

# Measures of Central Tendency

## Section 3-1

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MAT 110

Lesson #5

# Objectives

- Find the mean of ungrouped and grouped data sets
- Find the median of ungrouped data sets
- Find the mode of ungrouped data sets, or the modal class of grouped data sets
- Find the midrange of ungrouped data sets
- Compute weighted means

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I will be using the TI-84 Plus in this video, but I have also made a video showing you how to use a Casio to perform the computations.

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When computing the mean, always report the value rounded to one more place than the raw data.

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Using a graphing calculator, we find a mean of approximately 64.2 cases/year.

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Using a graphing calculator, we find a mean of approximately 104.1 feet.

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This assumption is not necessarily true, but it is the best method of estimating the mean given that we don't have the raw data to work with.

The formula for the mean for a grouped data set is  $\bar{X} = \frac{\sum(f \cdot X_m)}{n}$  (see p. 113 for more information).

Graphing calculators can also compute means for grouped data.

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42–48	4
49–55	1

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First, find the midpoints of each class (you should verify): 17, 24, 31, 38, 45, 51

Using a graphing calculator, we find a mean of 28.9 points.

## Mean for Grouped Data

Here is the hand computation for the previous example:

Class	Midpoint	Frequency	$f \cdot X_m$
14-20	17	10	170
21-27	24	11	264
28-34	31	6	186
35-41	38	8	304
42-48	45	4	180
49-55	52	1	52
TOTALS		40	1156

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35-41	38	8	304
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49-55	52	1	52
TOTALS		40	1156

Thus, the mean is  $\frac{1156}{40} = 28.9$ .

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Graphing calculators will find the median of a data set (using the same method we did when we found the mean)

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First, sort: 50, 50, 84, 91, 95, 95, 102, 102, 105, 118, 120, 125, 160, 160

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95	105	50	125	102	120	160
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First, sort: 50, 50, 84, 91, 95, 95, 102, 102, 105, 118, 120, 125, 160, 160

There are two middle values: 102 and 102. The median is the average of these, which is 102.

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First, sort: 50, 50, 84, 91, 95, 95, 102, 102, 105, 118, 120, 125, 160, 160

There are two middle values: 102 and 102. The median is the average of these, which is 102.

Our graphing calculator also finds a median of 102.



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A data set in which no value occurs more than once is said to have no mode.

## Mode and Modal Class

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## Mode and Modal Class

The data show the number of gallons of various nonalcoholic drinks Americans consume in a year. Find the modal class.

Drink	Gallons
Soft Drinks	52
Water	34
Milk	26
Coffee	21

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Soft Drinks	52
Water	34
Milk	26
Coffee	21

The modal class is Soft Drinks.

## Midrange

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Graphing calculators do not compute midrange for us, but they do tell us the minimum and maximum values in the data set.

## Midrange

The data shows the number of paid days off workers get in a sample of various countries in the world. Find the midrange of the data.

38	29	10	34	28	30
30	26	19	20	25	

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$$MR = \frac{10 + 38}{2} = 24$$

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Graphing calculators will also compute weighted means; the method for finding a weighted mean is very similar to that for finding the mean of grouped data.

## Weighted Mean

A recent survey of a new diet cola reported the following percentages of people who liked the taste. Find the weighted mean of the percentages.

Area	% Favored	Number Surveyed
1	40	1000
2	30	3000
3	50	800

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The value column is % Favored, and the weights are the Number Surveyed.

$$\text{By hand: } \bar{X} = \frac{40(1000) + 30(3000) + 50(800)}{1000 + 3000 + 800} = \frac{170000}{4800} \approx 35.4\%$$

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This can be verified using a graphing calculator.

## Next Steps

- Read 3-2
- Watch Video Lesson #6
- Complete Assignment 3

Thanks for watching!