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Q. 1:- Construct a grouped frequency distribution table and comulative frequency curve(ogive) for the observation below

423, 369, 387, 411, 393, 394, 371, 377, 389
409, 392, 408, 431, 401, 363, 391, 405, 382, 400
381, 400, 381, 399, 415, 428, 422, 396, 372
410, 419, 386, 390

Solution:-

$$N = 30$$
$$X_m = 431$$
$$X_o = 363$$

$$\Rightarrow R = X_m - X_o$$
$$\Rightarrow R = 431 - 363$$
$$\Rightarrow R = 68$$

No of classes

$$K = 1 + 3.33 \log N$$
$$= 1 + 3.33 \log (30)$$
$$= 1 + 3.33 (1.4771)$$

$= 1 + 3.33(1.4771)$

$= 1 + 4.9187\,43$

$K = 6$ (by rounding)

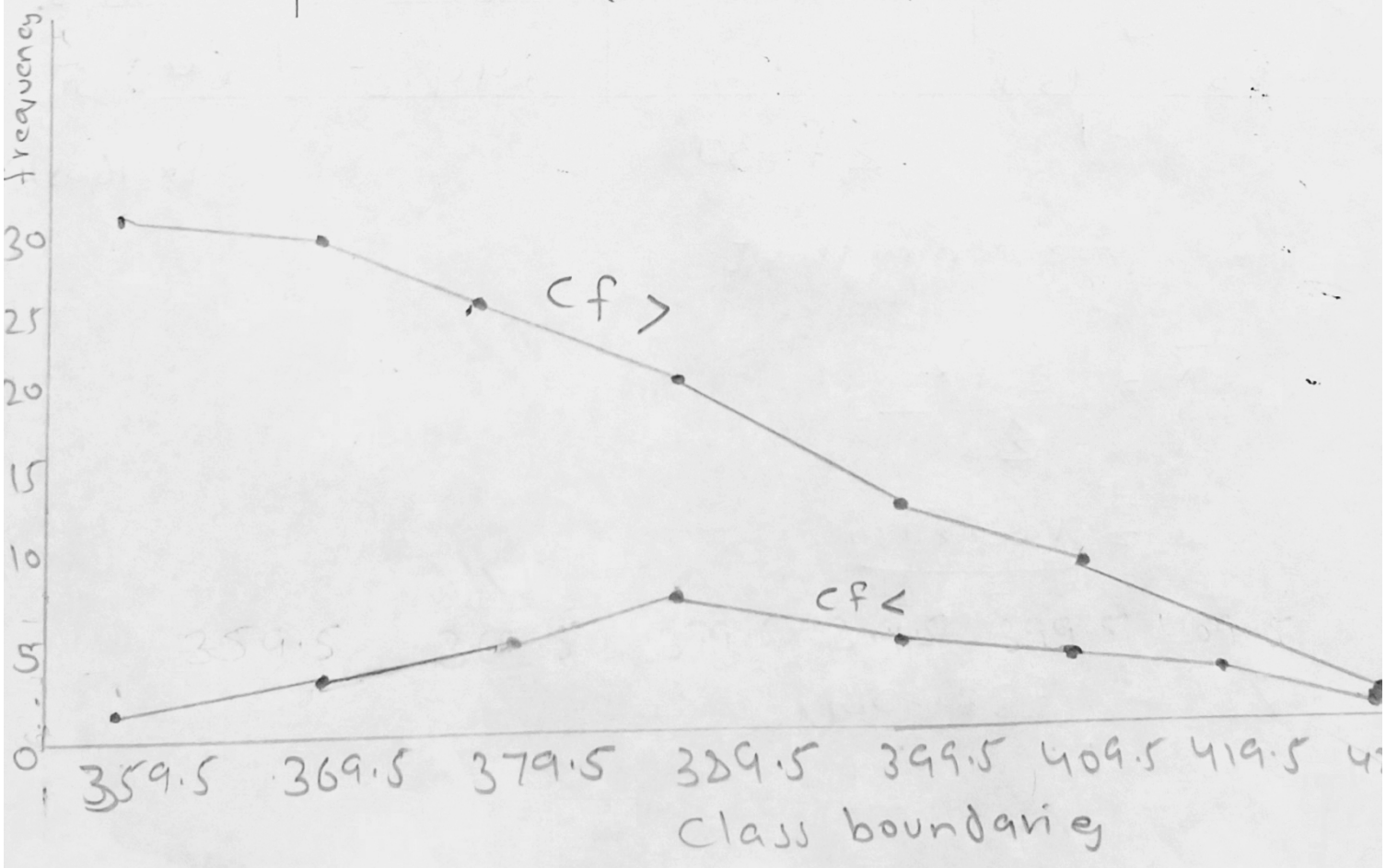
$=$

$h = R/K$

$h = 30/6$

$h = 5$

Classes	Class Boundaries CB	Frequency f	Tally	C.f<	C.f>
360 – 369	359.5 – 369.5	2	II	2	30
370 – 379	369.5 – 379.5	3	III	5	28
380 – 389	379.5 – 389.5	5	IIII	10	25
390 – 399	389.5 – 399.5	7	IIII II	17	20
400 – 409	399.5 – 409.5	5	IIII	22	13
410 – 419	409.5 – 419.5	4	IIII	26	8
420 – 429	419.5 – 429.5	3	III	29	4
430 – 439	429.5 – 439.5	1	I	30	1



