CENTRAL TENDENCY MASTERY:
UNLOCKING INSIGHTS WITH
Mean, Median, and Mode in Statistics

written by:

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WHEN YOU'RE SURROUNDED BY PEOPLE WHO SHARE A PASSIONATE COMMITMENT AROUND A COMMON PURPOSE, ANYTHING IS POSSIBLE

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Preface

This eBook is written for guide and knowledge to all readers that equips with comprehensive notes, calculation and examples about central tendency.

The content of this eBook is designed with full of examples and explanation more on how to find mean, mode and median. Thus, readers may know how to mastery central tendency and the important of it in our daily life. Its very useful because they are indicators of points (or range of points) where the distribution is concentrated.

At the end of the eBook, writers hope that readers would be able to define the term central tendency, how to describe measures of central tendency and can discuss the mean, median and mode.

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1

INTRODUCTION MEASURE OF CENTRAL TENDENCY

Statistics is defined as the study and manipulation of data also deals with the analysis of numerical data. It is used to derive conclusions from data that is collected and analysed. The basics of statistics comprise of:

i)   Measure of Central Tendency (Mean, Median, Mode)

ii)   Measure of Dispersion (Variance and Standard Deviation)

Therefore, in here. We'll discuss more on how to **Mastery the Central Tendency by Unlocking Insights with Mean, Median and Mode in Statistics.**

1.1 WHAT IS CENTRAL TENDENCY?

A measure of central tendency is a single value that attempts to describe a set of data by identifying the central position within that set of data. They are also classed as summary statistics.

1.2 WHAT IS THE PURPOSE OF CENTRAL TENDENCY?

The purpose of central tendency is to find a single numerical value to represent a range of data. By doing so, one may give an approximate value that represents an entire data set.

1.3 WHY ARE MEASURES OF CENTRAL TENDENCY IMPORTANT?

Measures of central tendency are essential in statistics as they provide a central reference point to understand the main characteristics of a dataset. These measures help in identifying patterns, making comparisons, and drawing meaningful conclusions from data. They are widely used in various fields such as finance, economics, psychology, and market research.

Mastery of Central Tendency Involves:

01 Understanding Context:

Knowing when to use each measure based on the nature of the data and the specific objectives of analysis.

Calculation & Interpretation: 02

Being able to calculate these measures accurately and interpret what they signify about the dataset.

03 Application:

to apply these measures in various statistical analyses, such as hypothesis testing, variance analysis, and forecasting.

EASE:
Easier to understand and calculate.

SUMMARIZING:
Summarizing the primary characteristics of entire dataset.
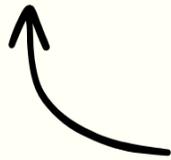
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OF MEASURE OF CENTRAL TENDENCY
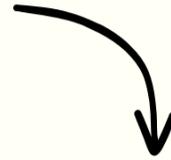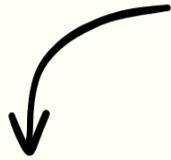
COMPARISONS:
Simplifies comparisons between two datasets.

DECISION:
Contributes to making more informed decisions.

PRACTICAL EXAMPLES OF CENTRAL TENDENCY

1 **DATA ANALYSIS:**

Analyzing financial data to determine average sales (mean), understanding income distribution (median), or identifying popular products (mode).

2 **RESEARCH STUDIES:**

Using central tendency measures to describe survey responses, test scores, or health indicators.

3 **BUSINESS DECISION MAKING:**

Using these measures to evaluate performance metrics, customer preferences, or production output.

By mastering central tendency measures, analysts and researchers can effectively summarize data, draw meaningful conclusions, and make informed decisions across various domains.

Let's watch the video!

MUST watch video introduction **MEASURE OF CENTRAL TENDENCY**....

Click here to watch video

2
MEAN MODE MEDIAN
~UNGROUPED DATA~

In statistics, collection of data is the first step in the field of research and once the collection process is complete the next step is to look for ways to condense and arrange the data, to study their characteristics. This process is known as the presentation of data.

Data in its original form which the researcher first collects from research is termed **ungrouped data**. In simple words, ungrouped data or raw data is a mere list of numbers that does not convey anything.

Ungrouped data is defined as the data given as individual points (i.e. values or numbers) such as 15, 63, 34, 20, 25, and so on.

