

2. **MEDIAN** the middle value when data is ordered from least to greatest.

"USEFUL when there is an OUTLIER"

*To find the median:

a) If there is an odd number of data points: take the middle one

E.g. if there are 7 numbers in the list, the median is the 4th
1, 2, 3, (4), 5, 6, 7

b) If there is an even number of data points: the median is the average of the two middle numbers (add and \div by 2)

Example 2

Find the median mark for each list of student grades.

a) ~~62~~, ~~64~~, ~~76~~, 89, ~~72~~, ~~54~~, 93

b) ~~56~~, 84, ~~63~~, ~~67~~, ~~62~~, 98

First, list the numbers in ascending order (smallest to biggest).

a) 54, 62, 64, (72), 76, 89, 93
Median = 4th entry
= 72

b) 56, 62, (63), (67), 84, 98
Median = $(63+67) \div 2$
= 65

3. **MODE** the value that occurs most often (doesn't have to be numerical)

There can be no modes as well as more than one mode.

Good and is the only choice with categorical type data when the value of the data is the most important info. Shows consistency

Example 3

Find the mode(s) for each list of numbers.

a) 5, 7, 9, 8, 6, 3, 4, 10
no mode = each # is unique

b) (25), (30), 32, (30), (25), 29, 20
Two modes: 25 and 30

c) 63, 57, 66, 83, (79), 72, (79), 69, 60, 63, (79), 85, 80
one mode: 79

Example 4

The modes of the following set of data are 7 and 9. What must be the value of y?

6, 9, 3, 4, 8, 0, 7, 2, 9, y

Since 7 and 9 are both modes, they must occur an equal number of times.

→ 9 occurs twice

→ 7 occurs once

∴ y must be 7.

MEAN, MEDIAN & MODE SUMMARY

How do you choose which measure of central tendency to use?

Mean: Use when the data is fairly close together

Median: Useful when there is an outlier (extreme value that is far away from other values which would skew the data.

Mode: Good when the value of the data is the most important information. Shows consistency and is the only choice with categorical type data.

ACTIVITY

Identify whether each statement below describes the mean, median, or mode. Answers are not unique (i.e., a statement could describe more than one measure of central tendency)

Description	Mean, Median or Mode?
Usually the least representative of a set of data	Mode
Most popular	Mean
May have more than one answer	Mode
Useful when comparing sets of data	Mean, Median
Not as popular as mean	Median, Mode
Extreme values (outliers) do not affect as strongly	Median
Used for categorical type data	Mode
Only one answer	Mean, Median
Data must be listed in ascending order (if done manually)	Median
Difficult to interpret or compare if there is more than one answer	Mode
Not as popular as median	Mode
Affected by extreme values (outliers)	Mean
Not affected at all by extreme values (outliers)	Mode
Useless if no values repeat	Mode

MEASURES OF CENTRAL TENDENCY – PRACTICE
MEAN, MEDIAN & MODE

- 1) Find the mean, median and mode for each set of data.
 - a) 64, 69, 72, 54, 89, 92

 - b) 6, 0, 8, 2, 9, 5, 6, 7, 7, 8

- 2) The masses, in kilograms, of group of Jessy Bragg's weight loss group are shown.
81, 79, 83, 76, 89, 75, 67, 83, 65, 74, 78
 - a) Find the mean, median and mode.

 - b) Is the median greater than or less than the mean?
 - c) Is the mode greater than or less than the mean?

- 4) The hourly rates of employees of a supermarket are given.
\$9.25, \$8.50, \$22.50, \$7.85, \$8.85, \$12.65, \$10.85, \$11.50
 - a) Find the mean, median and mode.

- b) Which of your answers best represents the data? Why?
- c) Which of your answers would most misrepresent the data? Why?
- 5) State and explain which measure of central tendency should be used in the following scenarios:
- a) The age of people in this classroom, not including your teacher.
- b) The most popular search engine used by students in this class.
- c) The amount money students in this classroom earned last summer.
- d) The age of people in this classroom including your teacher.

BONUS QUESTION

- 6) You earned the following marks (all equally weighted) on your first five tests: 28, 36, 38, 41, and 44. What mark would you have to get on the next test in order to bring your test mean average up to 80%?

Solutions

1. **a)** mean = 65.8; median = 66.5; mode = 54 **b)** mean = 5.8; median = 6; mode = 7
 c) mean = 3.8; median = 2.6; modes = 2.1 and 5.7 **d)** mean = 95/12; median = 5/6; mode = n/a
2. **a)** mean = 77.3; median = 78; mode = 83 **b)** greater than **c)** greater than
3. **a)** mean = \$11.49; median = \$10.05; mode = n/a **b)** median; wide range of wages **c)** mean; data is not close together
5. **a)** mean **b)** mode **c)** median **d)** median
6. **a)** 106% or 53 out of 50.