

ALGEBRA 1: Week of May 11

- Go through the slides (notes) and work through the examples on a separate piece of paper.
- Do the given practice problems (again, on a separate piece of paper).
- Check your answers with the key given (last slide).
- Take a photo or scan in your work and submit it in Google Classroom. If you have questions or would like feedback on your work, add that as a comment with your submitted work.
- The other option for turn in is to send it in on Monday when the new packet is available.
- Check your school email/google calendar for online help sessions via Zoom.

Day 1: Slides 2-8

Day 2: Slides 9-15

Day 3: Slides 16-17

Answers on Slide 18

Day 1: Lesson 4.1 Measures of Center

Target: Find the mean, median and mode of data sets.

Vocabulary

Statistics

The process of collecting, displaying and analyzing a set of data.

Measures of Center

Numbers which are commonly used to represent sets of numbers.

Measures of Center

Mean

The sum of all values, divided by the number of values.

$$\text{Mean} = \frac{\text{Sum of Values}}{\text{Number of Values}}$$

Median

The middle number of an ordered data set. If there are two middle numbers find the mean of those numbers.

Mode

The number or item in a data set which appears most often. A data set may have one mode, no mode or several modes.

Example 1

Find the mean, median and mode of the data set:

3, 8, 9, 9, 10, 10, 28

Subtotal the numerator before dividing OR push "=" before dividing.

Find the mean.

The mean is 11.

$$\frac{3+8+9+9+10+10+28}{7} = \frac{77}{7} = 11$$

Find the median.

The median is 9.

3, 8, 9, 9, 10, 10, 28

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Find the mode.

The modes are 9 and 10.

Both 9 and 10 appear twice.

Example 1 Continued...

Find the mean, median and mode of the data set:

17, 8, 10, 15, 19, 2, 9, 12

Find the mean.

The mean is 11.5.

$$\frac{17+8+10+15+19+2+9+12}{8} = \frac{92}{8} = 11.5$$

Find the median. Order the numbers From the lowest to the highest. Ten and twelve are the middle numbers.

2, 8, 9, 10, 12, 15, 17, 19

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$$\frac{10+12}{2} = 11$$

Find the mean of these numbers.

The median is 11.

Find the mode.

No number appears more than any other number. There is no mode.

Example 2

Marcus and his friends split some small pizzas. Marcus ate $\frac{1}{3}$ of a pizza. His friends each ate $\frac{3}{4}$, $\frac{2}{3}$ and $\frac{1}{2}$ of a pizza. What fraction of a pizza did each of them have, on average?

The average is the mean.

$$\text{Mean} = \frac{\frac{1}{3} + \frac{3}{4} + \frac{2}{3} + \frac{1}{2}}{4}$$

Change the fractions to a common denominator.

$$\text{Mean} = \frac{\frac{4}{12} + \frac{9}{12} + \frac{8}{12} + \frac{6}{12}}{4}$$

Write 4 as a fraction. Multiply by the reciprocal of the denominator.

$$\frac{27}{12} \div \frac{4}{1} = \frac{27}{12} \cdot \frac{1}{4} = \frac{27}{48} = \frac{9}{16}$$

Each boy ate $\frac{9}{16}$ of a pizza, on average.

Day 1: 4.1 Practice Problems

Find the three measures of center.

1. 1, -3, 12, -3, -8, 0, 9, 16 2. $2, -\frac{3}{4}, -2.5, 6, \frac{7}{2}, \frac{19}{4}, -6$
 3. $\frac{3}{16}, \frac{9}{8}, 0, -\frac{1}{8}, -3, \frac{1}{16}, \frac{5}{8}, 1$ 4. $\frac{11}{4}, -\frac{1}{2}, \frac{7}{8}, 2, \frac{7}{8}, 2, -\frac{1}{2}, \frac{11}{4}$

Create a data set with the indicated number of values and given measures of center. Show that your data set works for all measures of center.

5. Five numbers
 Mean = 12, Median = 13,
 Mode = 8
6. Eight numbers
 Mean = 18.5, Median = 18,
 Mode = 16, 22

Day 1: 4.1 Practice Problems

7. List six numbers that satisfy each set of conditions. Show that your numbers work.

- a. The mean is less than all but one of the numbers.
 b. The mean is greater than all but one of the numbers.
 c. Would you be able to complete parts a and b if the word "mean" were replaced by the word "median"? Why or why not?

8. Is it possible for the mean to be greater than all of the numbers in a data set? Explain.

End Day 1

Day 2: Lesson 4.2

Using the Mean to Find Data

Target: Use the mean to find missing numbers in data sets. Find the range of data sets.

Vocabulary

Range

The difference between the maximum (largest value) and minimum (smallest value) values in a data set.

Good to Know!

Two data sets may have the same mean but different ranges. The data set with the largest range shows that the data is more spread out than in the other data set.

Example 1

Jasmine needs to average 62 seconds or less in four preliminary heats to make the final cut for the girls 400-meter team. Jasmine ran the first three heats in 60.4, 59.9 and 62.1 seconds. What is the slowest time she can get in the fourth heat and still make the cut?

She will run 4 heats. She needs to have a mean of 62.

$$\frac{\text{Sum of values}}{4} = 62$$

Multiply both sides by 4 to find the Sum of Values.

$$4 \cdot \frac{\text{Sum of values}}{4} = 62 \cdot 4 = 248$$

Subtract her previous times from 248.

$$248 - 60.4 - 59.9 - 62.1 = 65.6$$

Jasmine needs to run the final heat in 65.6 seconds or less to make the final cut.