On the other hand, **ungrouped frequency distributions** refers to the number of observations of each value.
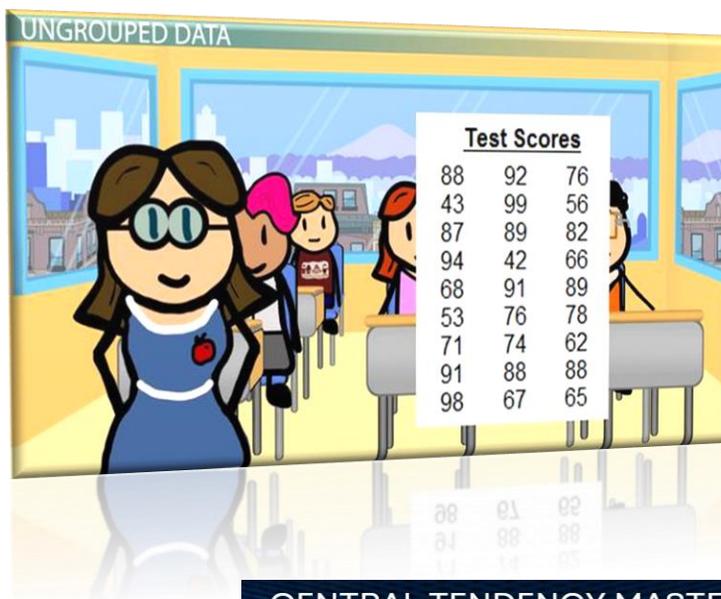
THREE

OF CENTRAL TENDENCY

MAIN MEASURES

1 MEAN
Average of the given numbers and is calculated by dividing the sum of given numbers by the total number of numbers.

2 MEDIAN
Is the middle value of the given list of data when arranged in an order.

3 MODE
is the value that is repeatedly occurring in a given set. We can also that set of data has a high frequency or appears more frequently.

2.1 MEAN UNGROUPED DATA

MEAN , $\bar{X}$

1. Average value of dataset
2. Most used in measure of Central Tendency
3. Mean = (sum of all values) / (total number of values)
4. Denoted by $\bar{x}$.

$$Mean, \bar{x} = \frac{sum\ of\ all\ data\ values}{total\ number\ of\ data} = \frac{\sum x}{n}$$

$$Mean, \bar{x} = \frac{\sum x}{n}$$

2.2 MEDIAN UNGROUPED DATA

MEDIAN, M

1. Middle most value in a dataset.
2. Divides the whole dataset into two halves.
3. Calculated by first arranging the data values in ascending or descending order and then finding the middle value.
4. Denoted by M.

Median (n = odd number),

$$\text{Median} = \left[\frac{(n+1)}{2} \right]^{th} \text{term}$$

Median (n = even number),

$$\text{Median} = \frac{\left[\left(\frac{n}{2} \right)^{th} \text{term} + \left\{ \left(\frac{n}{2} \right) + 1 \right\}^{th} \text{term} \right]}{2}$$

APPLY THREE SUBSEQUENT STEPS
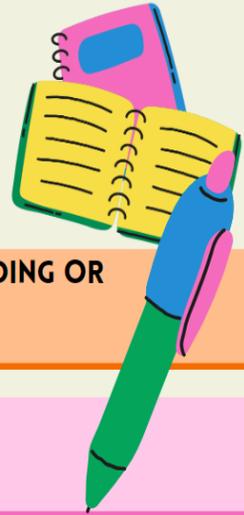
To find median, we :

1 SORT THE DATA EITHER IN ASCENDING OR DESCENDING ORDER.

2 COUNT THE NUMBER OF DATA, N.

3 VERIFY WHETHER 'N' IS AN EVEN OR AN ODD NUMBER OF DATA.

Median (n = even number),

$$\text{Median} = \frac{\left[\left(\frac{n}{2}\right)^{th} \text{term} + \left\{\left(\frac{n}{2}\right) + 1\right\}^{th} \text{term}\right]}{2}$$

Median (n = odd number),

$$\text{Median} = \left[\frac{(n+1)}{2}\right]^{th} \text{term}$$

UNGROUPED DATA

2.3 MODE UNGROUPED DATA

MODE, Mo

1. Most frequently occurring value in a dataset.
2. Denoted as Mo.
3. Since doesn't involve any calculation, it can be found using observation.

Mode for ungrouped can be:

1) One mode.

2) Two modes or more.

3) No mode at all.

Name of modes depends on dataset:

Unimodal (only one mode), bimodal (two modes), trimodal, or multimodal.

UNGROUPED DATA

Let's watch the video!

to understand more about **MEAN MODE MEDIAN ungrouped data**....
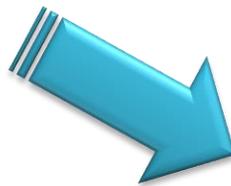
Click here to watch video

UNGROUPED DATA

EXAMPLE : 2.1

From the set of data, **find the mean, mode and median.**

3, 2, 7, 1, 5, 9 and 5

SOLUTION

- **Mean, $\bar{x}$**

$$\bar{x} = \frac{\sum x}{n} = \frac{3 + 2 + 7 + 1 + 5 + 9 + 5}{7} = \frac{32}{7} = \mathbf{4.571}$$

- **Median, m**

To find the median, **REARRANGE** all the numbers in order.

1, 2, 3, 5, 5, 7, 9

Here, n = 7. It's **ODD** number of data.

