

stat

Statistical Description of Data.

* Latin :- status, Italian :- statista, German :- statistik, French :- statistique

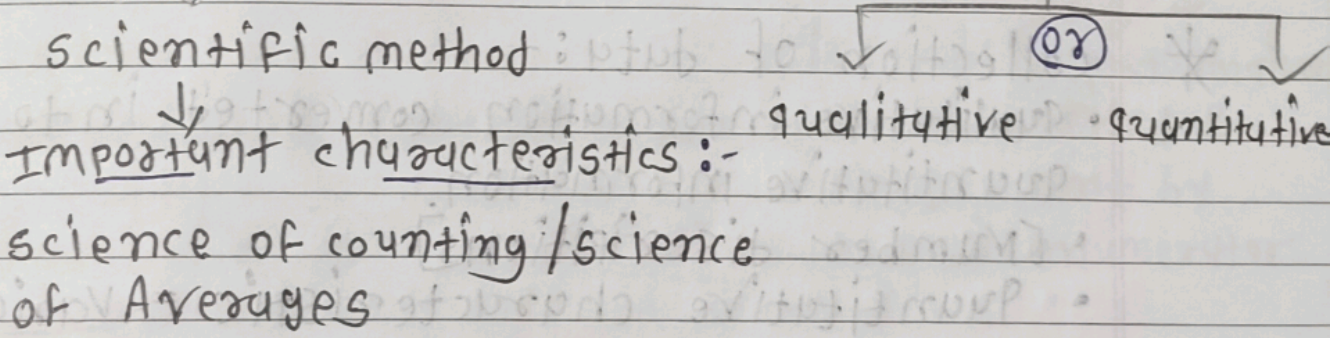
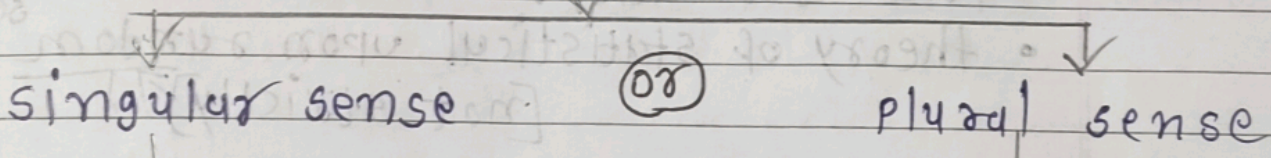
* Statistics was analogous [same] to state.

* Utility :- Arthshashtra [birth & death]
↳ Chandragupta's reign
↳ Fourth century B.C.

Abu Fuzul :- Ain-i-Akbari [statistical record]
↳ Akbar's reign [Egypt]
↳ sixteenth century A.D.

First census :- Pharaoh, 300 B.C. to 2000 B.C.

* Definition of Statistics :-



* Economics :- economics have the roots in statistics.

- economics & statistics are closely associated
- Time Series, Index, Demand Analysis.
- Economics + statistics = Econometrics.

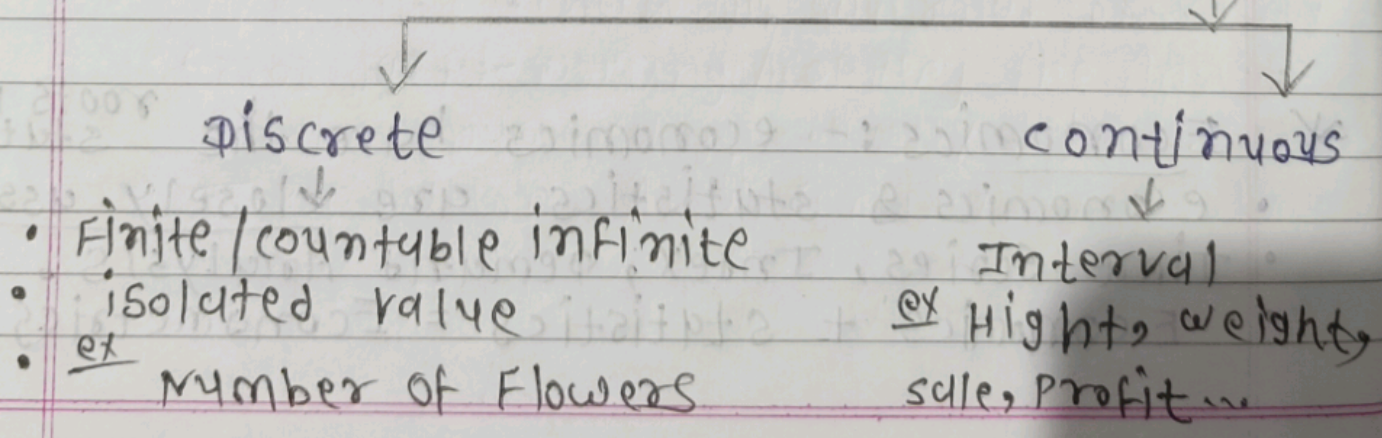
* Business management :-
 make decisions :- hunches [हुरसुती],
 institution [संस्था], trials & errors.
 • merits as well as demerits.

