Name: _____ Date: _____

The Bakery Where the Average Misleads

Circle group

Picture a small bakery with nine people on its payroll. Eight workers each earn $30,000 a year. The owner earns $120,000. A writer for the newspaper wants to tell how much people at the bakery make. She must pick which kind of average to use.

The mean is what most people think of first. To find it, add all the values. Then divide by how many there are. The eight workers add up to $240,000. With the owner, the total is $360,000. Divide by nine people. The mean is $40,000. That sounds nice, but no worker earns that much. One big paycheck pulled the mean up.

The median is a different average. Put the values in order from least to greatest. Pick the one in the middle. With nine people, the fifth value is in the middle. It is $30,000. The median shows the typical worker better. One odd value does not drag it around.

A value far from the rest is called an outlier. With an outlier, the mean can mislead. The median stays steady. Home prices and salaries are often shown with the median. A careful reader asks which average was used. A careful writer may show both.

Questions

1. How much does each of the eight workers earn in a year?

_____

_____

2. How do you find the mean?

_____

_____

3. What is the mean pay at the bakery?

_____

_____

4. What is the median pay at the bakery?

_____

_____

5. Why is the mean higher than what the workers earn?

_____

_____

6. Why are home prices often shown with the median?

_____

_____

Words to know

payroll: the list of people a business pays
mean: the average found by adding values and dividing
median: the middle value when numbers are put in order
outlier: a value that is far away from the rest

Talk together (every group has these)

1. Find one fact that every group read. How did your sheet say it?
2. What did your sheet tell you that you think another group's did not? Ask them.
3. What is one question about this topic that none of the sheets answered?

Name: _____ Date: _____

The Bakery Where the Average Misleads

Triangle group

Imagine a small bakery with nine people on its payroll. Eight workers each earn $30,000 a year. The owner earns $120,000. A newspaper writer wants to describe how much people at the bakery make, and she has to choose which kind of average to use.

The mean is what most people think of first. To find it, add up all the values and divide by how many there are. The eight workers add up to $240,000, and with the owner's pay the total is $360,000. Dividing by nine people gives a mean of $40,000. That number sounds nice, but not one worker actually earns it. The single large paycheck pulled the mean upward.

The median is a different average. To find it, put the values in order from least to greatest and pick the one in the middle. With nine people, the fifth value is in the middle, and it is $30,000. The median describes the typical worker much better, because it is not dragged around by one unusual value.

Statisticians call a value far from the rest an outlier. When a data set has an outlier, the mean can be misleading, while the median stays steady. Home prices and salaries are often reported with the median for this reason. A careful reader asks which average was used, and a careful writer sometimes reports both so that the full picture is clear.

Questions

1. How much does each of the eight workers earn in a year?

_____

_____

2. How do you find the mean of a group of numbers?

_____

_____

3. What is the mean pay at the bakery?

_____

_____

4. What is the median pay at the bakery?

_____

_____

5. Why does the mean sound higher than what the workers really earn?

_____

_____

6. Why are home prices often reported with the median?

_____

_____

Words to know

payroll: the list of people a business pays
mean: the average found by adding values and dividing
median: the middle value when numbers are put in order
outlier: a value that is far away from the rest
misleading: giving a false idea

Talk together (every group has these)

1. Find one fact that every group read. How did your sheet say it?
2. What did your sheet tell you that you think another group's did not? Ask them.
3. What is one question about this topic that none of the sheets answered?

Name: _____ Date: _____

The Bakery Where the Average Misleads

Square group

Imagine a modest neighborhood bakery with nine people on its payroll. Eight of the employees each earn $30,000 a year, while the owner earns $120,000. A newspaper reporter hoping to describe how much people at the bakery make must decide which kind of average will present the most honest picture.

The mean is the measure that most people think of first. To calculate it, you add together all of the values and then divide by how many values there are. The eight employees contribute $240,000, and with the owner's salary the total reaches $360,000. Dividing by nine people produces a mean of $40,000. That figure sounds respectable, but not a single employee actually earns it, because the one exceptionally large paycheck has pulled the mean upward.

The median is a different kind of average. To find it, you arrange the values from least to greatest and select the one in the middle. With nine people, the fifth value sits in the middle, and it is $30,000. The median describes the typical employee far more accurately, since it is not dragged around by a single unusual value.

Statisticians use the word outlier for a value that lies far from all the others. When a data set contains an outlier, the mean can be misleading, whereas the median remains steady. For this reason, home prices and salaries are frequently reported using the median. A thoughtful reader asks which average was used, and a thoughtful writer sometimes reports both so that the complete picture is clear.

Questions

1. How much does each of the eight employees earn in a year?

_____

_____

2. How is the mean of a group of numbers calculated?

_____

_____

3. What is the mean salary at the bakery?

_____

_____

4. What is the median salary at the bakery?

_____

_____

5. Why does the mean sound higher than what the employees really earn?

_____

_____

6. Why are home prices frequently reported with the median?

_____

_____

Words to know

payroll: the list of people a business pays
mean: the average found by adding values and dividing
median: the middle value when numbers are put in order
outlier: a value that is far away from the rest
misleading: giving a false idea

Talk together (every group has these)

1. Find one fact that every group read. How did your sheet say it?
2. What did your sheet tell you that you think another group's did not? Ask them.
3. What is one question about this topic that none of the sheets answered?

For the teacher: The Bakery Where the Average Misleads

Each student sheet carries a shape, not a level. The same topic and facts, written three ways.

Circle: The Bakery Where the Average Misleads

Easier · 194 words · Flesch-Kincaid grade 3.5

1. $30,000.
2. Add all the values, then divide by how many there are.
3. $40,000.
4. $30,000.
5. The owner's big paycheck pulled the mean up.
6. A few very costly homes would pull the mean up, but the median stays steady.

Triangle: The Bakery Where the Average Misleads

This passage · 226 words · Flesch-Kincaid grade 6.4

1. $30,000.
2. Add up all the values and divide by how many there are.
3. $40,000.
4. $30,000.
5. The owner's large paycheck pulled the mean upward.
6. A few very expensive homes would pull the mean up, but the median stays steady.

Square: The Bakery Where the Average Misleads

Harder · 247 words · Flesch-Kincaid grade 9

1. $30,000.
2. By adding together all of the values and dividing by how many values there are.
3. $40,000.
4. $30,000.
5. The owner's exceptionally large paycheck pulled the mean upward.
6. A few extremely expensive homes would pull the mean up, while the median remains steady.