Location m is at $\left(\frac{7+1}{2}\right)^{th}$ data = at 4th data = **5**

- **Mode, m_o.** Value 5 appears more than any other number.

Therefore, mode is **5**.

UNGROUPED DATA

EXAMPLE : 2.2

Find the mean, mode and median. Give the answer correct to 2 decimal places.

108, 99, 112, 111, 108, 100, 87, 87.

SOLUTION

- **Mean, $\bar{x}$**

$$\bar{x} = \frac{\sum x}{n} = \frac{108 + 99 + 112 + 111 + 108 + 100 + 87 + 87}{8}$$

$$= \frac{812}{8} = \mathbf{101.50} \, (\mathbf{2dp})$$

- **Mode, m_o.** Look at the highest frequency. Therefore, mode is **87** and **108**.

EXAMPLE : 2.3

Find the mean, mode and median. Give the answer correct to 2 decimal place.

108, 99, 112, 111, 108, 100, 87, 87.

SOLUTION

- **Median, *m.*** To find the median, **REARRANGE** all the numbers in order.

4th   **5th**

87, 87, 99, 100, 108, 108, 111, 112

Here, *n* = 8. It's **EVEN** number of data.

$$M = \frac{\text{value of } \left(\frac{n}{2}\right)^{th} \text{observation} + \text{value of } \left(\frac{n}{2}+1\right)^{th} \text{observation}}{2} = \frac{\left(\frac{8}{2}\right)^{th} + \left(\frac{8}{2}+1\right)^{th}}{2}$$

Then, calculate average $\dfrac{4^{th}+5^{th}}{2} value\ data = \dfrac{100+108}{2}$ = **104**

Therefore, **M = 104.**

EXAMPLE : 2.4

UNGROUPED DATA

The set of data 9, 6, 12, 13, 9, 8, 13, 14, h and k have a mode of 9 and a median of 10. **Find the value of h and k** if $h < k$.

SOLUTION

- **Mode** = 9. So that 9 must occur more than others.

Therefore, **h is 9**.

- **Median** = 10 and $h < k$. **REARRANGE** all the numbers in order.

$$6\ 8\ 9\ 9\ 9\ k\ 12\ 13\ 13\ 14$$

As the number of data is 10 (**EVEN DATA**).

Location m is at $\dfrac{\left(\frac{n}{2}\right)^{th}+\left(\frac{n}{2}+1\right)^{th}}{2}\ data = \dfrac{\left(\frac{10}{2}\right)^{th}+\left(\frac{10}{2}+1\right)^{th}}{2}\ data$

$$\dfrac{5^{th}+6^{th}}{2}\ data = \dfrac{9+k}{2} = 10\ .$$

Therefore, **k = 20 − 9 = 11.**

EXAMPLE : 2.5

The mean of a set of 5 numbers is 12.7. **What extra number must be added** to bring the mean up to 13.1?

SOLUTION

$$Mean , \bar{x} = \frac{sum\ of\ all\ data\ values}{total\ number\ of\ data} = \frac{\sum x}{n}$$

By using the formula above;

Sum of all data values = 5 x 12.7

= 63.5

New sum of all data values = 6 x 13.1

= 78.6

Difference = 15.1

Therefore, the extra number need to be added is **15.1**.

EXAMPLE : 2.6

Given that the mean of a data *(b-4), (b+4), (b+7), (2b-3), (3b+6)* has a mean is 11.6. **Find the value of b.**

SOLUTION

$$Mean = \frac{\Sigma x}{n} = \frac{(b-4)+(b+4)+(b+7)+(2b-3)+(3b+6)}{5}$$

$$11.6 = \frac{8b+10}{5}$$

$$b = 58-10$$

$$b = 6$$

Let's watch the video!

to calculate **MEAN MODE MEDIAN** ungrouped data….
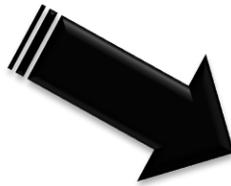
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EXERCISE 1

Q1 Find the mean, median and mode of each set of numbers below.
a. 3, 4, 7, 3, 5, 2, 6, 10.
b. 17, 18, 16, 17, 17, 14, 22, 15, 16, 17, 14, 12.
c. 108, 99, 112, 111, 107, 100, 101.

Q2 Five people play golf and at one hole, their scores are 3, 4, 4, 5, 7. For these scores, find:
a. the mean
b. the median
c. the mode

Q3 Adam takes 4 tests and scores the following marks:
65, 72, 58, 77.
a. What are his median and mean scores?
b. If he scores 70 in his next test, does his mean increase, or decrease? Find his new mean scores.

