



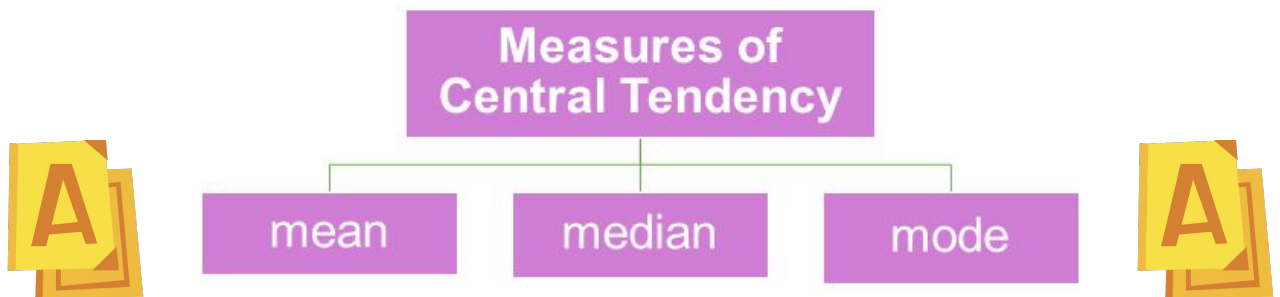
# Helping With Math

## Solving Measures of Central Tendency

GRADE 6



In statistics, the central tendency is considered as the descriptive summary of a data set or distribution. By calculating the single value from the dataset, it reflects the centre of the data distribution. The three measures of central tendency are mean, median, and mode.



- Mean is the measure of central tendency that represents the average value of the dataset. It can be calculated as the sum of all the values in the dataset divided by the number of values.

$\bar{x}$  = sum of all observations divided by the number of observations



 $\bar{x}$ 

**Mean means...**

- a mathematical average of a group of two or more numerals.
- an arithmetical average
- the sum of the values of all observations or data points divided by the number of observations
- important information about the data set at hand
- a single number that can provide a lot of insights into the experiment and nature of the data
- the most commonly used measure of central tendency
- can be greatly affected by extreme values

### ***In solving for mean of a given set of data...***

1. Add all the scores/values. Arranging them is not necessary.
2. Divide the total of the scores/values by the number of cases (n).

For example: What is the mean of the given set of data:

3, 3, 5, 2, 7, 8, 10, 12, 10, 9?

Solution: The number of cases is 10 ( $n = 10$ ).

$$3 + 3 + 5 + 2 + 7 + 8 + 10 + 12 + 10 + 9 = \mathbf{69}$$

$$\text{Then, } 69 \div 10 = \mathbf{6.9}$$

**Thus, the average or mean of the given set of data is 6.9.**





## Median means...



- middle value
- the positional value of the variable that splits the distribution into two equal parts.
- resulting to one part is made of all values greater than or equal to the median value and the other comprises all values less than or equal to it.
- the “middle” element given that the data set is arranged in order of the magnitude.
- determined by the position of different values. Unlike mean, median remains unaffected of extreme values.

## In solving for median of a given set of data...

1. The median can be easily calculated by arranging the data from smallest to largest and locating the middle value.

In the event that there are even numbers of data, there will be two observations which fall in the middle. The median in this case is computed as the average of the two middle values.

For example: What is the median of the given set of data:  
3, 3, 5, 2, 7, 8, 10, 12, 10, 9? ( $n = 10$ )

Solution: Arrange first the values in ascending order.

2, 3, 3, 5, 7, 9, 9, 10, 10, 12.

↑  
*the two middle values*

To determine the median, get the average of 7 and 9.

$$(7+9) \div 2 = 16 \div 2 = 8$$

Thus, **the median is 8.**



## MODE



### *Mode means...*



- most typical value of a given set of data
- the value around which maximum concentration of items occurs
- “la Mode” in French which can be translated as the most fashionable values of a distribution, because it is repeated the highest number of times in the series.
- the most frequently observed data value.
  - A data is said to be unimodal if it has one mode only.
  - A data is said to be bimodal if it has two values of mode.
  - A data is multimodal if it has more than two values of mode.

