Math Virtual Learning

6th Grade Math

Mean Absolute Deviation

May 14, 2020

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Lesson: May 14, 2020

Objective/Learning Target:
Students will find and interpret measures of variability (mean absolute deviation).

Warm Up Activity

Find the mean of the following data set.

70, 72, 74, 76, 80, 114

Find the mean of the following data set.

$$\frac{70 + 72 + 74 + 76 + 80 + 114}{6} = \frac{486}{6} = 81$$

Lesson Videos

Mean Absolute Deviation (MAD)

Mean Absolute Deviation!

the average amount that each number is away from the mean of the whole set.

Step 1: Find the mean (the average)
Step 2: Find the *deviations*: subtract each number and the mean.
Step 3: Find the average of all of the "deviations"
  (make the answers positive in step 2, add them all ,then divide)

Example: Find the mean absolute deviation of:
80, 85, 81, 0, 85, 90, 87, 92

Step 1:
Find the average:

80 + 85 + 81+0 + 85 + 90 + 87 + 92 = 600
600/8 = 75

Step 2:
Find the deviations

80 - 75 = **5**	85 - 75 = **10**	81 - 75 = **6**	0 - 75 = **-75**
85 - 75 = **10**	90 - 75 = **15**	87 - 75 = **12**	92- 75 = **17**

Step 3:
Find the average of the absolute value of the deviations:

5 + 10 + 6+ 75 + 10 + 15 + 12 + 17 = 150
150/8 = **18.75**

Practice #1

Elena, Jada, and Lin enjoy playing basketball during recess. Lately, they have been practicing free throws. They record the number of baskets they make out of 10 attempts. Here are their data sets for 12 school days.

Elena	4	5	1	6	9	7	2	8	3	3	5	7
Jada	2	4	5	4	6	6	4	7	3	4	8	7
Lin	3	6	6	4	5	5	3	5	4	6	6	7

1. Record the distance between each of Elena's scores and the mean.

Elena	4	5	1	6	9	7	2	8	3	3	5	7
distance from 5	1		1									

Now find *the average of the distances* in the table. Show your reasoning and round your answer to the nearest tenth.

2. Find the mean absolute deviation of Jada's data. Round it to the nearest tenth.

Jada	2	4	5	4	6	6	4	7	3	4	8	7
distance from 5												

3. Find the mean absolute deviation of Lin's data. Round it to the nearest tenth.

Lin	3	6	6	4	5	5	3	5	4	6	6	7
distance from 5												

Practice #1

1.	Elena	4	5	1	6	9	7	2	8	3	3	5	7
	distance from 5	1	0	4	1	4	2	3	3	2	2	0	2

Elena's MAD: 2. $\frac{1+0+4+1+4+2+3+3+2+2+0+2}{12} = \frac{24}{12} = 2$

2.	Jada	2	4	5	4	6	6	4	7	3	4	8	7
	distance from 5	3	1	0	1	1	1	1	2	2	1	3	2

Jada's MAD: 1.5. $\frac{3+1+0+1+1+1+1+2+2+1+3+2}{12} = 1.5$

3.	Lin	3	6	6	4	5	5	3	5	4	6	6	7
	distance from 5	2	1	1	1	0	0	2	0	1	1	1	2

Lin's MAD: 1. $\frac{2+1+1+1+0+0+2+0+1+1+1+2}{12} = 1$

Review

- What is variability?
- The spread of data from the mean

- What does a distribution that has no variability look like?
  - All data points are the same

- Little?
- The data points are clustered

- A lot?
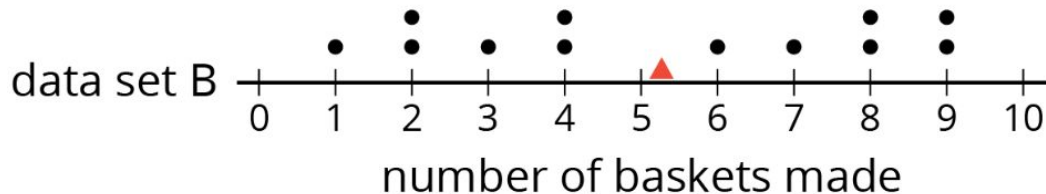- The data points are spread far apart

Practice #2

Andre and Noah joined Elena, Jada, and Lin in recording their basketball scores. They all recorded their scores in the same way: the number of baskets made out of 10 attempts. Each collected 12 data points.

- Andre's mean number of baskets was 5.25, and his MAD was 2.6.
- Noah's mean number of baskets was also 5.25, but his MAD was 1.

1. **Without calculating, decide which dot plot represents Andre's data and which represents Noah's. Explain how you know.**

Triangle represents the mean.

data set A

0 1 2 3 4 5 6 7 8 9 10
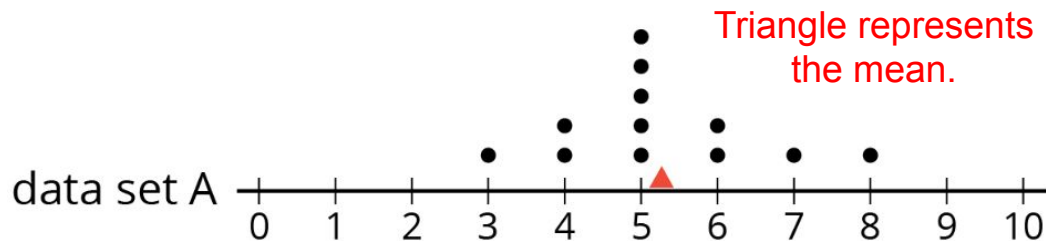
2. **If you were the captain of a basketball team and could use one more player on your team, would you choose Andre or Noah? Explain your reasoning.**

data set B

0 1 2 3 4 5 6 7 8 9 10

number of baskets made

Practice #2

Andre and Noah joined Elena, Jada, and Lin in recording their basketball scores. They all recorded their scores in the same way: the number of baskets made out of 10 attempts. Each collected 12 data points.

