Internal Exam Preparation

Date
Page

Bhumika ma'am :—

Formulas :—

* Mean :—

— when raw data [only x] is given

$$\bar{x} = \frac{\Sigma x}{n}$$

where,

Σx : total of observation
n : total number of observation

in Excel :- = average ( )

— For Assume mean method

$$\bar{x} = A + \frac{\Sigma d}{n}$$

where,

A : Assumed mean (from x)
d : deviation
[d : x - A]
Σd : sum of deviations

$M = Q_2 = D_5 = P_{50}$
$Q_1 = P_{25}$
$Q_3 = P_{75}$

— when discrite observu
means [x and f

$$\bar{x} = \frac{\Sigma fx}{\Sigma f}$$

where,

f: frequency
Σf: Sum of frequencies
fx: Multiplication of f and x
Σfx: Sum of fx values

— when class is given.

x: upper limit + lower limit
2

Mean properties:—

→ $\Sigma(x - \bar{x}) = 0$

→ $\Sigma(x - A)$

Sum of deviations any other valu
are either - + and 0

→ $\Sigma(x - \bar{x})^2 < \Sigma(x - A)^2$

* Median :—

— when raw data [only x] is given,

Step 1 :- Asscending order

$M : \left(\frac{n+1}{2}\right)^{th}$ observation

n : total number of observations

In Excel. : Median ( )

— when discrite data is given.

[Colums : x. f. cf]

$M : \left(\frac{n+1}{2}\right)^{th}$ observation.

—

— when continuous serise is given.

$M : L + \left(\frac{n}{2} - cf\right) \times C$

$M = \frac{n}{2}^{th}$ class

[class f cf]

f

where.

L : lower limit of the M^{th} class

cf : cf of $M-1^{th}$ class's upper cf

f : M^{th} class frequency

C : class length

Mode :—

— when raw data is given,

Z : 3m - 2$\bar{x}$

— when class is given.

Z^{th} class : Highest frequency's class

$$z : L + \frac{f_1 - f_0}{2f_1 - f_0 - f_2} \times c$$

where.

L : Lower limit of z^{th} class
f_1 : highest frequency
f_0 : highest frequency's upper frequency
f_2 : highest frequency's next frequency
C : class length

Variance :—

In excel var.s / var.p
variance : $(Std)^2$

* Quartiles :-

- when raw data is given.

$Q_1 : \left(\frac{n+1}{4}\right)^{th}$ observation

$Q_2 : 2\left(\frac{n+1}{4}\right)^{th}$ observation

$Q_3 : 3\left(\frac{n+1}{4}\right)^{th}$ observation

In Excel. = Quartiles ( )

- when Continuous Series is given.

Q_1 Class : $\left(\frac{n}{4}\right)^{th}$ class

$Q_1 : L + \frac{\left(\frac{n}{4}\right) - cf}{f} \times C$

Q_2 Class : $2\left(\frac{n}{4}\right)^{th}$ Class

Q_1 : $L + \frac{2\left(\frac{n}{4}\right) - cf}{f} \times c$

Q_3 class : $3\left(\frac{n}{4}\right)^{th}$ class

Q_3 : $L + \frac{3\left(\frac{n}{4}\right) - cf}{f} \times c$

* Decilies :—

— when raw data is given.

D_1 : $\left(\frac{n+1}{10}\right)^{th}$ observation

D_5 : $5\left(\frac{n+1}{10}\right)^{th}$ observation

- when class is given.

D_1^{th} class : $\left(\frac{n}{10}\right)^{th}$ class

$$D_1 : L + \frac{\left(\frac{n}{10}\right) - cf}{f} \times c$$

D_5^{th} class : $5\left(\frac{n}{10}\right)^{th}$ class

$$D_5 : L + \frac{5\left(\frac{n}{10}\right) - cf}{f} \times c$$

* Percentiles :-

- when raw data is given.

$$P_1 : \left(\frac{n+1}{100}\right)$$

$$P_3 : 3\left(\frac{n+1}{100}\right)$$

Measures :-

Mean deviation,

- when raw data is given

$$MD[mean] = \frac{\Sigma |x - mean|}{n}$$

- when discrite or class is given,

$$MD[mean] = \frac{\Sigma f |x - mean|}{n}$$

median deviation.

$$MD[median] = \frac{\Sigma |x - m|}{n} = \frac{\Sigma |}{n}$$

- Quartile deviation.

$$Qd = \frac{Q_3 - Q_1}{2}$$

- Coefficient of Quartile deviation.

$$\frac{(Q_3 - Q_1)}{(Q_3 + Q_1)}$$

- when class is given.

P_1^{th} class : $\left(\frac{n}{100}\right)^{th}$ class

$$P_1 : L + \frac{\left(\frac{n}{100}\right) - cf}{f} \times C$$

P_3^{th} class : $3\left(\frac{n}{100}\right)^{th}$ class

$$P_3 : L + \frac{3\left(\frac{n}{100}\right) - cf}{f} \times C$$

* Standard deviations :-

- when raw data is given

Population

$$Sd : \sqrt{\frac{\Sigma (x - \bar{x})^2}{n}}$$

in Excel = Stdev.PC)

Population Sample:-

$$Sd: \sqrt{\frac{\Sigma(x-\bar{x})^2}{(n-1)}}$$ [accurate]

In Excel : stdDev.S ( )

- when class is given

$$Sd: \sqrt{\frac{\Sigma fx^2}{\Sigma f} - \left(\frac{\Sigma fx}{\Sigma f}\right)^2}$$

* Geometric mean: —

$$gm: \sqrt[n]{(1+k)(1+k)\ldots} - 1$$

k: rate of interest
n: number of years

* Harmonic mean: —

$$\frac{n}{\left(\frac{1}{x_1} * \frac{1}{x_2} \ldots \frac{1}{x_n}\right)}$$

in Excel = Harmean( )