DO WHAT IS RIGHT, NOT WHAT IS EASY

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Q4
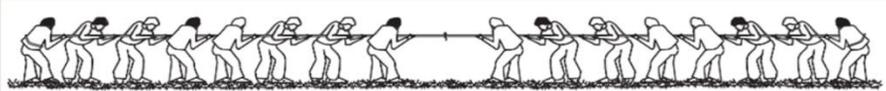
a. The weights, in kilograms, of the 8 members of RUMAH BIRU tug of war team at a school sport are: 75, 73, 77, 76, 84, 76, 77, 78.

Calculate the mean weight of the team.

b. The 8 members of RUMAH MERAH tug of war team have a mean weight of 64 kilograms.

Which team do you think will win a tug of war between RUMAH BIRU and RUMAH MERAH? Give a reason for your answer.

Q5

A basketball team plays 8 matches. The number of points they score in each match are: 62, 68, 67, 79, 82, 50, 74, 62.

a. work out the mean number of points scored.

b. write down the modal number of points scored.

c. Write down the median number of points scored.

QUIZ TIME

1

SCAN QR @ CLICK LINK

https://tinyurl.com/CentralTendencyMastery1

Kahoot!

QUIZ TIME

2

SCAN QR @ CLICK LINK

https://tinyurl.com/quizMeanModeMedian

Quizizz

3

MEAN MODE MEDIAN ~UNGROUPED FREQUENCY TABLE~

3.1 WHAT IS A FREQUENCY DISTRIBUTION?

The **frequency** of a value is the number of times it occurs in a dataset. A **frequency distribution** is the pattern of frequencies of a variable. It's the number of times each possible value of a variable occurs in a dataset.

3.2 WHAT IS UNGROUPED FREQUENCY DISTRIBUTIONS

Ungrouped frequency distributions present the frequencies of individual data elements instead of data classes. These distribution types come in handy when determining the number of times specific values appear in a dataset/s or observation/s.

One key thing to note is that ungrouped frequency distributions work best when the number of samples or observations is low.

Example: Ungrouped frequency table

Club	No. of Students, Frequency
Mathematics	17
Engineering	10
Science	25
English	15
IT	15
Go Green	20

Table 3.1 : Number of students by club at Tun Teja's school

3.3 WHEN TO USE UNGROUPED FREQUENCY DISTRIBUTIONS

Ungrouped frequency distributions can be useful when you want to see how often each individual value occurs in a dataset.

Note that ungrouped frequency distributions work best with small datasets in which there are only a few unique values.

However, if we had a dataset with more than hundreds values above, an ungrouped frequency distribution would be incredibly long and difficult to gather information from.

For larger datasets, it makes sense to construct grouped frequency distributions.

EXAMPLE : 3.1

UNGROUPED FREQUENCY TABLE
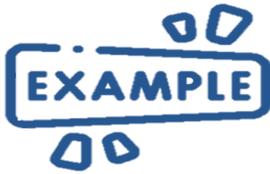
Construct an ungrouped frequency distribution table from the following data

21,23,19,17,12,15,15,17,17,19,23,23,21,23,25,25,21,19,19,19

SOLUTION

Here minimum value is 12 and maximum value is 25.
For each value, draw a tally mark, next to the x.

x	Tally
12	I
13	
14	
15	II
16	
17	III
18	
19	IIII
20	
21	III
22	
23	IIII
24	
25	II
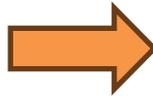
Count tally marks to determine the total frequency of each x.

x	Tally	Frequency
12	I	1
13		0
14		0
15	II	2
16		0
17	III	3
18		0
19	IIII	5
20		0
21	III	3
22		0
23	IIII	4
24		0
25	II	2
		$\sum f = 20$

WHAT IS A FREQUENCY DISTRIBUTION?

FREQUENCY?

is the number of times it occurs in a dataset.

UNGROUPED FREQUENCY?

The number of observations of each value of a variable.

UNGROUPED FREQUENCY TABLE

Let's watch the video!

to understand how to construct **UNGROUPED FREQUENCY table**....

Click here to watch video

EXAMPLE : 3.2

UNGROUPED FREQUENCY TABLE

The scores of 50 students in an IQ test are recorded in a table below. **Find mean, mode and median.**

Score, x	4	5	6	7	8	9	10
Frequency, f	3	3	9	14	13	8	3

SOLUTION

Score, x	4	5	6	7	8	9	10	Total
Frequency, f	3	3	9	14	13	8	3	$\sum f = 53$
$f \times x$	12	15	54	98	104	72	30	$\sum fx = 385$
Cumulative frequency, cf	3	6	15	29	42	50	53	

continue

UNGROUPED FREQUENCY TABLE

SOLUTION

Score, x	4	5	6	7	8	9	10	Total
Frequency, f	3	3	9	14	13	8	3	$\sum f = 53$
$f \times x$	12	15	54	98	104	72	30	$\sum fx = 385$
Cumulative frequency, cf	3	6	15	29	42	50	53	

- **Mean**, $\bar{x} = \dfrac{\sum fx}{\sum f} = \dfrac{385}{53} = $ **7.264 scores.**

- **Mode**, look at the highest frequency. Then, mode = **7.**

- **Median**, since $\sum f = 53$. Here it's **ODD** number.