- Andre's mean number of baskets was 5.25, and his MAD was 2.6.
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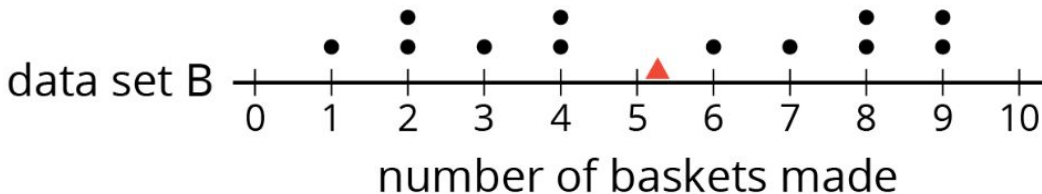
1. **Andre is represented by data set B, because there is more variation. Noah is represented by data set A, because there is less variation, and the data is clustered.**

Triangle represents the mean.

data set A

0 1 2 3 4 5 6 7 8 9 10
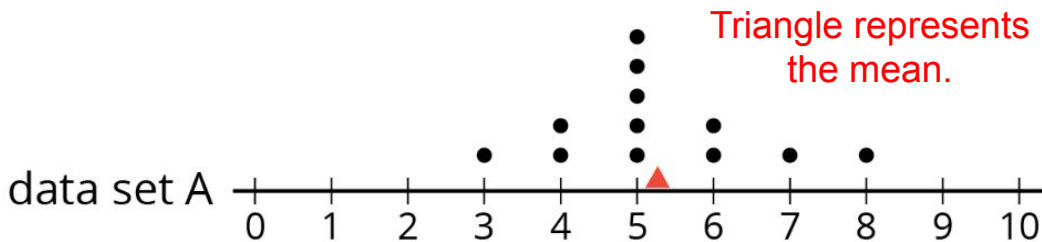
2. **Opinion based:**
Example - If I were a captain, I would choose Noah, because he is more consistent with his shooting.

data set B

0 1 2 3 4 5 6 7 8 9 10

number of baskets made
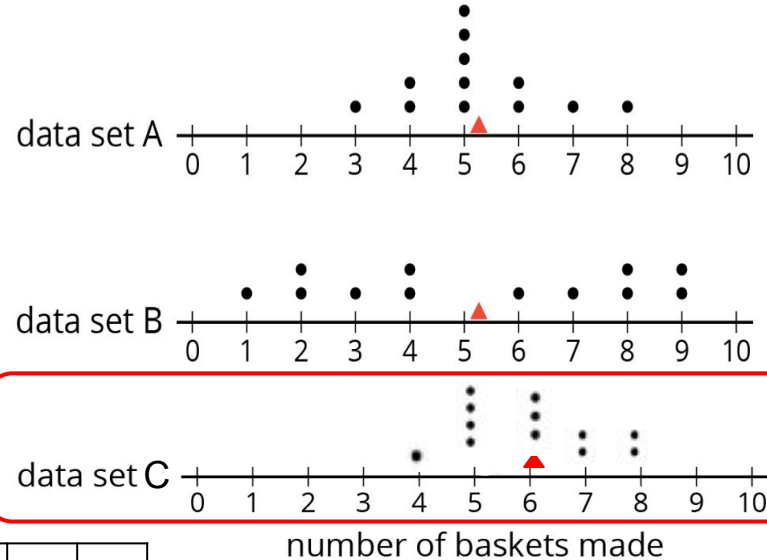
An eighth-grade student decided to join Andre and Noah and kept track of his scores. His data set is shown here. The mean number of baskets he made is 6.

1. **Calculate the MAD.**
2. **Draw a dot plot to represent his data and mark the location of the mean with a triangle (▲).**
3. **Compare the eighth-grade student's mean and MAD to Noah's mean and MAD. What do you notice?**
4. **Compare their dot plots. What do you notice about the distributions?**
5. **What can you say about the two players' shooting accuracy and consistency?**

data set A

data set B

data set C

number of baskets made

eighth-grade student	6	5	4	7	6	5	7	8	5	6	5	8
distance from 6												

An eighth-grade student decided to join Andre and Noah and kept track of his scores. His data set is shown here. The mean number of baskets he made is 6.

1 - 2. Look at the bottom right corner.

3. The eighth-grade student and Noah's MAD's are the same, but the eighth-grade students mean is one higher (6).

4. The eighth-grade student and Noah's data sets are both clustered, however the eighth-grade student's data is cluster more to the right.

5. Both players are consistent with their shooting, but the eighth-grade student is more accurate.

data set A
0 1 2 3 4 5 6 7 8 9 10

data set B
0 1 2 3 4 5 6 7 8 9 10

data set C
0 1 2 3 4 5 6 7 8 9 10

number of baskets made

eighth-grade student	6	5	4	7	6	5	7	8	5	6	5	8
distance from 6	0	1	2	1	0	1	1	2	1	0	1	2

MAD =
1+2+1+1+1+2+1+1+2/12 =
12/12 = 1

Summary/Reflection

In words describe how you find the mean absolute deviation.

How is this different than finding the mean?

Additional Practice:

Click on the link below to get additional practice and to check your understanding!

Practice:

Mean Absolute Deviation Desmos Practice
- click Join
- click Continue without signing in
- type your name

Khan Academy: Mean Absolute Deviation Practice