(1)

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Q:-3

Define the following terms.

(a) Population and Sample.

(b) The Range

(c) The Weighted Arithmetic Mean.

Ans

Population:

In statistics, a population is a set of similar items or events which is of interest for some question or experiment. A statistical population can be a group of existing objects or a hypothetical and potentially infinite group of objects conceived as a generalization from experience.

(a) Sample :-

In statistics and quantitative research methodology, a Sample is a set of individuals or objects collected or selected from a statistical population by defined procedure. the elements of a Sample are known as Sample points.

(B) The Range :-

In statistics, the Range of a set of data is difference between the largest and smallest values.

Q No # 1 Construct a group frequency distribution table and cumulative frequency curve (ogive) for the observations below

423, 369, 387, 411, 393, 394, 371, 377
385, 405, 392, 408, 431, 401, 363, 391,
405, 382, 400, 381, 395, 415, 428, 422
376, 372, 416, 419, 386, 390.

Step No # 1

no of observation = 30
find the largest value $X_m = 431$
" " smallest value $X_o = 371$

$X_m - X_o = 431 - 363 = 68 / = 9.71 \approx 10$

group	F	Tally	C.F.	x (mid point)	C.F
360 - 369	2	II	2	364.5	30
370 - 379	3	III	5	374.5	27
380 - 389	5	IIII	10	384.5	22
390 - 399	7	IIII II	17	394.5	15
400 - 409	5	IIII	22	404.5	10
410 - 419	4	IIII	26	414.5	6
420 - 429	3	III	29	424.5	3
430 - 439	1	I	30	434.5	2
	30			3196	

Q No #2) For observation given in Q1 calculate Mean and geometric mean.

Class	F	C.F	x (midpoint)	f(x)
360 - 369	2	2	364.5	729
370 - 379	3	5	374.5	1123.5
380 - 389	5	10	384.5	1922.5
390 - 399	7	17	394.5	2761.5
400 - 409	5	22	404.5	2022.5
410 - 419	4	26	414.5	1658
420 - 429	3	29	424.5	1273.5
430 - 439	1	30	434.5	434.5
	30			11920

$$\text{Mean} = \frac{\sum f_i x_i}{n}$$

$$\text{Mean} = \frac{11920}{30} = 397.3$$

Mean = 397.3

(b) G.M :-

$$G.M = \text{Antilog}\left|\frac{\Sigma f \log x}{N}\right|$$

$$= \text{Antilog}\left|\frac{149.9}{30}\right|$$

log (x)	f(log x)
2.56	5.12
2.57	7.71
2.58	12.9
2.59	90.3
2.60	13
2.61	10.4
2.62	7.86
2.63	2.63
20.76	149.9

$$G.M = \text{Antilog}\left|\frac{149.9}{30}\right|$$

$$= \text{Antilog}\left|4.996\right|$$

$$\boxed{G.M = 79432.8}$$

Q No # For observation given in Q2 calculate Mean and geometric mean.

Class	F	C.F	X (midpoint)	F(x)
360 - 369	2	2	364.5	729
370 - 379	3	5	374.5	1123.5
380 - 389	5	10	384.5	1922.5
390 - 399	7	17	394.5	2761.5
400 - 409	5	22	404.5	2022.5
410 - 419	4	26	414.5	1658
420 - 429	3	29	424.5	1273.5
430 - 439	1	30	434.5	434.5
	30			11920

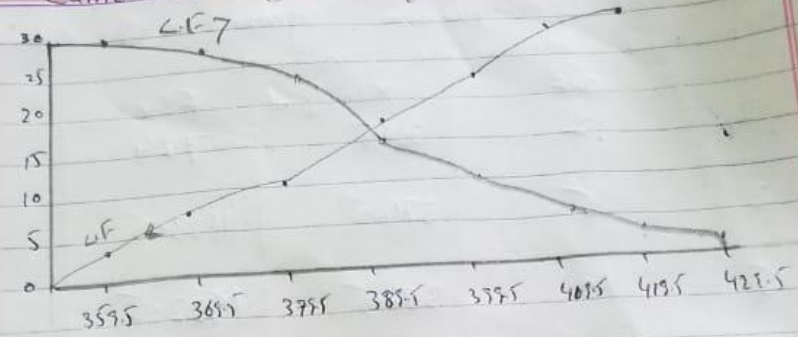
$$\text{Mean} = \frac{\sum f_i x_i}{n}$$

$$\text{Mean} = \frac{11920}{30} = 397.3$$

Mean = 397.3

(3)

Cumulative frequency curve or ogive



419.5 429.5

9.5 429.5

(c) The weighted arithmetic mean is similar to an ordinary arithmetic mean (the most common type of average) except that instead of each of the data points contributing equally to the final average, some data points contribute more than others. the notion of weighted mean plays a role in descriptive statistics and also occurs in a more general form in several other areas of mathematics.
if all the weights are equal, then the weighted mean is the same as the arithmatic mean. while weighted arithmetic means. they do have a few counterintuitive properties, as captured for instance in Simpson's paradox.