

# Quiz

# Statistics

We measure center and spread (or variability).

## Center

mean

mode

median

## Spread

range

IQR

MAD

A **measure of spread** tells us how much a [data sample](#) is spread out or scattered. We can use the [range](#) and the [interquartile range \(IQR\)](#) to measure the spread of a sample. Measures of spread together with [measures of location \(or central tendency\)](#) are important for identifying key features of a sample to better understand the [population](#) from which the sample comes from.

**EQ: How can I find the mean absolute deviation of a set of data?**

**What does it tell us about the data?**

## MEAN ABSOLUTE DEVIATION

### MEAN ABSOLUTE DEVIATION (MAD)

The mean absolute deviation of a data set is the average of the absolute value of the differences between that element and the mean of the data.

$$\text{MAD} = \frac{|x_1 - \bar{x}| + |x_2 - \bar{x}| + |x_3 - \bar{x}| + \dots + |x_n - \bar{x}|}{n}$$

where  $x_1, x_2, x_3, \dots, x_n$  are elements of the data  
 $n$  is the number of elements in data  
 $\bar{x}$  is the mean of the data

**EQ: How can I find the mean absolute deviation of a set of data? What does it tell us about the data?**

## Mean Absolute Deviation

The Mean Absolute Deviation (MAD) of a set of data is the average distance between each data value and the mean.

The steps to find the MAD include:

1. find the mean (average)
2. find the difference between each data value and the mean
3. take the absolute value of each difference
4. find the mean (average) of these differences

$$\text{Population MAD} = \frac{1}{n} \sum_{i=1}^n |x_i - \bar{x}|$$

Find the mean of the populations,  $\bar{x} = \underline{2.54}$

Population of Largest U.S. Cities (millions)				
1.5	3.8	1.3	1.6	2.9
1.4	0.9	2.3	8.4	1.3

$$n = 10$$

$$X - 2.54$$



Population of the Largest U.S. cities, x	Deviation from the mean $x - \bar{x}$	Absolute value of the deviations from the mean $ x - \bar{x} $
1.5	-1.04	1.04
3.8	1.26	1.26
1.3	-1.24	1.24
1.6	-0.94	0.94
2.9	0.36	0.36
1.4	-1.14	1.14
0.9	-1.64	1.64
2.3	-0.24	0.24
8.4	5.86	5.86
1.3	-1.24	1.24

Find the mean of these absolute deviations.

Mean Absolute Deviation

$$\text{MAD} = \frac{14.96}{10} = 1.496 \approx \underline{\underline{1.5}}$$

Example 2: The table shows the number of Calories in several sandwiches at two restaurants. Find the MAD for each set of data.

Number of Calories per Sandwich											
Susan's Sub Shop						The Picnic Basket					
490	380	270	430	510	410	550	320	470	430	610	290

What does the MAD tell us about each set of data?

Susan's: 415  
 $\bar{x}$

Picnic Basket: 445  
 $\bar{x}$

x - 415

x	$x - \bar{x}$	$ x - \bar{x} $
490		75
380		35
270		145
430		15
510		95
410		5
		<hr/>
		370
		6

$\frac{370}{6} = 61.\bar{6} \approx 62$

x - 445

x	$x - \bar{x}$	$ x - \bar{x} $
550		105
320		125
470		25
430		15
610		165
290		155
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		590
		6

$\frac{590}{6} = 98.\bar{3} \approx 98$







# Homework #4

## Statistics Worksheet