   Median is at value $\left(\dfrac{n+1}{2}\right)^{th}$ observation $= \left(\dfrac{53+1}{2}\right)^{th} = $

   27th observation.

Therefore, median is **7.**

Observation 27th is here.

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EXAMPLE : 3.3

UNGROUPED FREQUENCY TABLE

A football team keep records of the number of goals it scores per match during a season. **Find the mean, mode and median** number of goals per match.

No. of Goals, x	0	1	2	3	4	5
Frequency, f	8	10	12	3	5	2

SOLUTION

No. of Goals, x	0	1	2	3	4	5	Total
Frequency, f	8	10	12	3	5	2	$\sum f = 40$
$f \times x$	0	10	24	9	20	10	$\sum fx = 73$
Cumulative frequency, cf	8	18	30	33	38	40	

UNGROUPED FREQUENCY TABLE

SOLUTION

No. of Goals, x	0	1	2	3	4	5	Total
Frequency, f	8	10	12	3	5	2	$\sum f = 40$
$x \times f$	0	10	24	9	20	10	$\sum fx = 73$
Cumulative frequency, cf	8	18	30	33	38	40	

- **Mean**, $\bar{x} = \dfrac{\sum fx}{\sum f} = \dfrac{73}{40} = $ **1.825 goals.**

- **Mode**, look at the highest frequency. Then, mode = **2.**

- **Median**, since $\sum f = 40$. Here it's **EVEN** number.

Median is at value $\dfrac{\left(\frac{n}{2}\right)^{th} + \left(\frac{n}{2}+1\right)^{th} observation}{2} = $

$\dfrac{\left(\frac{40}{2}\right)^{th} + \left(\frac{40}{2}+1\right)^{th} observation}{2} = \dfrac{2+2}{2}$.

Observation 20th and 21st is here.

Therefore, median is **2.**

EXAMPLE : 3.4

UNGROUPED FREQUENCY TABLE

The bar chart shows how many cars were sold by a salesman over a period of time.

Find the mean, mode and median.

SOLUTION
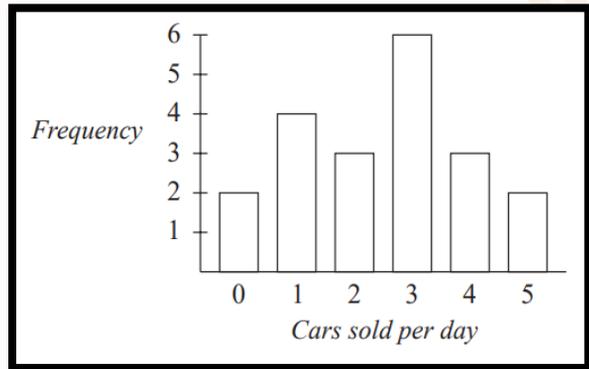
The data can be transferred to a table and another column added as shown.

Cars sold daily, x	Frequency, f	Car sold x Frequency	Cumulative frequency, CF
0	2	0x2 = 0	2
1	4	1x4 = 4	6
2	3	2x3 = 6	9
3	6	3x6 = 18	15
4	3	4x3 = 12	18
5	2	5x2 = 10	20
	$\sum f$ = 20	$\sum fx$ = 50	

continue

UNGROUPED
FREQUENCY TABLE

SOLUTION

Cars sold daily, x	Frequency, f	Car sold x Frequency	Cumulative frequency, CF
0	2	0x2 = 0	2
1	4	1x4 = 4	6
2	3	2x3 = 6	9
3	6	3x6 = 18	15
4	3	4x3 = 12	18
5	2	5x2 = 10	20
	$\sum f = 20$	$\sum fx = 50$	

- **Mean**, $\bar{x} = \dfrac{\sum fx}{\sum f} = \dfrac{50}{20} =$ **2.5 cars.**

- **Mode**, look at the highest frequency. Then, mode = **3.**

- **Median**, since $\sum f = 20$. Here it's **EVEN** number. Median

is at value $\dfrac{\left(\frac{n}{2}\right)^{th} + \left(\frac{n}{2}+1\right)^{th} observation}{2} =$

Observation 10th and 11th is here.

$\dfrac{\left(\frac{20}{2}\right)^{th} + \left(\frac{20}{2}+1\right)^{th} observation}{2} = \dfrac{3+3}{2}$.

