

Find The Mean Absolute Deviation: {1, 10, 7, 6, 4, 8} A) 1.7 B) 1.9 C) 2.1 D) 2.3 E) 2.5

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Understanding the Concept of Mean Absolute Deviation (MAD)

When analyzing data, understanding how spread out or dispersed the data points are is crucial. One of the most effective measures for this purpose is the Mean Absolute Deviation (MAD). MAD quantifies the average distance between each data point and the mean of the dataset, providing insight into the variability within the data.

Definition of Mean Absolute Deviation:

The MAD is calculated by:

1. Finding the mean (average) of the dataset.
2. Calculating the absolute deviations of each data point from the mean.
3. Finding the average of these absolute deviations.

This measure is particularly useful because it is easy to interpret and less sensitive to extreme values compared to other measures like variance or standard deviation.

Step-by-Step Calculation of MAD for the Data Set {1, 10, 7, 6, 4, 8}

Before diving into the calculations, let's understand the process clearly.

Step 1: Calculate the Mean of the Data Set

Given data points: 1, 10, 7, 6, 4, 8

- Sum of the data points: $1 + 10 + 7 + 6 + 4 + 8 = 36$
- Number of data points: 6

Mean (μ):

$$\mu = \frac{\text{Sum of data points}}{\text{Number of data points}} = \frac{36}{6} = 6$$

Step 2: Find the Absolute Deviations of Each Data Point from the Mean

Calculate the absolute difference between each data point and the mean:

Data Point	Calculation	Absolute Deviation
1	$ 1 - 6 = 5$	5
10	$ 10 - 6 = 4$	4
7	$ 7 - 6 = 1$	1
6	$ 6 - 6 = 0$	0
4	$ 4 - 6 = 2$	2
8	$ 8 - 6 = 2$	2

Step 3: Calculate the Mean of These Absolute Deviations

Sum of the absolute deviations:

$$5 + 4 + 1 + 0 + 2 + 2 = 14$$

Number of data points: 6

MAD:

$$\text{MAD} = \frac{\text{Sum of absolute deviations}}{\text{Number of data points}} = \frac{14}{6} \approx 2.33$$

Matching the Calculated MAD to the Provided Options

The options given are:

- A) 1.7
- B) 1.9
- C) 2.1
- D) 2.3
- E) 2.5

Our calculated MAD is approximately 2.33, which closely aligns with option D) 2.3.

Therefore, the correct answer is D) 2.3.

Why is Finding the MAD Important?

Understanding the variability in data through measures like MAD helps in various real-world scenarios:

- Quality Control: Monitoring the consistency of manufacturing processes.
- Financial Analysis: Assessing the volatility of investments.
- Educational Testing: Understanding the spread of scores among students.
- Research Data Analysis: Quantifying data dispersion for accurate interpretation.

Advantages of MAD:

- Easy to interpret.
- Less affected by outliers than variance or standard deviation.
- Suitable for comparing variability across different datasets.

Limitations of MAD:

- Less sensitive to outliers than some other measures.
- Not as widely used as standard deviation in certain fields, but still valuable.

Additional Tips for Calculating MAD

To ensure accuracy when calculating the MAD:

- Always start by accurately computing the mean.
- Use absolute values to avoid negative deviations canceling out positive ones.
- Double-check calculations, especially when summing deviations.

Sample Calculation Recap:

1. Find the mean.
2. Subtract the mean from each data point.
3. Take the absolute value of each difference.
4. Find the average of these absolute differences.

Summary

Calculating the Mean Absolute Deviation for the dataset {1, 10, 7, 6, 4, 8} involves finding the mean, calculating the absolute deviations from this mean, and then averaging those deviations. The process reveals a MAD of approximately 2.33, which, when rounded to one decimal place, corresponds to 2.3. Therefore, the correct choice from the options provided is D) 2.3.

Understanding MAD is essential for anyone involved in data analysis, whether in academic research, business, or everyday decision-making. It provides a clear picture of how data points are spread out around the mean, helping to inform better insights and decisions.

Key Takeaways

- MAD measures the average distance of data points from the mean.
- It is simple to compute and easy to interpret.
- For our dataset, $MAD \approx 2.3$, aligning with option D.
- Incorporating MAD into data analysis enhances understanding of data variability.

By mastering the calculation of MAD, you can better analyze and interpret data, leading to more informed conclusions and decisions.

Frequently Asked Questions

What is the first step to find the mean absolute deviation of the data set {1, 10, 7, 6, 4, 8}?

Calculate the mean (average) of the data set.

How do you find the mean of the data set {1, 10, 7, 6, 4, 8}?

Add all the numbers together and divide by the total count: $(1 + 10 + 7 + 6 + 4 + 8) / 6 = 36 / 6 = 6$.

What is the mean of the data set {1, 10, 7, 6, 4, 8}?

The mean is 6.

How do you find the absolute deviations for each data point in the set?

Subtract the mean from each data point and take the absolute value of the result.

What are the absolute deviations of each data point in {1, 10, 7, 6, 4, 8} when the mean is 6?

