction, 20, plus, 40, divided by, 2, end fraction, equals, start fraction, 60, divided by, 2, end fraction, equals, 30

The median is 303030.

Practice problems

PROBLEM A

The following data points represent the number of points scored by each player on the Wildcats basketball team last game.

Sort the data from least to greatest.

- 888
- 555
- 888
- 444
- 888
- 121212

- 131313

- 555

- 999

Find the median number of points.

[_____]

 points

CheckExplain

Want to practice more of these? Check out this exercise on [calculating the median](#).

Finding the mode

The mode is the most commonly occurring data point in a dataset. The mode is useful when there are a lot of repeated values in a dataset. There can be no mode, one mode, or multiple modes in a dataset.

Example 1

Ms. Norris asked students in her class how many siblings they each had.

Find the mode of the data:
000, 000, 111, 111, 111, 111, 111, 111, 222, 222, 222, 333, 555

Look for the value that occurs the most:
000, 000, \large111, \large111, \large111, \large111, \large111, \large111, 222, 222, 222, 333, 555

The mode is 111 sibling.

Example 2

Ms. Rubin asked students in her class how many siblings they each had.

Find the mode of the data:
000, 000, 000, 111, 111, 111, 111, 222, 222, 222, 222, 444

Look for the value that occurs the most:
000, 000, 000, \large111, \large111, \large111, \large111, \large222, \large222, \large222, \large222, 444

There is a tie for the value that occurs the most often.

The modes are 111 and 222 siblings.