STATISTICS

mode = 3 median - 2 mean

Grouped

Class of Intervals	10-25	25-40	40-55	55-70	70-85	85-100
NO. of Students	2	3	7	6	6	6

MEDIAN

Intervals	No. of students	Cummulative frequency
10-25	2	2
25-40	3	5
40-55	7	(12) c
ℓ (55-70	(6) f	18
70-85	6	24
85-100	6	30

Median class : Class where c.f. is just greater or equal to n/2

n = 30 ; n/2 = 15

55-70 is median class

lower limit of the median class (ℓ) = 55

c = cum frequency of median preceeding class

$$\text{Median} = \ell + \frac{n/2 - c}{f} \times h = 62.5$$

MODE

Modal Class: Class where frequency is maximum

Class size (h) = 15

Max. frequency $f_1 = 7$, Modal class = 40-55

Lower limit of modal class = 40

$f_0 = 3$ (Previous class f value)

$f_2 = 6$ (next class f value)

$$\text{Mode} = \ell + \left(\frac{f_1 - f_0}{2f_1 - f_0 - f_2}\right) \times h = 40 + 4/5 \times 15 = 52$$

MEAN

3 Methods

Direct Method

$$\bar{x} = \frac{\sum f_i x_i}{\sum f_i} = 62$$

Step deviation

$$\bar{x} = a + h\bar{u}$$

$$\bar{x} = a + h\left(\frac{\sum f_i u_i}{\sum f_i}\right) = 62$$

Assumed mean method

$$\bar{x} = a + \bar{d}$$

$$\bar{x} = a + \left(\frac{\sum f_i d_i}{\sum f_i}\right) = 62$$

Class Intervel	f_i	x_i	$f_i x_i$	$d_i = x_i - a$	$u_i = \frac{x_i - a}{h}$	$f_i u_i$	$f_i d_i$
10-25	2	17.5	35	-30	-2	-4	-60
25-40	3	32.5	97.5	-15	-1	-3	-45
40-55	7	47.5	332.5	0	0	0	0
55-70	6	62.5	375	15	1	6	90
70-85	6	77.5	465	30	2	12	180
85-100	6	92.5	555	45	3	18	270
	30		1860			$\sum f_i u_i = 29$	$\sum f_i d_i = 435$

Ungrouped

MEAN

$$x = \frac{\sum f_i x_i}{\sum f_i}$$

MODE

The value of the observation having the max. frequency

MEDIAN

$x_1, x_2, \ldots\ldots x_n \rightarrow$ observations

$f_1, f_2, \ldots\ldots f_n \rightarrow$ frequencies

n is even → Average of $\left(\frac{n}{2}+1\right)^{th}$ & $\left(\frac{n}{2}\right)^{th}$ observation.

n is odd → $\left(\frac{n+1}{2}\right)^{th}$ observation.