

3-13-19

Aim: SWBAT find the Mean Absolute Deviation and understand what it suggests about a set of data.

HW: Packet Pages 31 - 32 and Finish Pages 20 - 22

Quiz Friday

Do Now: Finish Packet Pages 27 - 28

AIM: SWBAT find the Mean Absolute Deviation and understand what it means about a set of data.

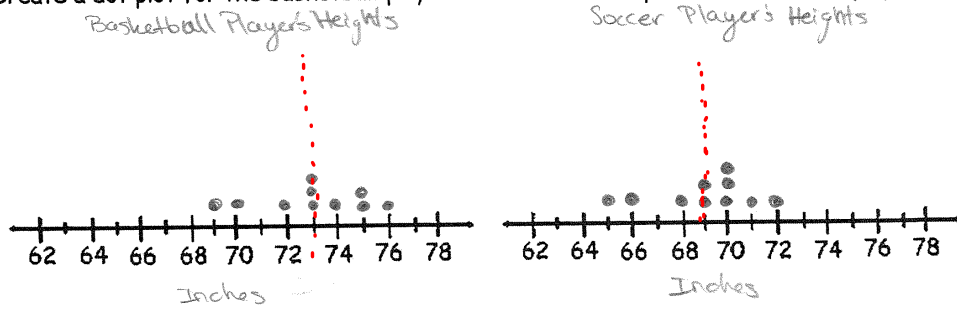
DO NOW:

The school nurse measured all of the boys' heights during their physical education class. She made a list of the basketball players' heights and the soccer players' heights.

Basketball Players' Heights (in.)
69, 70, 72, 73, 73, 74, 75, 75, 76

Soccer Players' Heights (in.)
65, 66, 68, 69, 69, 70, 70, 70, 71, 72

Create a dot plot for the basketball players and another dot plot for the soccer players.



What can you conclude about the data sets based on your dot plots?

Basketball players are taller, on average, than soccer players.

Notes:

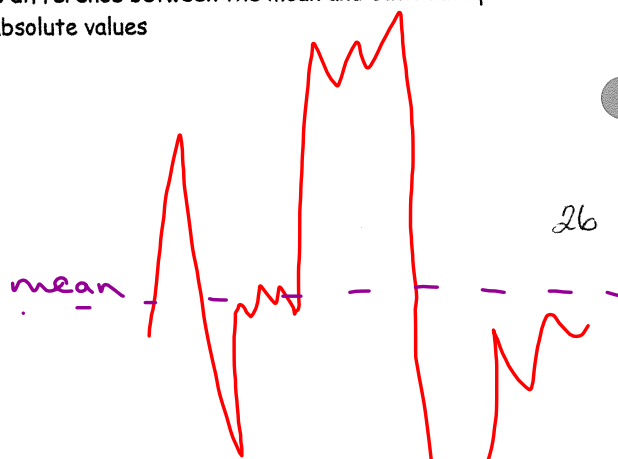
You have found measures of center to describe the middle of a set of data and you have used the interquartile range to describe the spread of a set of data. The mean absolute deviation is the average distance between each data value and the mean. A data set with a greater mean absolute deviation has data values that are more spread out from the mean. A data set with a lower mean absolute deviation has data values that are more clustered around the mean.

To find the Mean Absolute Deviation (MAD):

- Find the mean of the data.
- Take the absolute value of the difference between the mean and each data point.
- Then find the mean of those absolute values

mean - - - - -

- Consistent Data
- Low Variability
- Low MAD



- Inconsistent
- High Variability
- High MAD

Find the MAD for the basketball players.

Basketball Players' Heights (in.)
69, 70, 72, 73, 73, 73, 74, 75, 75, 76

1) Calculate the mean. $\frac{69+70+72+73+73+73+74+75+75+76}{10} = \frac{730}{10} = 73$

2) Take the absolute value of the difference between the mean and each data point.

of the data point and the mean

$ 69-73 = -4 = 4$	$ 74-73 = 1 = 1$
$ 70-73 = -3 = 3$	$ 75-73 = 2 = 2$
$ 72-73 = -1 = 1$	$ 75-73 = 2 = 2$
$ 73-73 = 0 = 0$	$ 76-73 = 3 = 3$
$ 73-73 = 0 = 0$	
$ 73-73 = 0 = 0$	

3) Find the mean of the absolute values. This is the MAD.

$$\frac{4+3+1+0+0+0+1+2+2+3}{10} = \frac{16}{10} = 1.6$$

Find the MAD for the soccer players.

Soccer Players' Heights (in.)
65, 66, 68, 69, 69, 70, 70, 70, 71, 72

1) Calculate the mean. $\frac{65+66+68+69+69+70+70+70+71+72}{10} = \frac{690}{10} = 69$

2) Take the absolute value of the difference between the mean and each data point.

of each data point and the mean.