Therefore, median is **3.**

continue

CENTRAL TENDENCY MASTERY:
UNLOCKING INSIGHTS
WITH
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EXAMPLE : 3.5

UNGROUPED FREQUENCY TABLE

The children in a class state how many children there are in their family. The numbers they state are given below.

a) **Find the mean, median and mode for this data.**

b) **Which is the most sensible measurement to use in this case?**

1 2 1 3 2 1 2 4 2 2 1 3 1 2

2 2 1 1 7 3 1 2 1 2 2 1 3

SOLUTION

The data can be transferred to a table and another column added as shown.

Children, x	Frequency, f	Children x Frequency	Cumulative frequency, CF
1	10	10	10
2	11	22	21
3	4	12	25
4	1	4	26
7	1	7	27
	$\sum f = 27$	$\sum fx = 55$	

continue

UNGROUPED FREQUENCY TABLE

SOLUTION

Cars sold daily, x	Frequency, f	Car sold x Frequency	Cumulative frequency, CF
1	10	10	10
2	11	22	21
3	4	12	25
4	1	4	26
7	1	7	27
	$\sum f = 27$	$\sum fx = 55$	

- **Mean**, $\bar{x} = \dfrac{\sum fx}{\sum f} = \dfrac{55}{27} = $ **2.037 scores.**

- **Mode**, look at the highest frequency. Then, mode = **2.**

- **Median**, since $\sum f = 27$. Here it's **ODD** number.

  Median is at value $\left(\dfrac{n+1}{2}\right)^{th}$ observation $= \left(\dfrac{27+1}{2}\right)^{th} = $

  14th observation.

Therefore, median is **2.**

Observation 14th is at here.

EXERCISE 2

QUESTION 1

The survey of questions 1 also asked how many TV sets there were in each hold. The results are given in Table 1.

Calculate the mean, mode and median number of TV sets per household.

TABLE 1

No. of TV Sets	Frequency
0	2
1	30
2	52
3	8
4	5
5	3

ANSWER THIS

TABLE 2

score	freq
6	11
8	26
10	27
12	32
14	31
16	12
18	15
20	7

ii) Select the statement that is CORRECT.
a. 6 people had scores of 11.
b. 27 people had scores of 10.
c. A and B are both correct.
d. All of these are false.

QUESTION 2

The Table 2 shows the scores on Quiz 2 for M. Refer to the table and answer the questions:

i) Find the MEDIAN, MEAN and MODE.

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TABLE 3

Score	No. of Students
10	3
15	10
20	P
25	7
35	5

Hence, find the MODE and MEDIAN score from Table 3.

If the mean of the following Table 3 is 20.6. Find the missing frequency (P).

ANSWER THIS

The tally charts shows the favourite sport of the students in a class.

i) What is the modal sport?

ii) How many students are in the class?

iii) How many more students liked football than rugby?

TABLE 4

Sport	Tally
Rugby	IIII
Football	IIII IIII I
Hockey	IIII IIII II
Cricket	III
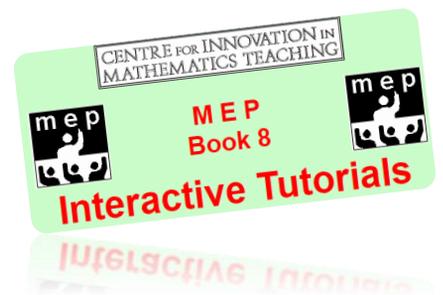
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QUIZ TIME

3

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m e p   **M E P**
Book 8   **m e p**

Interactive Tutorials

TEST YOURSELF:
THE MEAN

Question 1:
Find the mean for each of the sets of data below:
a)   4, 9, 7, 10, 5
b)   2, 8, 6, 3, 12, 7, 4
c)   3, 2, 1, 3, 2, 2, 1, 3, 1, 2, 3, 2, 1
d)   1, 8, 7, 5, 6, 4, 7, 6
e)   20, 30, 24, 32
f)   12, 8, 14, 5, 1, 3, 0, 8, 10, 11
g)   9, −3, −6, 5, 0
h)   1.4, 2.8, 2.4, 2.5, 2.8, 3.1, 1.1

Question 2:
A basketball team plays 8 matches. The number of points they score in each match are: 62, 68, 67, 79, 82, 50, 74, 62
a)   Find the mean number of points scored.
b)   Write down the modal number of points scored.
c)   Write down the median number of points scored.

Question 3:
Mr. Holland gives his class a test. The results are:
          34%, 44%, 75%, 21%, 98%, 86%, 71%, 76%, 63%, 55%
a)   Determine the mean mark.
b)   Determine the median mark.
c)   How many students scored above the mean mark?

TEST YOURSELF:
THE MEAN

Question 4:
Five houses on a street are sold in 2016. They sell for

RM175,000 RM184,000 RM150,000 RM201,000 RM191,000

Calculate the mean price.

Question 5:
The mean of four numbers is 10. Three of the numbers are 9, 11 and 7. Determine the fourth number.

