

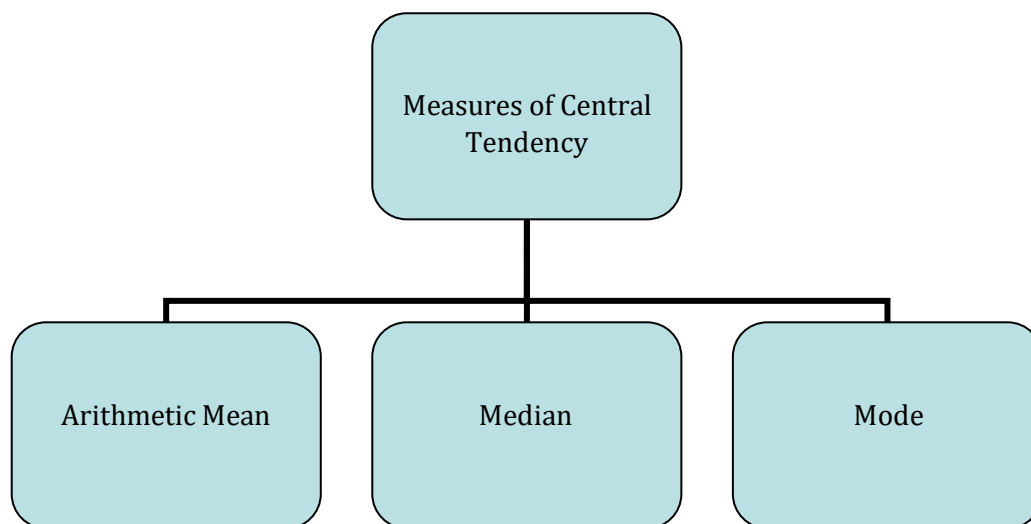
Meta data of E- Content (Pre production)

S. N.	AREA OF MATA DATA	Measures of Central Tendency
1	Topic	Arithmetic Mean
2	Subject	Economics
3	Topic connected which area of subject?	Measures of Central Tendency
4	Class/ Level	XI
5	Objectives	After going through this content, the student will have an understanding about meaning of mean, its calculation, advantages and disadvantages.
6	Summary	Measures of Central Tendency are the values which are general representative of the whole data. There are three main measures of central tendency- mean, median and mode. This content deals with mean. The major advantage of mean is that it is the easiest one to calculate and understand. It takes into consideration all the values of the variable. But mean is not the best measure of central tendency when there are outlier values.
7	Key Words	Mean, Measures of Central Tendency
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Arithmetic Mean

Mean is one of the important measures of central tendency. Let's first learn what do we mean by measure of central tendency



Definition

Simpson and **Kafka** defined it as “ A measure of central tendency is a typical value around which other figures congregate”

Waugh has expressed “An average stand for the whole group of which it forms a part yet represents the whole”.

1. The average represents all the measurements made on a group, and gives a concise description of the group as a whole.

2. In case we are comparing two or more groups of performance of a group over a period of time, the measure of central tendency provides us with a basis to make comparison.
3. Arithmetic mean is represented by a value that represents all the values of the variable.

Arithmetic Mean is a mathematical average and it is the most popular and the most convenient measure of central tendency. It is obtained by dividing sum of the values of all observations in a series (ΣX) by the number of items (n) constituting the series.

Thus, mean of a set of numbers $X_1, X_2, X_3, \dots, X_n$ is denoted by \bar{x} and is expressed as

$$\text{Mean} = \frac{\text{Sum of the items}}{\text{Number of the items}} = \frac{\Sigma X}{n}$$

Example : Calculate the Arithmetic Mean of number of daily users of DTC buses.

Month	No. of Days	Total no. of passengers
April, 2014	30	43000
May, 2014	31	47200
June, 2014	30	46000
July, 2014	31	41000
August, 2014	31	44100
September, 2014	30	49000
TOTAL	183	2,70,300

$$\text{Mean} = \frac{\text{Total number of users}}{\text{Total number of working days}}$$

$$= \frac{\sum X}{N}$$

$$= \frac{270300}{183} = 1477.05$$

So, on an average, 1477 people travel in a day in DTC buses.

Merits of Mean:

- It is the easiest measure of central tendency to understand and calculate.
- It includes all the values of the study.
- It is clearly and specifically defined.

Limitation of Mean:

- The most important disadvantage of the mean is that mean may be influenced by outlier values and, thereby, misrepresent the data.

Calculate arithmetic mean by Direct Method, Short cut Method and Step-deviation Method

Marks	20	30	40	50	60	70
No. of Students	8	12	20	10	6	4

Marks (X)	No. Of Students (f)	fX	D=(X-40)	d'=d/10	fd	fd'
20	8	160	-20	-2	-160	-16

30	12	360	-10	-1	-120	-12
40	20	800	0	0	0	0
50	10	500	10	1	100	10
60	6	360	20	2	120	12
70	4	280	30	3	120	12
Total	60	2460			60	6

1. Direct Method:

$$\text{Mean} = \frac{2460}{60} = 41$$

2. Assumed Mean Method:

$$\text{Mean} = 40 + (60/60) = 40 + 1 = 41$$

3. Step-Deviation Method:

$$\text{Mean} = 40 + (6/60 * 10) = 40 + 1 = 41$$

Activity

1. What is the utility of calculating arithmetic mean?
2. Give simple formula for calculation of mean.
3. Sometimes, mean is not considered to be a good indicator value of the group. When does it happen?
4. Can mean be used in case of categorical (non-numerical) data ?

Answer Keys

1. It gives us a value which is representative of the whole data concerning a particular variable.
2. Mean = $\frac{\Sigma X}{n}$
3. When there are some outlier values, the mean may not be a good representative value.
4. No (Categorical data is related with qualities such as good, bad, honest, dishonest, beautiful etc.)