Frequently Asked Questions

- Define Arithmetic mean. What are the merits of Arithmetic mean?

Answer: *Horace Sacrist* defined Arithmetic Mean as "Arithmetic mean is the amount secured by dividing the sum of values of the items in a series by their number".
Merits of Arithmetic mean are:
  - It is rigidly defined and is always definite.

  - It is easy to understand and easy to calculate.

  - It is based on all the observations; so that it becomes a good representative.

  - It can be easily used for comparison.

  - It is amenable to algebraic treatment.

  - Of all the averages, arithmetic mean is affected least by fluctuations of sampling. Thus property is sometimes described by saying that arithmetic mean is stable average

- What do you mean by continuous series?

Answer: The series dealing with the continuous variable is called continuous series.
The continuous variable is one which can assume any conceivable value within a range.
For example: income, weight, length etc.

- What are the three methods of calculating Arithmetic mean?

Answer: The three methods of calculating Arithmetic mean are:
  - Direct method
  - Short-cut method
  - Step-deviation method

$$\bar{x} = A + \frac{\sum fdx}{n}$$

- In this formula   what does A stands for? Explain with example.

Answer: A stands for the assumed mean in the given series. For example:
Salary of workers is given:

Salary	30	40	50	60	70	80

Here, we have taken one value from the series i.e. 60 as assumed mean.

- $$\overline{x} = A + \frac{\sum dx'}{n} \times C$$
  Write the formula for calculating Arithmetic mean using step-deviation method in individual series?

Answer: Formula using step deviation method is:

- Explain how dx' is calculated?

Answer: In order to calculate dx' we have to take some value in the series as assumed mean (A). Then, take deviation from x by applying the formula (x-A). Then, divide (x-A) by the common factor "C" and apply the formula x-A/C.

- What do you mean by individual series?

Answer: Individual observations or series mean is the one where frequencies are not given. Here, all the different values of the items are added and are divided by the total number of items.

- What are the demerits of Arithmetic mean?

Answer: Demerits are:
  - It cannot be determined by inspection nor can it be located graphically.
  - Arithmetic mean cannot be used if we are dealing with qualitative characteristics.
  - Arithmetic mean cannot be obtained if a single observation is missing.
    It is affected very much by extreme values.
  - Arithmetic mean may lead to wrong conclusion if the details of the data from which it is computed are not given.
  - Arithmetic mean cannot be calculated if the extreme class is open.
  - In extremely asymmetrical (skewed) distribution, usually arithmetic mean is not a suitable
  - measure of location.

$$\sum (x - \overline{x})^2$$

- What does this formula state?

Answer: Sum of squared deviations of the items is minimum when deviation is from the actual mean.

- Write the formula for calculating Arithmetic mean using direct method in continuous

series?

$$\overline{x} = \frac{\sum fx}{n}$$

Answer: Formula is:

• What do you mean by discrete series?

Answer: The series dealing with discrete variables is known as Discrete Series. Discrete series cannot be expressed in fractions.

• Calculate arithmetic mean from the following using short-cut method in individual series.

Wages in Rs. (x)	150	155	159	140	160	153	154	142

$$\overline{x} = A + \frac{\sum dx}{n}$$

Answer: Short-cut method formula is:

Here, $\overline{x}$ = Arithmetic mean,
A is the assumed mean,
n is the no. of items,
dx' is deviation of items from assumed mean (x-A).

Wages in Rs. (x)	dx = (x-A)
150	150-153 = -3
155	155-153 = +2
159	159-153 =+6
140	140-153 = -13
160	160-153 = +7
153	153-153 = 0
154	154-153 = +1
142	142-153 = -11
N= 8	$\sum dx \ \sum dx$ = - 11

Let Assumed mean (A) is 153.
n = 8 and dx = -11.

Thus, as per the formula: $\overline{x}$ = 153+ (-11)/8 = 153-1.375 = 151.635.
Hence, AM is 151.635.

• The arithmetic mean of a series is 50. What will be the revised mean when each item of the series is multiplies by 6 and result is divided by 2.

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Answer: Solution: Here, $\overline{x}=50$.
Thus, arithmetic mean when each item is multiplies by 6 is 50*6=300.
Arithmetic mean when the resultant is divided by 2 is 300/2 = 150.

Hence, $\overline{x}$ = 150.

$$\sum(x-\overline{x})=0$$

- What does this formula state?

Answer: The algebraic sum of the deviations of a set of values from their AM is zero.

- $$\overline{x}=\frac{\sum x}{n}$$ In this formula what does n, $\overline{x}$, $\sum x$ stands for? Explain with example.

Answer: Wages of five workers is given in a table.

Wages in Rs. (x)	100	120	150	110	140

Here, n is the number of items in the series i.e. 5.
$\overline{x}$ = Arithmetic mean.
$\sum x$ = Sum of all items of x, i.e. 620.