Question 6:
The mean of six numbers is 5. Five of the numbers are 6, 6, 5, 3 and 1. What is the sixth number?

Question 7:
The mean of five numbers is 8.2. Four of the numbers are 8, 10, 12 and 10. Determine the fifth number.

Question 1:

Work out the mode for the each of the following
a)   5, 6, 6, 7, 8, 10
b)   1, 1, 1, 4, 6, 8, 12
c)   5, 5, 7, 7, 7, 8, 8, 9
d)   5, 7, 3, 5, 8, 9, 10, 2 8, 3, 3, 4, 6, 8, 13, 3, 18
e)   12, 14, 15, 17, 15
f)   2.3, 2.6, 2.8, 2.7, 2.8, 2.7, 2.4, 2.3, 2.1, 2.3
g)   −2, −1, 5, 8, −2, 2, −1, 9, −1, 1, 2, −1

Question 2:

The bar chart shows the shoe size of a group of students.
a)   How many students in total are there?
b)   What is the modal shoe size?
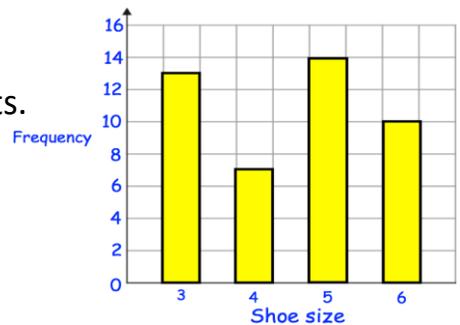
Question 3:

Find the mode for the each of the following:
a)   8, 1, 1, 7, 2, 1, 5, 9, 4, 1, 5, 5, 9, 6, 4, 3, 2, 3, 1, 1, 9, 8, 7,
b)   8, 9, 7, 3, 4, 7, 9, 3, 4, 5, 1, 2, 2, 1, 3, 0, 0, 8, 1, 4, 7, 8, 6, 6, 3, 3, 3, 1, 3, 3, 5

Question 4:

Mrs. Green gives her class a test. The results are shown in the bar chart below.
a)   What is the modal grade?
b)   How many students sat the test?
c)   A grade C or above is a "pass."
What is the percentage of the students passing the test?
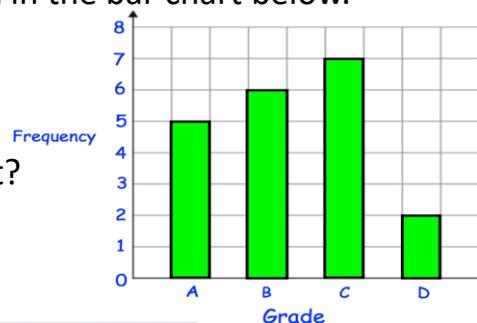
Question 1:

Determine the median for the each of the following

a)   5, 1, 4, 6, 8

b)   9, 1, 3, 6, 7, 8, 9

c)   6, 4, 7, 1, 3, 8, 1, 10

d)   7, 3, 8, 9, 6, 5

e)   9, 8, 6, 6, 6, 7, 1, 2, 6, 8

f)   −4, 5, −7, −1, 2, 0, 9

g)   20, 30, 10, 20, 40, 50, 60, 10, 80, 30

h)   49, 34, 12, 10, 53, 20, 65, 34, 90, 100, 33

i)   6.2, 6.8, 6.6, 7.2, 6.4, 7.4, 5.8

Question 2:

Shown are the ages and weights of 5 dogs.

a)   Which dog has the median age?

b)   Which dog has the median weight?

	Fido	Lucky	Toto	Barney	Tess
Age	4	12	7	9	1
Weight	14kg	9kg	30kg	16kg	8kg

Question 3:

The height of some footballers are listed below:

1.81m, 1.78m, 1.88m, 1.79m, 1.86m, 1.85m, 1.78m, 1.93m

a)   Calculate the median height.

b)   What is the modal height?

Question 4: Write down five numbers with a median of 7

Question 5: Write down eight numbers with a median of 10

Question 6: Write down four different numbers with a median of 4.5

Question 7: The mean of five numbers is 8.2. Four of the numbers are 8, 10, 12 and 10. Determine the fifth number.

Question 1:

The length of nine caterpillars are listed below

9cm, 4cm, 8cm, 10cm, 7cm, 5cm, 13cm, 10cm, 6cm

a) Find the mode.
b) Find the median.
c) Find the mean.

Question 2:

James plays six games of darts. His scores are 120, 71, 80, 14, 90, 117
Should James use the mean or the median to give him the highest average score?