$ 65-69 = -4 = 4$	$ 70-69 = 1 = 1$
$ 66-69 = -3 = 3$	$ 70-69 = 1 = 1$
$ 68-69 = -1 = 1$	$ 70-69 = 1 = 1$
$ 69-69 = 0 = 0$	$ 71-69 = 2 = 2$
$ 69-69 = 0 = 0$	$ 72-69 = 3 = 3$

3) Find the mean of the absolute values. This is the MAD.

$$\frac{4+3+1+0+0+1+1+1+2+3}{10} = \frac{16}{10} = 1.6$$

* Next, let's go back to the dot plots you created for the do now. Draw a vertical dotted line on each graph to represent the mean height. Then look at each graph and look at how the data points relate to the mean (the dotted line).

- The mean absolute deviation represents the relationship between the data points and the mean of the data set.
- If the MAD is low, the data points should be closer (or more clustered around the mean) and if the MAD is greater, the data points will appear more spread out from the mean.

Draw some conclusions about the heights of the basketball players compared to the heights of the soccer players.

- The mean basketball player's height is taller than the mean height of soccer players
- The MADs are the same
- _____

Now consider another situation. If two data sets have the same mean but different MADs, how does that reflect in the dot plot?

How are the mean and the MAD reflected in the dot plots you created in the do now?

The mean is the center of the dots.

The MAD reflects how close the dots cluster to the mean.

If two data sets have the same mean but different MADs, how does that reflect in the dot plot?

You would see one dot plot clustering closer to the mean than the other.

The points scored by a basketball player in his last seven games were: 17, 22, 17, 30, 15, 17 & 8. Find the mean and the MAD. Describe what the MAD represents in this situation.

$$\text{Mean} = \frac{17+22+17+30+15+17+8}{7} = \frac{126}{7} = 18$$

$$\text{MAD} = \frac{1+4+1+12+3+1+10}{7} = \frac{32}{7} = 4\frac{4}{7}$$

The MAD represents that, on average, the points scored are 4.6 points from the mean.

The number of tomatoes in five boxes was 18, 21, 16, 19 and 20. Find the mean and the MAD. Describe what the MAD represents in this situation.

$$\text{Mean} = \frac{18+21+16+19+20}{5} = \frac{94}{5} = 18.8$$

$$\text{MAD} = \frac{0.8+2.2+2.8+0.2+1.2}{5} = \frac{7.2}{5} = 1.44$$

The MAD represents that, on average, the # of tomatoes in a box differs by 1.44 tomatoes from the mean.

Homework - Mean Absolute Deviation

1. The number of pages in books read by sixth and seventh grade students during one semester are shown below.

Sixth Grade: 125, 132, 150, 137

Seventh Graders: 198, 174, 208, 120

- A) Find the Mean Absolute Deviation (MAD) of pages read by sixth graders.
- B) Find the Mean Absolute Deviation (MAD) of pages read by seventh graders.
- C) Which dot plot would show the data more spread out from the mean?
- D) Which dot plot would show the data more clustered around the mean?

Use the following information to answer questions 2 & 3.

Paula's grades on her history tests this semester are: 79, 93, 92, 86, and 90

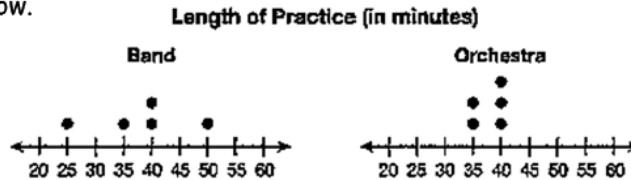
2. Which shows the deviation of each of her grades from her mean grade?
- | | |
|--------------------|---------------------|
| a. -9, 5, 4, -2, 2 | c. -11, 6, 5, -4, 4 |
| b. -8, 6, 3, -3, 2 | d. -14, 9, 5, -3, 2 |
3. What is the mean absolute deviation (MAD) of Paula's history grades?
- | | |
|--------|--------|
| a. 0 | c. 4.4 |
| b. 4.2 | d. 22 |

Use the following information to answer questions 4 – 6.

The lengths, in seconds, of four folk songs are 128, 165, 182, and 141

The lengths, in seconds, of four pop songs are 90, 98, 102, and 94

4. What is the mean absolute deviation, in seconds, of the folk songs?
 - a. 18
 - b. 18.25
 - c. 19.5
 - d. 19.75
5. What is the mean absolute deviation, in seconds, of the pop songs?
 - a. 2
 - b. 4
 - c. 6
 - d. 8
6. Which of the following statements is true?
 - a. The variability in the times of the folk songs is about half that of the pop songs
 - b. The variability in the times of the folk songs is about twice that of the pop songs
 - c. The variability in the times of the folk songs is about 3 times that of the pop songs
 - d. The variability in the times of the folk songs is about 4 times that of the pop songs
7. The lengths, in minutes, of the school band and orchestra practices are shown in the dot plots below.



- A. What is the mean absolute deviation, in minutes, of the length of each group's practice?
- B. Draw a conclusion comparing the two groups.