Example 2

What is the range of the following data sets?

- a. 17, 29, 33, 34, 38, 40

The maximum is 40 and the minimum is 17.

$$\begin{aligned} \text{Range} &= \text{Maximum} - \text{Minimum} \\ &= 40 - 17 = 23 \end{aligned}$$

- b. 26, 37, 40, 33, 35, 38

The maximum is 40 and the minimum is 26.

$$\begin{aligned} \text{Range} &= \text{Maximum} - \text{Minimum} \\ &= 40 - 26 = 14 \end{aligned}$$

Example 3

The following ordered data set has a range of 33 and a mean of 37. What are the two missing data pieces?

21, 26, 31, 31, 38, ____, 43, 49, **54**

The range is 33. The minimum is 21. Find the maximum. Add 21 to both sides. The largest value in the data set is 54.

$$\begin{aligned} \text{Range} &= \text{Maximum} - \text{Minimum} \\ 33 &= \text{Maximum} - 21 \\ + 21 & \qquad \qquad + 21 \\ \hline 54 &= \text{Maximum} \end{aligned}$$

The mean is 37. There are 9 numbers in the data set.

$$\text{Mean} = 37 = \frac{\text{Sum of Values}}{9}$$

Multiply 37 by 9.

$$9 \cdot 37 = \frac{\text{Sum of Values}}{9} \cdot 9$$

$$333 = \text{Sum of Values}$$

Example 3 continued...

The following ordered data set has a range of 33 and a mean of 37. What are the two missing data pieces?

21, 26, 31, 31, 38, **40**, 43, 49, **54**

Subtract the known values to find the missing numbers.

$$333 - 21 - 26 - 31 - 31 - 38 - 43 - 49 - 54 = 40$$

The two missing values are 40 and 54.

Day 2: 4.2 Practice Problems

For each data set, use the given values and the mean to find the missing number.

1. 28, 40, 36, 47, 33, ___

Mean = 35

2. 98, 74, 68, 90, 65, 80, ___

Mean = 77

3. 12, 8, -2, 3, 1, 11, 17, ___

Mean = 7

4. 17, 10.2, 20.4, 15, 9.8, 20.1, ___

Mean = 15.6

Find the range of the following sets of data.

5. 28, 31, 31, 38, 42, 45, 50

6. -9, -6, 0, 3, 5, 5, 12, 15

7. \$5.25, \$7.50, \$8, \$3.50, \$7, \$8.50

8. 7, 12, -5, 6, 8, 10

Day 2: 4.2 Practice Problems

Use the data and the range to find the missing number in each ordered data set.

9. 48, 50, 52, 53, 59, 62, ___

Range = 19

10. ___, 17, 23, 28, 33, 41, 48

Range = 37

Use the range and the mean to determine the missing numbers in each ordered data set.

11. ___, 40, 40, ___, 50, 52

Range = 13

Mean = 44

12. 9, ___, 22, 25, 26, 28, ___

Range = 23

Mean = 23

13. Carmen had scores of 82%, 72% and 74% on her first three tests of the term. What score will she need on her fourth test in order to have an average of 80% on the first four tests?

End Day 2

Day 3: The mean has a special relationship to the numbers in a data set. Follow these steps to explore this relationship.

Use the mean formula:

$$\text{Mean} = \frac{\text{Sum of Values}}{\text{Number of Values}}$$

* Step 1: Copy the table below.

Mean = _____							
Data Values	15	18	18	19	20	24	26
Difference from the mean	-5						
Sum of Differences = _____							

* Step 2: Find the mean of the set of numbers and write it at the top of the table.

* Step 3: Fill in the second row of the table by finding the difference between the data value and the mean of the data set (Data Value - Mean). Be sure to subtract in the correct order. The first one has been done for you.

* Step 4: Find the sum of the differences in the second row of your table and write it in the "Sum of Differences" blank.

Follow steps 1-4 and complete the table below.

Mean = _____

Data Values	11	13	14	16	20	28
Difference from the mean						

Sum of Differences = _____

Mean = _____

Data Values	23	24	25	26	29	?
Difference from the mean	-4	-3	-2	-1	2	?

Sum of Differences = 0

Mean = _____

Data Values	36	29	44	43	20	49	?
Difference from the mean	-2	-6	9	5	-18	11	?

Sum of Differences = 0

End Day 3

ANSWER PAGE

Day 2:	10, 11	7, \$5	4, 16.7	11, 39, 43	1. Mean = 3, Median = 0.5, Mode = -3
Day 2:	2, 64	5, 22	8, 17	12, 19, 32	2. Mean = 1, Median = 2, Mode = None
Day 2:	3, 6	6, 24	9, 67	13, 92%	3. Mean = $\frac{25}{2}$, Median = $\frac{11}{2}$, Mode = None
Day 3:	1. mean = 17	2. mean = 27	3. mean = 38		4. Mean = $\frac{11}{4}$, Median = $\frac{11}{2}$, Mode = None
Step 2: 20	sum of differences = 0				5. Possible answer: 8, 8, 13, 14, 17
Step 3:					6. Possible answer: 10, 12, 16, 16, 20, 22, 22, 30
Step 4:					7. a. Possible answer: 5, 16, 16, 17, 18, 18; Mean = 15
					b. Possible answer: 2, 3, 4, 5, 6, 22; Mean = 7
					c. No: Half the numbers would be less than the median and half would be larger.
					8. No: (Answers may vary) Mean has to be somewhere between the maximum and minimum.

ALGEBRA: LAST SLIDE for this week!