Question 3:

Shown are the weights of 3 puppies.

a) Calculate the mean
b) Determine the median weights
c) What is the mode weight
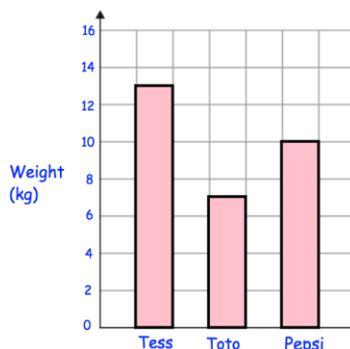
Question 4:

The amount of water in some containers are:

2 litres, 330ml, 0.08 litres, 0.7 litres, 75ml, 5000ml, 0.15 litres

(a) Determine the median.
(b) Find the mean.

Question 5:

The median height of 11 footballers is 1.85m. Only one footballer has a height of 1.85m. How many footballers have a height under 1.85m?

Question 6:
Belfast Giants have played 5 matches and the mean number of goals scored is 3. When they play the 6th match, the mean increases to 4. How many goals were scored in the 6th match?

Question 7:
James is a car salesman. He has a target of selling 5 cars a day from Monday to Friday. Over Monday to Thursday, he has sold a mean of 6 cars a day. How many cars must he sell on Friday to meet his target?

Question 8:
A teacher surveys a group of students. He asks how much pocket money they receive each week. Their respond are:

    RM5 RM8 RM4 RM50 RM6   RM8 RM7.50 RM10   RM8   RM7
a)   Work out the median
b)   Work out the mean

Question 9:
Shown below are five cards which are arranged in order from smallest to largest

5				
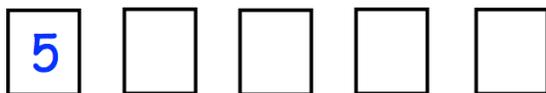
The range of the cards is 6. The median of the cards is 7. The mean of the cards is 8. Work out the 4 missing numbers.

Answer Exercise 1

QUESTION 1:

a. Mean=5 | Mode=3 | Median=4.5

b. Mean=16.25 | Mode=17 | Median=416.5

c. Mean=92.571 | Mode=none | Median=107

QUESTION 2:

Mean=4.6 | Mode=4 | Median=4

QUESTION 3:

Median=68.5 | Mean=68 | New Mean=68

QUESTION 4:

Mean=77 | Rumah Biru win.

QUESTION 5:

Mean=58.75 | Mode=62 | Median=67.5

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Answer Exercise 2

QUESTION 1:

Mean=1.93 | Mode=2 | Median=2

QUESTION 2:

i) Mean=12.2 | Mode=12 | Median=12
ii) b

QUESTION 3:

Missing (P) = 25 | Mode = 20 | Median = 20

QUESTION 4:

i) Hockey ii) 30 students iii) 7 students

"A person who never made a mistake never tried anything new." — Albert Einstein

CENTRAL TENDENCY MASTERY:
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Mean, Median, and Mode in Statistics

Question 1

a) 7
b) 6
c) 2
d) 5.5
e) 26.5
f) 7.2
g) 1
h) 2.3

Question 2

(a) mean = 68   (b) mode = 62   (c) median = 67.5

Question 3:

a) mean = 62.3%
b) median = 67%
c) 6 students scored above the mean mark.

Question 4: RM180,200
Question 5: 13
Question 6: 9
Question 7: 1

CENTRAL TENDENCY MASTERY:
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Question 1:
a) 6
b) 1
c) 7
d) 5
e) 15
f) 2.3
g) -1

Question 2:
(a) 44
(b) Size 5

Question 3:
(a) 1
(b) 3

Question 4:
a) Grade C
b) 20
c) 18/20 or 9/10

BACK TO
TEST URSELF

CENTRAL TENDENCY MASTERY:
UNLOCKING INSIGHTS
WITH
Mean, Median, and Mode in Statistics

52

Question 1:

(a) 5   (b) 7   (c)   5   (d) 6.5   (e) 6
(f) 0   (g) 30   (h)   34   (i) 6.6   (j) 139.5

Question 2:
(a) Toto
(b) Fido

Question 3:
(a) 1.83m
(b) 1.78m

Question 4:   5, 6, 7, 8, 9   7, 7, 7, 7, 7   6, 6, 7, 9, 100

Question 5: 7, 8, 9, 10, 10, 11, 12, 13   3, 4, 5, 9, 11, 13, 19, 20
Question 6:   3, 4, 5, 6   1, 3, 6, 120
Question 7: -5, -3, -1, 1, 4, 9   -20, -15, -4, 4, 9, 80

Question 1:
a)   mode = 10cm
b)   median = 8cm
c)   mean = 8cm

Question 2:
He should use the median

Question 3:
a)   range = 6 kg
b)   median = 10kg
c)   mean = 10kg

Question 4:
a)   median = 330ml
b)   range = 4925ml

Question 5:
5 footballers have a height under 1.85m

Question 6: 9 goals

Question 7: 1 car

Question 8:
a)   median = RM7.75
b)   mean = RM11.35

Question 9: The four missing numbers are 7, 7, 10, 11

Feedback

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