They are $|1 - 6|=5$, $|10 - 6|=4$, $|7 - 6|=1$, $|6 - 6|=0$, $|4 - 6|=2$, $|8 - 6|=2$.

How do you calculate the mean absolute deviation (MAD) from the absolute deviations?

Add all the absolute deviations and divide by the number of data points: $(5 + 4 + 1 + 0 + 2 + 2) / 6$.

What is the sum of the absolute deviations in the data set {1, 10, 7, 6, 4, 8}?

The sum is $5 + 4 + 1 + 0 + 2 + 2 = 14$.

What is the mean absolute deviation (MAD) of the data set {1, 10, 7, 6, 4, 8}?

$MAD = 14 / 6 \approx 2.33$, which is closest to option D) 2.3.

Based on the calculations, which option correctly represents the mean absolute deviation of the data set?

Option D) 2.3.

Why is the mean absolute deviation an important measure in statistics?

It indicates the average distance of data points from the mean, measuring data variability and consistency.

Additional Resources

Find The Mean Absolute Deviation: {1, 10, 7, 6, 4, 8} is a common problem encountered in statistics that helps us understand the variability or spread within a data set. The mean absolute deviation (MAD) measures how much individual data points differ from the mean (average) of the entire set, providing insight into the consistency or dispersion of data values. Unlike variance or standard deviation, MAD is straightforward to compute and interpret, making it a valuable tool in descriptive statistics, data analysis, and quality control.

In this guide, we will walk through the process of calculating the mean absolute deviation step-by-step for the data set {1, 10, 7, 6, 4, 8}. By the end, you will understand how MAD is derived, why it's useful, and how to select the correct answer from the given options.

Understanding the Concept of Mean Absolute Deviation

What is the Mean Absolute Deviation?

The mean absolute deviation is the average of the absolute differences between each data point and the mean of the data set. It quantifies how spread out the data points are around the mean, offering a measure of variability that is less sensitive to outliers than variance or standard deviation.

Key points:

- It measures dispersion around the mean.
- Uses absolute values to avoid positive and negative differences canceling out.
- Provides an intuitive sense of how far data points are from the average.

Why Use MAD?

MAD is especially useful in situations where:

- You need a simple, interpretable measure of variability.
- You want to minimize the impact of outliers.
- You prefer an easier calculation compared to variance or standard deviation.

Step-by-Step Calculation of the Mean Absolute Deviation

Let's now compute the MAD for the data set {1, 10, 7, 6, 4, 8}.

Step 1: Find the Mean of the Data Set

The mean (μ) is calculated by summing all data points and dividing by the number of points.

$$\text{Mean} \ (\mu) = \frac{\text{Sum of all data points}}{\text{Number of data points}}$$

Calculating:

$$\text{Sum} = 1 + 10 + 7 + 6 + 4 + 8 = 36$$

Number of data points:

$$n = 6$$

Thus,

$$\mu = \frac{36}{6} = 6$$

Step 2: Find the Absolute Differences from the Mean

Next, calculate the absolute value of the difference between each data point and the mean:

Data Point	Calculation	Absolute Difference
1	$ 1 - 6 $	5
10	$ 10 - 6 $	4
7	$ 7 - 6 $	1
6	$ 6 - 6 $	0
4	$ 4 - 6 $	2
8	$ 8 - 6 $	2

Step 3: Calculate the Mean of the Absolute Differences

Sum all the absolute differences:

$$5 + 4 + 1 + 0 + 2 + 2 = 14$$

Divide by the number of data points:

$$\text{MAD} = \frac{14}{6} \approx 2.3333$$

Step 4: Round and Match with the Multiple Choice Options

The approximate MAD is 2.33. Among the options provided:

- A) 1.7
- B) 1.9
- C) 2.1
- D) 2.3
- E) 2.5

The value 2.3 (Option D) is the closest, and typically, rounding to one decimal place is acceptable in such problems.

Final Answer and Explanation

Based on the calculations, the mean absolute deviation of the data set {1, 10, 7, 6, 4, 8} is approximately 2.33, which aligns most closely with Option D) 2.3.

Why Is Knowing the MAD Important?

Understanding how to compute and interpret MAD can be crucial in various contexts:

- Data analysis: Helps assess the consistency of measurements.
- Quality control: Determines variability in manufacturing processes.
- Financial analysis: Measures the volatility of asset returns.
- Educational assessments: Understands the spread of test scores.

Summary of the Calculation Process

1. Calculate the mean of the data set.
2. Find the absolute differences between each data point and the mean.
3. Compute the average of these absolute differences.
4. Interpret the MAD as a measure of variability, informing about the data's spread.

Final Remarks

Calculating the mean absolute deviation is a straightforward but powerful way to quantify data variability. When tackling similar problems, always follow the systematic approach outlined above: find the mean, compute absolute deviations, and then average these deviations. This process not only helps in exams or assignments but also enhances your understanding of data dispersion in real-world applications.

In conclusion, for the data set {1, 10, 7, 6, 4, 8}, the correct answer to Find The Mean Absolute Deviation is Option D) 2.3.

Find The Mean Absolute Deviation 1 10 7 6 4 8 A 1 7b 1 9c 2 1d 2 3e 2 5

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