

Name: \_\_\_\_\_

Date: \_\_\_\_\_

## THE MEAN AS A BALANCING POINT N-GEN MATH<sup>®</sup> 7



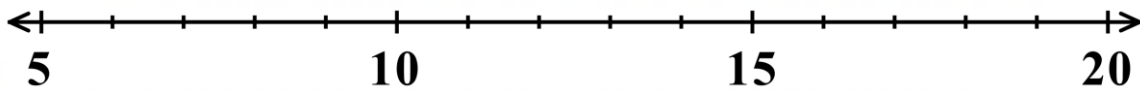
We analyze and summarize data using a variety of **statistical measures**. Perhaps the most important of these is the **mean** of a data set, also known as the **average**.

**Exercise #1:** Four friends compare the amount of money they have with them. The amounts were \$6, \$9, \$14, \$19.

- (a) Find the mean or average amount of money the friends had with them.      (b) Why does it make sense to think of the mean as the “fair share” amount of the data set?

We can think about the mean in a different way that has a **geometric/distance** component to it.

**Exercise #2:** Consider the four numbers (amounts) from *Exercise #1*. Plot the four numbers on the number line below and draw a vertical dashed line at the location of the mean. Label the mean.



**Exercise #3:** Some of the values of the data set lie below the mean and some lie above it. State each of their distances above or below the mean in the table below.

Illustrate the distances on the number line.

What is true about the distances above and below the mean?

Data Value	Distance from Mean	Above/Below
6		
9		
14		
19		



What you saw in *Exercise #3* is always true about the mean.

### THE MEAN AS A BALANCING POINT

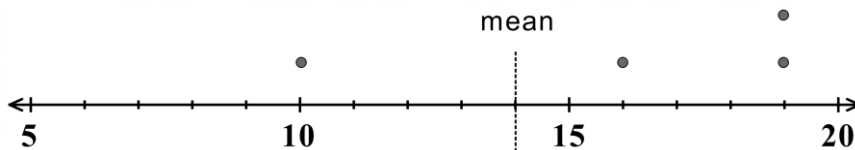
The mean will be located on a number line such that the sum of the distances of data below it is equal to the sum of the distances of the data above it. In other words, the mean **balances** the distances above and below it.

**Exercise #4:** Given the five numbers 2, 3, 7, 13, and 15 do the following.

- (a) Find the mean of the five numbers.      (b) Verify that the sum of the distances below the mean is equal to the sum of the distances above the mean.

Data Value	Distance from Mean	Above/Below
2		
3		
7		
13		
15		

**Exercise #5:** A distribution of four data values is shown below. If a fifth value was added such that the mean of the data set was equal to 14 (as marked), what is the fifth value?



**Exercise #6:** On Emma's first four math quizzes she earned scores of 79, 76, 87, and 91. Emma would like to score high enough on her fifth quiz to have a quiz average of 85. What would she need to score in order to have this average?



Name: \_\_\_\_\_

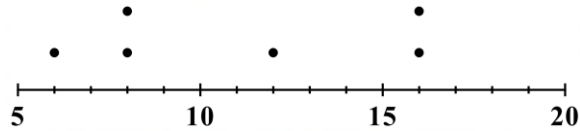
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**THE MEAN AS A BALANCING POINT**  
**N-GEN MATH<sup>®</sup> 7 HOMEWORK**

**FLUENCY**

1. Which of the following is the mean of the data set shown in the dot plot below?

- (1) 9.5
- (2) 10
- (3) 11
- (4) 11.5



2. The mean of two numbers is 23. If one of the two numbers is 30, which is the other number? \_\_\_\_\_

- (1) 16
- (2) 19
- (3) 26
- (4) 37

3. The mean of three numbers is 16. If two of the numbers are 9 and 12 then the other number must be which of the following? \_\_\_\_\_

- (1) 11
- (2) 18
- (3) 23
- (4) 27

4. In a set of four numbers, two of them are each 3 units below the mean and one of them is 13 units above the mean. Which of the following is true of the fourth number? \_\_\_\_\_

- (1) It is 10 units below the mean.
- (2) It is 10 units above the mean.
- (3) It is 7 units below the mean.
- (4) It is 7 units above the mean.

5. Shana takes her daughter and three friends to the movies. Her daughter and friends are each 12 years old. When Shana is included, the average age of the five people is 18 years old. Which of the following is Shana's age? \_\_\_\_\_

- (1) 36
- (2) 42
- (3) 45
- (4) 48



## USING YOUR MATH

6. Logan was studying the weight of Gala apples. He takes a random sample of 8 of these apples from the grocery store and finds their weights in grams. The data set, in ascending order, is shown below:

128, 131, 135, 139, 140, 148, 155, 160

- (a) What is the **median** weight of apples in this sample?      (b) What is the **mean** weight of apples in this sample?

- (c) Based on (b), fill in the table below. Then, find the sum of the distances below the mean and the sum of the distances above the mean.

Value	128	131	135	139	140	148	155	160
Distance from Mean								
<b>Below/Above</b>								

sum of distances below = \_\_\_\_\_      sum of distances above = \_\_\_\_\_

7. Isabelle is training for a 10k run and has a goal of running on average 15 kilometers per week for the 6 weeks leading up to the run. Her totals for the first four weeks are shown below.

8, 11, 13, 16

- (a) If Isabelle plans to run 18 kilometers in the fifth week, how many kilometers would she need to run in the sixth week to meet her goal? Show how you found your answer.

- (b) After answering part (a), Isabelle decided to run the same amount both the fifth and sixth week in order to meet her goal. How far must she run each week?