### *In solving for mode of a given set of data...*

1. To solve for mode, just pick the number with the most number of occurrence. Unlike median, arranging the values is unnecessary.

For example: What is the mode of the given set of data:

3, 3, 5, 2, 7, 8, 10, 12, 10, 9? ( $n = 10$ )

Solution: 3 and 10 occurred twice. Thus the values of mode in this given set of data is 3 and 10. The distribution is bimodal.



## PRACTICE EXERCISES

Solve for the measures of central tendency given the following set of values.

50	38	49	48	35	60	51
55	38	47	48	44	53	60
45	39	50	50	50	38	51

**Mean:**

**Median:**

**Mode:**



# TABLE OF ACTIVITIES

1. Ask the Librarian
2. Books On Sale
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5. The Average Book Time
6. The Bookshelves
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8. Library Duties
9. Book Drive
10. The Book Nerds



## ASK THE LIBRARIAN

Mr. Owen, the librarian, is available for your friends' inquiries. Help him provide answers by determining which of the following statements are TRUE. If it is not, replace the underlined word to correct it.

1. The three measures of central tendency are mean, median, and mode.

2. Mean and median are not affected by extreme values.

3. Mode is the most commonly used measure of central tendency.

4. To solve for median, values must be arranged in ascending or descending order first.

5. Mean is a positional value of the variable that splits the distribution into two equal parts.

6. A data is multimodal if it has more than two values of mode.

7. Mean is the sum of the values of all observations or data points divided by the number of observations



# BOOKS ON SALE

Hooray! Books are on sale! Get these books on its lowest discounted price by solving for the value of mean.



1. The given set of data is : 35, 45, 23, 55, 41, 52, 60, 48, 68, 70,

2. The given set of data is : 104, 97, 85, 68, 80, 90, 75.

3. The given set of data is : 14.5, 17.6, 19.7, 11.25, 12, 16, 19, 20.

4. The given set of data is

x	5	8	10	12
frequency	3	6	2	5





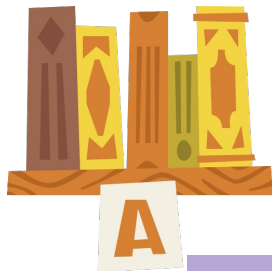
# IN THE MIDDLE OF THE BOOKSTORE

You are tasked to arrange these books with attached serial numbers. Then indicate the median.

1. 35, 68, 19, 38, 19, 49, 50, 31, 27, 31, 18, 21, 18

2. 100, 97, 83, 90, 75, 86, 94, 90, 91, 100, 87, 99

3. 23, 17, 21, 18, 4, 5, 20, 6, 20, 27, 11, 10, 3



# THE TOP-SELLING BOOK

Determine the top-selling book of the month by solving for the value of mode/s of the given set of data. Identify as well the type of distribution in terms of the number of modes it has.



Given: 11, 21, 13, 15, 17, 18, 18, 11, 21

Type of distribution: \_\_\_\_\_

2. Given: 104, 86, 98, 68, 98, 91, 78, 98, 68

Type of distribution: \_\_\_\_\_

3. Given: 3.2, 1.8, 7.5, 9.1, 0.2, 0.1, 2.3, 1.8

Type of distribution: \_\_\_\_\_

4. Given: 70, 77, 87, 89, 71, 70, 78, 97, 78, 77, 88, 77, 78, 98

Type of distribution: \_\_\_\_\_

5. Given: 35, 67, 89, 21, 45, 45, 21, 67, 98, 67, 21, 78

Type of distribution: \_\_\_\_\_

6. Given: 60, 35, 79, 81, 45, 78, 34, 45, 78, 89, 89, 90

Type of distribution: \_\_\_\_\_

7. Given: 0.1, 0.45, 0.4, 0.5, 0.5, 0.6, 9, 0.9, 11, 2, 5, 6

Type of distribution: \_\_\_\_\_



# THE AVERAGE BOOK TIME

Given below are the time spent, in minutes, by these 6th graders in reading their favorite books each day. Using these values, answer the questions that follow.



