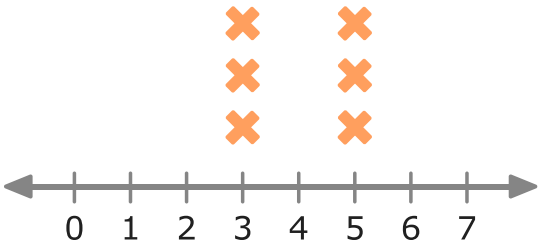
Mean absolute deviation

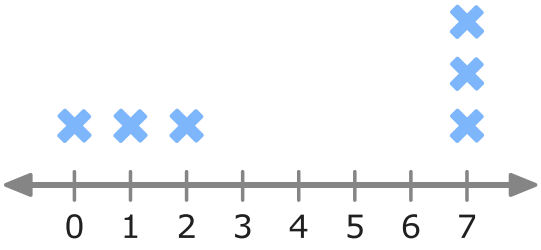
What is mean absolute deviation?

The **mean absolute deviation**, or **MAD**, of a data set is a number that measures variability, or how spread out the data values are. It shows, on average, how far each data point is from the mean.

Look at the line plots below. The two data sets have different MADs.



Mean absolute deviation = 1



Mean absolute deviation = 3

The first data set has a smaller mean absolute deviation than the second data set. So, the first data set varies less than the second data set. You can see how the data points in the first line plot are less spread out than the ones in the second plot.

How to find mean absolute deviation

To calculate the mean absolute deviation of a data set, follow these steps:

1. Calculate the mean.
2. Calculate the distance each data point is from the mean.
3. Calculate the mean of those distances.

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Let's try it! Find the MAD of the data set below.

0 1 2 7 7 7

First, calculate the mean. You can find the mean by adding the numbers in the data set and then dividing by the number of values in the set.

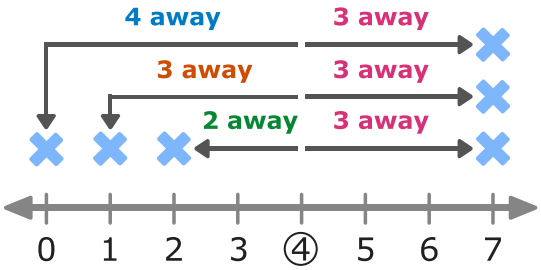
$$\text{Mean} = \frac{0 + 1 + 2 + 7 + 7 + 7}{6}$$

$$= \frac{24}{6}$$

$$= 4$$

So, the mean of the data set is 4.

Then, calculate the distance each data point is from the mean. You can use a number line.



You can also find the distance from the mean using absolute value. Subtract the mean from each data point and take the absolute value of the difference.

Data point	Distance from the mean
0	$\|0 - 4\| = \mathbf{4}$
1	$\|1 - 4\| = \mathbf{3}$
2	$\|2 - 4\| = \mathbf{2}$
7	$\|7 - 4\| = \mathbf{3}$
7	$\|7 - 4\| = \mathbf{3}$
7	$\|7 - 4\| = \mathbf{3}$

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Now, calculate the mean of those distances. Add the distances together and divide the sum by the total number of data points.

$$\text{MAD} = \frac{4 + 3 + 2 + 3 + 3 + 3}{6}$$

$$= \frac{18}{6}$$

$$= 3$$

So, the mean absolute deviation is 3!

Go to IXL to try some practice problems!

Ezra timed the length of each of the 7 commercials that aired during his favorite TV show. The lengths were:

76 seconds 84 seconds 87 seconds 80 seconds 47 seconds 74 seconds 77 seconds

What was the mean absolute deviation of the lengths of the commercials?

If the answer is a decimal, round it to the nearest tenth.

mean absolute deviation (MAD): _____ seconds

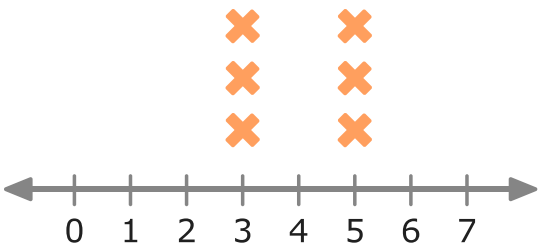
Calculate mean absolute deviation JUV

What does mean absolute deviation tell you?

The data sets below represent the number of goals scored by two soccer teams over the course of 6 games.

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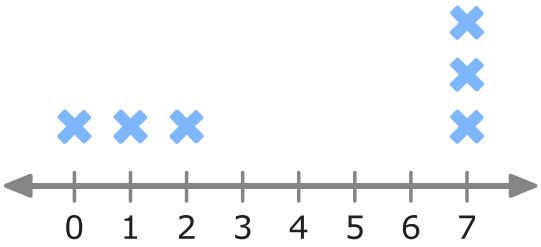
Team A



Mean = 4

Mean absolute deviaton = 1

Team B



Mean = 4

Mean absolute deviaton = 3

If you just looked at the mean, you would think the teams were very similar. Both teams scored an average of 4 goals per game.

But, the mean absolute deviation gives more information.

Team A has a MAD of 1. So, the number of goals Team A scored didn't vary much from the mean. The number of goals Team A scored was, on average, 1 away from the mean.

Team B has a MAD of 3. So, the number of goals Team B scored was more spread out from the mean. The number of goals Team B scored was, on average, 3 away from the mean.

Team B has more variability than Team A.

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Skills

Calculate mean absolute deviation JUV

Lessons

Mean, median, mode, and range

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