

Calculate the Mean Absolute Deviation in Google Sheets

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Introduction to Mean Absolute Deviation (MAD)

The **Mean Absolute Deviation** (MAD) is a fundamental statistical measure used to quantify the variability or [dispersion](#) within a set of data values. It provides a straightforward metric describing how far, on average, each data point is situated from the central tendency, specifically the [mean value](#) of the set.

Understanding the MAD is crucial for effective data analysis. A low MAD suggests that the individual data points are tightly clustered around the mean, indicating high consistency. Conversely, a high MAD indicates that the data points are widely spread out, signifying greater variability or heterogeneity within the [dataset](#).

This comprehensive tutorial outlines the exact process for calculating the Mean Absolute Deviation efficiently using the powerful functions available in **Google Sheets**.

Deconstructing the Mean Absolute Deviation Formula

The calculation of the Mean Absolute Deviation is defined by the following mathematical formula:

$$\text{Mean absolute deviation} = (\sum |x_i - \bar{x}|) / n$$

To ensure clarity when implementing this formula in a spreadsheet environment, we break down the components:

Σ - This is the Greek letter sigma, representing the operation of "summation" or adding up a sequence of numbers.

x_i - Represents the i th individual data value within the set.

\bar{x} - Denotes the arithmetic [mean value](#) of the entire [dataset](#).

n - Represents the total number of observations, commonly referred to as the [sample size](#).

In essence, the formula directs us to calculate the absolute difference between each data point and the mean, sum these differences, and then divide by the total count of observations.

Step 1: Inputting the Data in Google Sheets

The first critical step in any statistical analysis within **Google Sheets** is organizing your raw data. Begin by entering all the values belonging to your [dataset](#) into a single, dedicated column. For this example, we will use Column A, ensuring that the data is clean and correctly formatted.

Visualizing the initial data input:

	A	B	C	D
1	Data values			
2	1			
3	14			
4	15			
5	16			
6	14			
7	25			
8	24			
9	23			
10	33			
11	12			
12	6			
13	17			
14	4			
15	14			
16	19			
17				
18				
19				
20				
21				
22				
23				

Once the data is correctly entered, we can proceed to calculate the central point around which the deviations will be measured.

Step 2: Calculating the Arithmetic Mean

Before calculating the deviation of each individual point, we must establish the central point, which is the [mean value](#). In **Google Sheets**, the most efficient way to find the arithmetic mean is by utilizing the built-in **AVERAGE()** function.

Select an empty cell (e.g., B1) to house the mean calculation. Apply the function to the range containing your data (A1:A15 in this specific example):

```
=AVERAGE(A1:A15)
```

This calculation determines the average value of the data points, which is absolutely essential for the subsequent steps in finding the [Mean Absolute Deviation](#).

	A	B	C	D
1	Data values			
2	1			
3	14			
4	15			
5	16			
6	14			
7	25			
8	24			
9	23			
10	33			
11	12			
12	6			
13	17			
14	4			
15	14			
16	19			
17				
18	Mean	15.8	=AVERAGE(A2:A16)	
19				
20				
21				
22				

Step 3: Determining Absolute Deviations

The next phase involves calculating the absolute difference (or deviation) between every observation (x_i) and the calculated mean (\bar{x}). Since the [Mean Absolute Deviation](#), by definition, ignores the direction of the difference, we must ensure these results are all positive values.

In **Google Sheets**, utilize the powerful **ABS()** function in conjunction with the subtraction operation. If the data is in Column A and the mean is in B1, the formula for the first data point (A1) placed in Column B would be:

=ABS(A1-\$B\$1)

It is crucial to use the absolute reference (**\$B\$1**) for the mean. This allows you to drag the formula down the column; the reference to the data point (A1, A2, etc.) changes automatically, but the reference to the mean remains fixed and correct for every row.

The resulting values in Column B represent the absolute deviations. Column C in the image below illustrates the specific formulas used to achieve the values in Column B.

	A	B	C	D
1	Data values	Abs. Deviation		
2	1	14.8	=ABS(A2-\$B\$18)	
3	14	1.8	=ABS(A3-\$B\$18)	
4	15	0.8	=ABS(A4-\$B\$18)	
5	16	0.2	=ABS(A5-\$B\$18)	
6	14	1.8	=ABS(A6-\$B\$18)	
7	25	9.2	=ABS(A7-\$B\$18)	
8	24	8.2	=ABS(A8-\$B\$18)	
9	23	7.2	=ABS(A9-\$B\$18)	
10	33	17.2	=ABS(A10-\$B\$18)	
11	12	3.8	=ABS(A11-\$B\$18)	
12	6	9.8	=ABS(A12-\$B\$18)	
13	17	1.2	=ABS(A13-\$B\$18)	
14	4	11.8	=ABS(A14-\$B\$18)	
15	14	1.8	=ABS(A15-\$B\$18)	
16	19	3.2	=ABS(A16-\$B\$18)	
17				
18	Mean	15.8	=AVERAGE(A2:A16)	
19				
20				
21				
22				
23				

Step 4: Final Calculation of MAD

With the absolute deviations calculated and listed, the final step is to apply the remainder of the MAD formula: summing the absolute deviations and dividing by the [sample size](#) (n).

You can perform this final calculation efficiently by combining the **SUM()** and **COUNT()** functions. Assuming your absolute deviations are in the range B1:B15, the formula for the final MAD value would be:

=SUM(B1:B15) / COUNT(B1:B15)

This calculation yields the average distance of all data points from the central mean, completing the Mean Absolute Deviation calculation.

	A	B	C	D
1	Data values	Abs. Deviation		
2	1	14.8	=ABS(A2-\$B\$18)	
3	14	1.8	=ABS(A3-\$B\$18)	
4	15	0.8	=ABS(A4-\$B\$18)	
5	16	0.2	=ABS(A5-\$B\$18)	
6	14	1.8	=ABS(A6-\$B\$18)	
7	25	9.2	=ABS(A7-\$B\$18)	
8	24	8.2	=ABS(A8-\$B\$18)	
9	23	7.2	=ABS(A9-\$B\$18)	
10	33	17.2	=ABS(A10-\$B\$18)	
11	12	3.8	=ABS(A11-\$B\$18)	
12	6	9.8	=ABS(A12-\$B\$18)	
13	17	1.2	=ABS(A13-\$B\$18)	
14	4	11.8	=ABS(A14-\$B\$18)	
15	14	1.8	=ABS(A15-\$B\$18)	
16	19	3.2	=ABS(A16-\$B\$18)	
17				
18	Mean	15.8	=AVERAGE(A2:A16)	
19	Mean Abs. Deviation	6.1867	=AVERAGE(B2:B16)	
20				
21				
22				

Interpreting the Result and Scaling the Method

Following the steps above, the resulting [Mean Absolute Deviation](#) for this specific dataset is determined to be **6.1867**. This result means that, on average, each data point deviates from the mean by approximately 6.1867 units. This value provides a clear, interpretable measure of the data's inherent variability.

This four-step methodology is highly scalable and remains consistent regardless of the magnitude of your data. Whether you are analyzing 15 data values or 5,000, you can employ these exact steps in **Google Sheets** to accurately determine the MAD, providing a robust measure of data [dispersion](#).

Related: [How to Calculate the Mean Absolute Deviation in Excel](#)