9, 11.5, 14.6, 19.7,  
20, 10, 15, 19.2,  
11.6, 6.6, 6.21

Mike's average: \_\_\_\_\_



8.5, 7.9, 15, 10.4,  
13, 13, 17, 5.4, 8,  
10, 12

Che's average: \_\_\_\_\_



21, 10, 5.6, 9.7, 3,  
15, 9.2, 10.4, 11,  
6, 8

Kyle's average: \_\_\_\_\_



15, 19, 12, 18.3, 17,  
7, 9.4, 12, 11, 5, 5

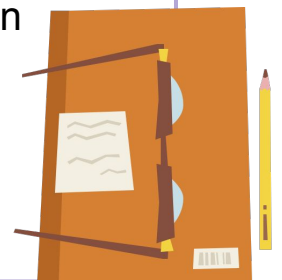
Lin's average: \_\_\_\_\_

1. Who spent the longest reading time in average? \_\_\_\_\_

2. Who spent the shortest time, in average, in reading his/her favorite book? \_\_\_\_\_

3. Who is the second best in terms of longest time spent in reading? \_\_\_\_\_

4. Who is last on the list? \_\_\_\_\_

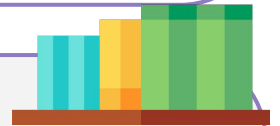
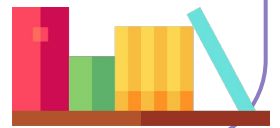


# THE BOOKSHELVES

Don't let the bookshelves remained unorganized. Solve for the mean, median, and mode of the following distribution. Show your solution.

1. Compute for the value of mean, median, and mode.

19 25 28 21 17 23 45  
21 43 21 19 11 14 23  
18 12 29 14 20 21 32



2. Compute for the value of mean, median, and mode.

34 15 19 23 45 18 19 19 19 14 21 34 15



# BOOK STACKS

Let's arrange this beautiful book stacks by determining which measure of central tendency is the most appropriate to use in each situation.

1. The value of the average time spent by the students in reading their books in the school library.

2. The most borrowed book in science-fiction section.

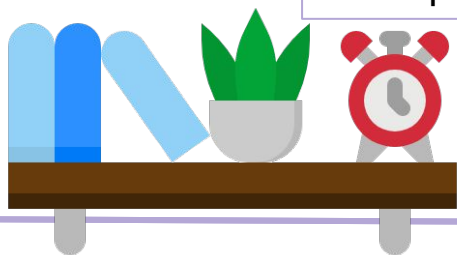
3. A value that will determine the upper and lower 50% of the 6th graders who borrowed books.

4. The rate of number of borrowers per week.

5. The librarian wants to determine the number of borrowed books per class.

6. The title of the most requested book in nonfiction area.

7. The value of the number of times a particular book is borrowed so that all the books can be sorted into two equal portion.



# LIBRARY DUTIES

See what will the last page reveal after you solve the following word problems.

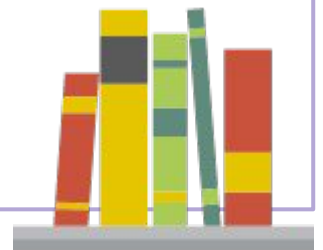
1. Helen is working as a library assistant in the nearby school. She was tasked to get the average number of books that can fit in a large bookshelf. Based on her initial inventory the number of books on 12 bookshelves are as follows: 35, 43, 38, 30, 48, 50, 32, 35, 40, 40, 40, 25. Determine her findings.

2. The number of borrowed books is out for the month of September.

1st week	2nd week	3rd week	4th week
142	250	189	212

What is the average number of books borrowed per week in the month of September?

3. Derek needs to accomplish his monthly report by computing the average books being borrowed by the 8 classes in 6th grade. The data are: 56, 89, 32, 90, 85, 73, 90, 58. What must be Derek's report?



