

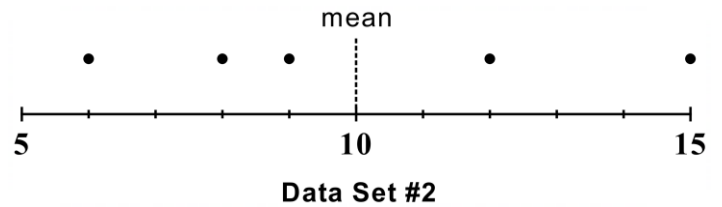
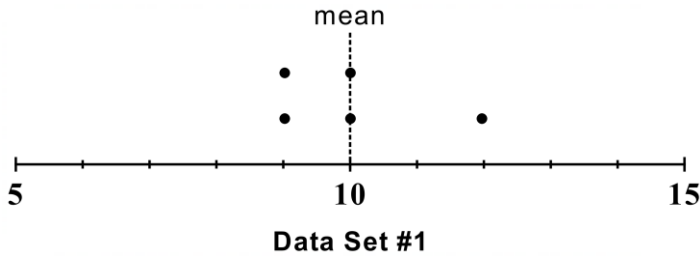
THE MEAN ABSOLUTE DEVIATION

N-GEN MATH[®] 7



Statistics is the branch of mathematics that is used to answer questions that involve **variability**, the fact that not all the data values are the same. We use **measures of center**, like the mean, to summarize the data set with one value. We also want a way to measure the amount that data values **vary** or **differ** from the mean.

Exercise #1: The two dot plots below show data sets, each that have means equal to 10.



- (a) For each data set below, fill in the distances above or below the mean each data value is. Also indicate whether it is above, on, or below the mean.

Data Set #1

Data Set #2

Value	Distance from Mean	Below, On, or Above
9		
9		
10		
10		
12		

Value	Distance from Mean	Below, On, or Above
6		
8		
9		
12		
15		

- (b) Which data set has values that are more spread out about from the mean? Explain from the graphs.
- (c) Find the average distance that the data values are away from their means for both data sets. Show the calculations that give you the answers.

Average Distance for Data Set #1:

Average Distance for Data Set #2:



What you found in *Exercise #1(c)* is known as the **mean absolute deviation (MAD)**. The word **deviation** in math refers to **how far** a data value is away from the **mean**. So, the **MAD** is the **average distance the data points are away from the mean**.

Exercise #2: A sample of 8 people exiting a movie were asked their ages. The data set is shown below.

16, 17, 18, 21, 23, 29, 36, 40

(a) Find the mean absolute deviation for this data set. Show your work.

(b) How many of the eight data values fall **within** one mean absolute deviation of the mean (i.e., they are closer than that value to the mean)? Show how you found your answer.

The mean absolute deviation can be challenging to calculate because it takes many steps. We will mostly stick with smaller data sets when evaluating the MAD.

Exercise #3: Jamila is trying to determine the typical amount of time a 7th grade student spends on math homework each night. She asks a random sample of 10 7th grade students to record the number of minutes they spent on math homework in a given night. The data is below.

8, 12, 12, 14, 17, 19, 20, 23, 26, 29

(a) Calculate the mean absolute deviation (MAD) for this data set.

(b) Are there any data values that fall more than twice the MAD away from the mean? If so, which?



Name: _____

Date: _____

**THE MEAN ABSOLUTE DEVIATION
N-GEN MATH[®] 7 HOMEWORK**

FLUENCY

- Which of the following is the mean absolute deviation of the data set shown below?
(1) 1
(2) 2
(3) 1.5
(4) 2.5
4, 5, 7, 8

- The mean of the data set shown below is 19. Which of the following is the data set's mean absolute deviation?
(1) 4.4
(2) 4.8
(3) 5.2
(4) 5.5
12, 16, 18, 22, 27

- Which of the following is closest to the mean absolute deviation of the data set below?
(1) 4.9
(2) 5.3
(3) 5.6
(4) 6.2
5, 7, 7, 9, 17, 21

- Which data set below would have a mean absolute deviation (MAD) closest to zero?
(1) 12, 17, 22, 38
(2) 1, 3, 5, 7
(3) 8, 8, 8, 9, 9
(4) 20, 25, 30

- The data set below has a mean of 20 and a mean absolute deviation of 9.4. How many of the values in the data set fall closer than the MAD to the mean?
(1) 5
(2) 6
(3) 7
(4) 8
4, 9, 10, 13, 17, 21, 25, 28, 33, 40



USING YOUR MATH

6. Cole is trying to determine how many pieces of candy a typical person collects on Halloween night. He collects data from 10 randomly selected students on how many pieces they had at the end of the night. The data set is shown below.

17, 22, 25, 27, 32, 40, 45, 51, 59, 62

- (a) What are the mean and median values for this data set? Label each measure of center.
- (b) Calculate the mean absolute deviation (MAD) for this data set. Show how you found your answer.
- (c) What percentage of the data set lies closer than the MAD to the mean? Show how you found your answer.

7. The ages of eight people at a birthday party are as follows:

7, 7, 7, 8, 8, 9, 10, 32

- (a) Find both the mean and the mean absolute deviation for this data set.
- (b) Explain why the MAD might *not* be a good measure of the variation in this data set.

