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Subject	**Probability & Statistics**
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Submitted to	**SIR DAUD**

Summer-20 Mid Term Assignment

Subject: Probability and Statistics

Note: Please attempt all Questions in sequence. All questions carry equal marks. **(30)**

Q1: Construct a grouped frequency distribution table and cumulative frequency curve (Ogive) for the observations below.

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

Grouped frequency distribution table:

Class Interval	Frequency	Class-Boundries	C.f <	C.f >
360-374	4	359.5-374.5	4	30
375-389	6	374.5-389.5	10	26
390-404	9	389.5-404.5	19	20
405-419	7	404.5-419.5	26	11
420-434	4	419.5-434.5	30	4

C.B = Δ = LCL of 2^{nd} clan-UCL of 1^{st} clan

= 375-374

= 1

C.B = Δ/2 => ½

= 0.5

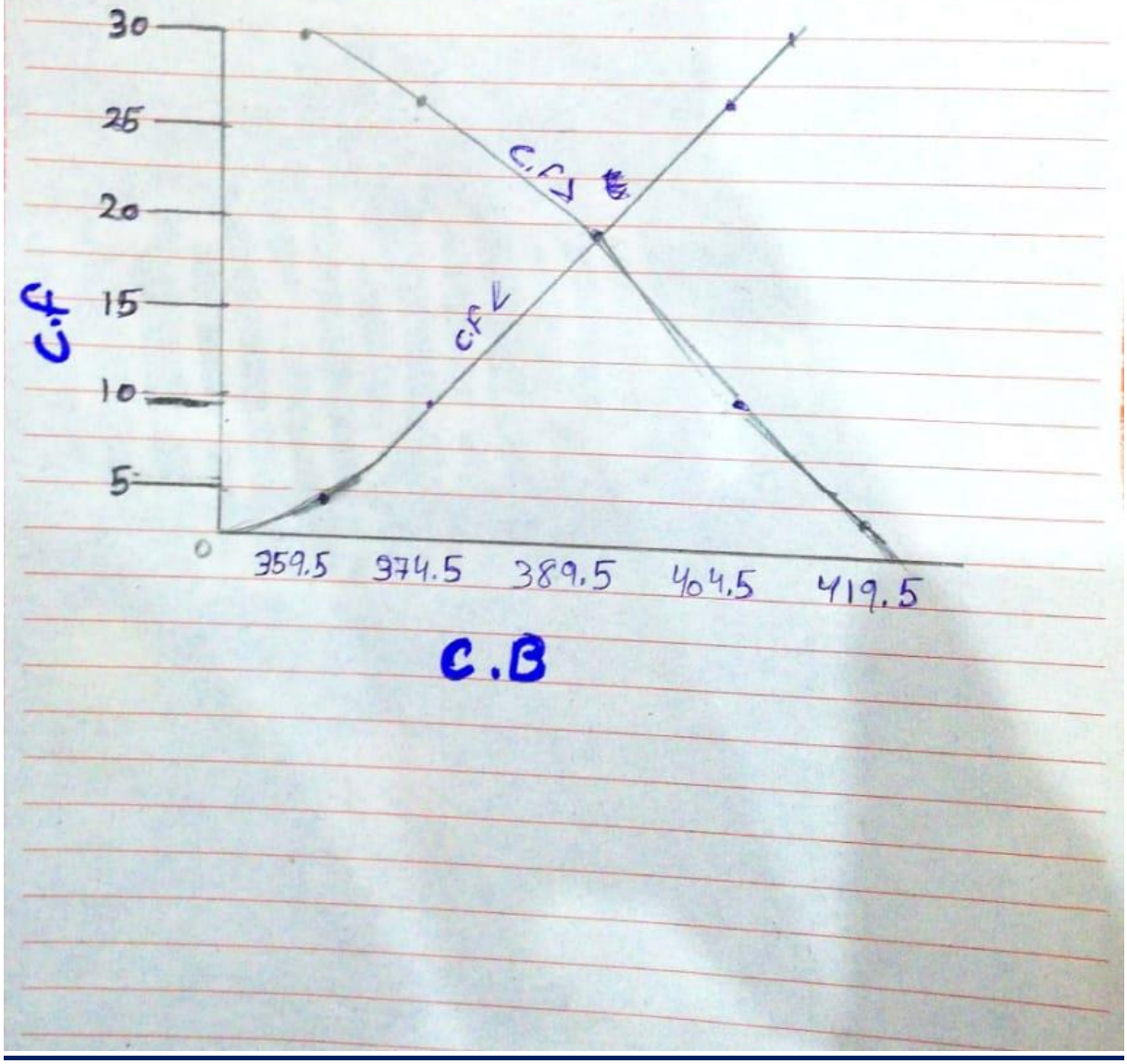
Ogive Diagram:

Date:

ID : 14263

Name : "Hooria Khan Orakzai"

OGIVE DIAGRAMS-



Q2: For the observations given in **Q1** calculate Mean and Geometric Mean.

Classes	frequency	Class-Boundries	Mid-Point x	F.m	Log x	f.log(x)
360-374	4	359.5-374.5	367	1468	2.56	10.24
375-389	6	374.5-389.5	382	2292	2.58	15.48
390-404	9	389.5-404.5	397	3573	2.59	23.31
405-419	7	404.5-419.5	412	2884	2.61	18.27
420-434	4	419.5-434.5	427	1708	2.63	10.52
Total	30					

Mean= $\frac{\sum(f.mid)}{\sum f}$

= $\frac{11925}{30}$

Mean=**397.5**

Geometric Mean:

$$\frac{\text{Antilog } (\sum f\log(x))}{\sum f}$$

= $\frac{\text{Antilog } (77.82)}{30}$

= Antilog (2.594)

G.M = **392.6 Answer**

Q3: Define the following terms

a) Population and Sample

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.
- A statistical population may be real such as the heights of all the college students or hypothetical such as all the possible outcomes from the toss of a coin.
- The number of observations in a finite population is called the size of the population denoted by the letter "**N".**

Sample:

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

  The information derived from a sample data is used to draw conclusions about the population

b) The Range

Range:

The range, the difference between the largest value and the smallest value, is the simplest measure of variability in the data. The range is

determined by only the two extreme data values. The variance (s^2) and the standard deviation (s). For example In {4, 6, 9, 3, 7} the lowest value is 3, and the highest is 9, so the range is 9 − 3 = 6. Range can also mean all the output values of a function.

c) The Weighted Arithmetic Mean

Weighted Arithmetic Mean

The weighted arithmetic mean, denoted by $\overline{Xw}$ of a set on n values $X_1, X_2 \ldots\ldots\ldots X_n$ with corresponding weights $W_1, W_2, \ldots\ldots\ldots W_n$ is defined as

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

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

Good Luck