Q.2:- For those observation given in Q.1 calculate mean and Geometric mean.

Solution:- To find Mean:-

Classes	frequency	x (midpoint)	(f.x)
360 - 369	2	544.5	1089
370 - 379	3	559.5	1678.5
380 - 389	5	574.5	2872.5
390 - 399	7	589.5	2358
400 - 409	5	604.5	3022.5
410 - 419	4	619.5	2478
420 - 429	3	634.5	1903.5
430 - 439	1	649.5	649.5
	$\Sigma f = 30$		$\Sigma fx = 16051.5$

So, we know that

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

$$= \frac{16051.5}{30}$$

$$\bar{x} = 535.05$$

For geometric Mean Given data is:

423, 369, 387, 411, 393, 394, 371, 377, 389, 409, 392, 408, 431
401, 363, 391, [illegible], 405, 382, 400, 381, 399, 415, 428, 422
396, 372, 410, 419, 386, 390

We know that

$$G = \sqrt[30]{423 \times 369 \times 387 \times 411 \times 393 \times 394 \times 371 \times 377 \times 389 \times 409 \times 392 \times 408 \times 431 \times 401 \times 363 \times 391 \times 405 \times 382}$$
$$\sqrt[30]{400 \times 381 \times 399 \times 415 \times 428 \times 422 \times 396 \times 372 \times 410 \times 419 \times 386 \times 390}$$

Taking log on bothsides

$$\text{Log } G = \text{Log} \sqrt[30]{\text{data}}$$

$$= \log (\text{data})^{\frac{1}{30}}$$

$$= \frac{1}{30} \log (\text{data})$$

$$= \frac{1}{30} [\log 423 + \log 369 + \log 387 + \log 411 + \log 393 + \log 394 + \log 371 + \log 377 + \log 389 + \log 409 + \log 392 + \log 408 + \log 431 + \log 401 + \log 363 + \log 391 + \log 405 + \log 382 + \log 400 + \log 381 + \log 399 + \log 415 + \log 428 + \log 422 + \log 396 + \log 372 + \log 410 + \log 419 + \log 386 + \log 390]$$

$$G_7 = \frac{1}{30}[2.6263 + 2.6670 + 2.5877 + 2.6138 + 2.5943 + 2.5954 + 2.5693 + 2.5763$$
$$2.5864 + 2.6117 + 2.5932 + 2.6106 + 2.6344 + 2.6031 + 2.5599$$
$$2.5921 + 2.6074 + 2.5820 + 2.6020 + 2.5801 + 2.6009 + 2.6180 + 2.6314$$
$$2.6253 + 2.5976 + 2.5705 + 2.6127 + 2.6222 + 2.5865 + 2.5910]$$

$$\log G_7 = \frac{1}{30}[20625 2.73743]$$

$$\log G_7 = 6875.09124$$

Taking antilog

Antilog $\log G_7$ = antilog 6875.09124

$$G_7 = 10.43080.$$

Q.3) Define following Terms:

(a) Population;-

A population or a statistical population is a collection or set of all possible observations whether finite or infinite, relevant to some characteristics of interest. denoted by "N"

Sample;-

A sample is a part or a subset of a population. The number of observation included in a sample is called the size of sample and is denoted by the letter "n"

(b) Range;-

The range is set of data is the difference between the largest and smallest values.

i.e

$$R = X_m - X_0$$

e.g

$X_m = 4$

$X_0 = 2$

So $R = 4 - 2$.

$R = 2$

The Weighted Arithmetic Mean:-

The weighted Arithmetic mean denoted by $\overline{X_w}$ of a set of n values $x_1, x_2, \ldots, x_n$ with corresponding weights $w_1, w_2, \ldots, w_n$ is defined

$$\overline{X_w} = \frac{x_1 w_1 + x_2 w_2 + \ldots + x_n w_n}{w_1 + w_2 + \ldots + w_n}$$

$$= \frac{\Sigma x_i w_i}{\Sigma w_i} \qquad (i = 1, 2, 3, \ldots, n)$$