# THE BOOK DRIVE

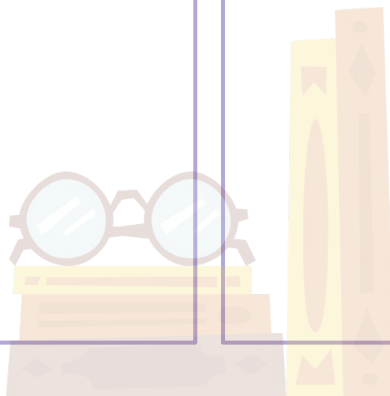
Let's do some charity work through this book drive. Solve these word problems systematically.

1. The book drive event organizer wants to know the missing data below. Compute what is missing if the average is 82 recipients.

Community	Recipients
A	85
B	102
C	73
D	?

2. On their 2nd day, Renei said that the mean, median, and mode of the data below is 73, 87, and 90, respectively. Is she correct?

Number of Recipients per Cluster	
90	43
90	65
87	73
35	45



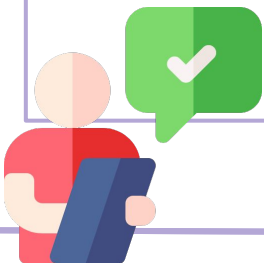
# THE BOOK NERDS

Let's investigate if your classmates are book nerds. Conduct a short survey in your class. Present your findings using the template below.

1. Select 9 random people in your class and ask them the number of minutes that they spent in reading book/s a day.

Name:	Name:	Name:
No. of minutes:	No. of minutes:	No. of minutes:
Name:	Name:	Name:
No. of minutes:	No. of minutes:	No. of minutes:
Name:	Name:	Name:
No. of minutes:	No. of minutes:	No. of minutes:

2. Compute for the three measures of central tendency from the data collected.





# ANSWER GUIDE

## Activity 1

- |         |                    |         |         |
|---------|--------------------|---------|---------|
| 1. TRUE | 2. Mode and median | 3. Mean |         |
| 4. TRUE | 5. Median          | 6. TRUE | 7. TRUE |

## Activity 2

- |                  |                      |
|------------------|----------------------|
| 1. Total: 497    | $497 \div 10 = 49.7$ |
| 2. Total: 599    | $599 \div 7 = 85.57$ |
| 3. Total: 136.05 | $136.05 \div 8 = 17$ |
| 4. Total: 143    | $143 \div 16 = 8.94$ |

## Activity 3

1. 31      2. 90.5      3. 17

## Activity 4

- |                          |                    |                   |
|--------------------------|--------------------|-------------------|
| 1. 11,18,21- multimodal  | 2. 98- unimodal    | 3. 1.8 - unimodal |
| 4. 77, 78 - bimodal      | 5. 21, 67- bimodal |                   |
| 6. 45,78,89 - multimodal | 7. 0.5 - unimodal  |                   |

## Activity 5

Mike's average: 13.04

Che's average: 10.93

Kyle's average: 9.9

Lin's average: 11.88

1. Mike    2. Kyle    3. Lin                      4. Kyle



# ANSWER GUIDE

## Activity 6

- |                |            |          |
|----------------|------------|----------|
| 1. Mean: 22.67 | Median: 21 | Mode: 21 |
| 2. Mean: 22.69 | Median: 19 | Mode: 19 |

## Activity 7

- |         |         |           |         |         |
|---------|---------|-----------|---------|---------|
| 1. Mean | 2. Mode | 3. Median | 4. Mean | 5. Mean |
| 6. Mode | 7. Mean |           |         |         |

## Activity 8

- 38 books per bookshelf
- 198.25 books per week
- 71.63 books per class

## Activity 9

- $(82 \times 4 = 328)$   $328 - (85 + 102 + 73) = 68$
- Her claim is incorrect because Mean: 66, median: 69, mode: 90

## Activity 10

Answers may vary.



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