* commerce & Industry :-
 • expanding of Industry,
 • collect, analysed, experts are order to
 maximise profit

→ limitations of the statistics :-

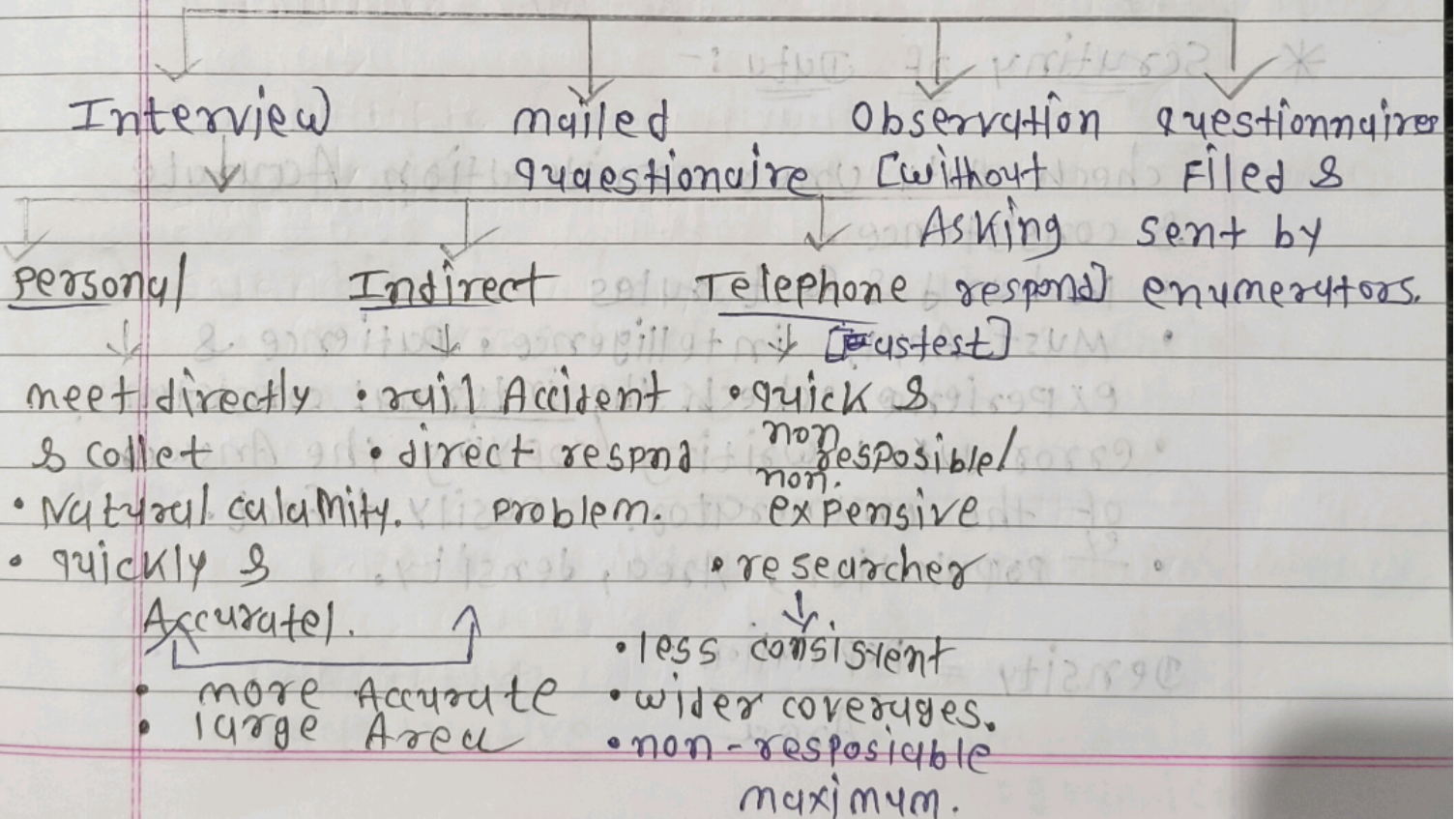
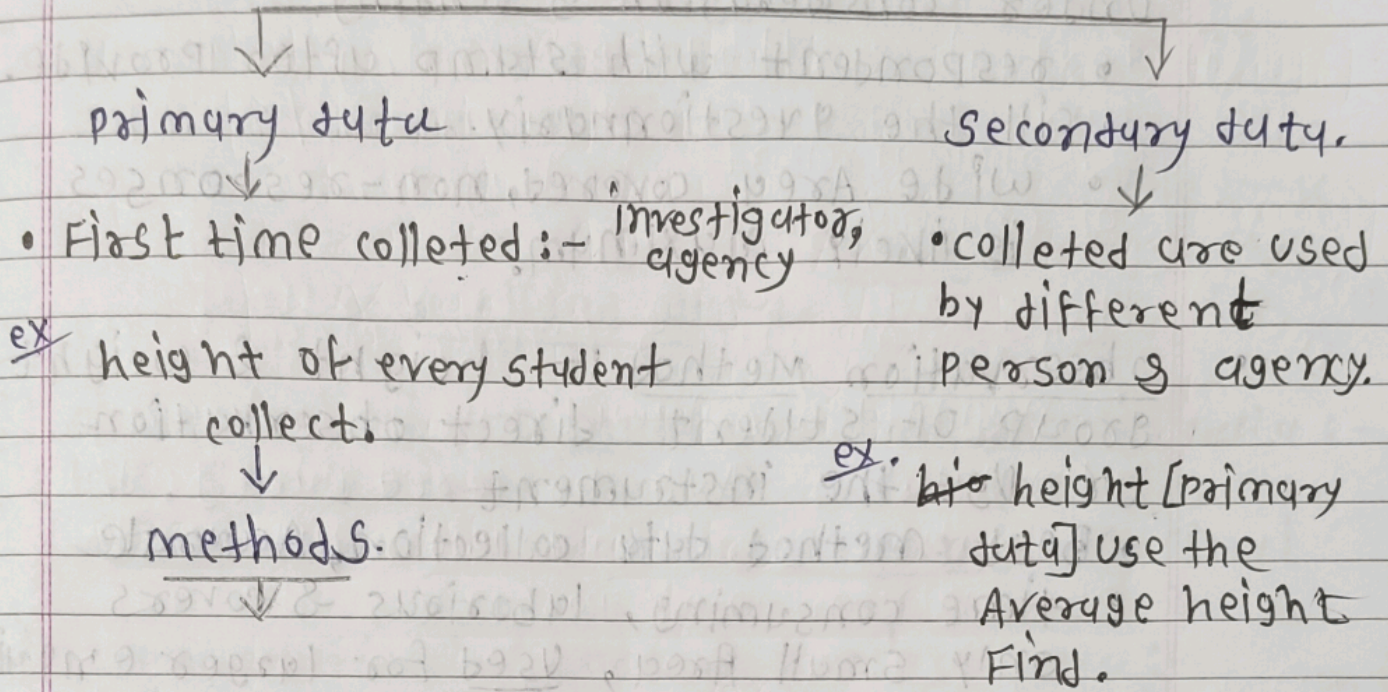
- deals with the aggregates
- concerned with ^{not} qualitative data.
- future projection of sales, production, price & quantity.
- theory of statistical upon random ^{sample} [not strictly]

* collection of data :-
 • qualitative information converted into the quantitative information
 • [Number descriptions]
 • Quantitative characteristic = variable



→ qualitative characteristic :- attribute.
ex gender of baby, colour of a flower.

* classify the data :-



- mailed questionnaire method :- comparison of framing well drafted & soundly sequenced.
 - covering All important aspects. problem under consideration & sending.
 - respondent with stamp after provide...
 - Fill the questionnaire...
 - wide Area covered, non-responses is likely maximum.
- observation method :- height & weight group of student direct observation or use the instrument
 - Best method data collection, Accurate
 - time consuming, laborious & covers only small Area, used for larger enquiries

* Scrutiny of Data :-

- check data under consideration Accurate & consistence.
- No hard & fast rules
- Must Apply intelligence, patience & experience. • check the internal consistency.
- error data :- waiting / copying the Answer of the enumerator. • easily defect.
- ex population, Area, density.

$$\text{Density} = \frac{\text{population}}{\text{Area}}$$

* presentation of data.

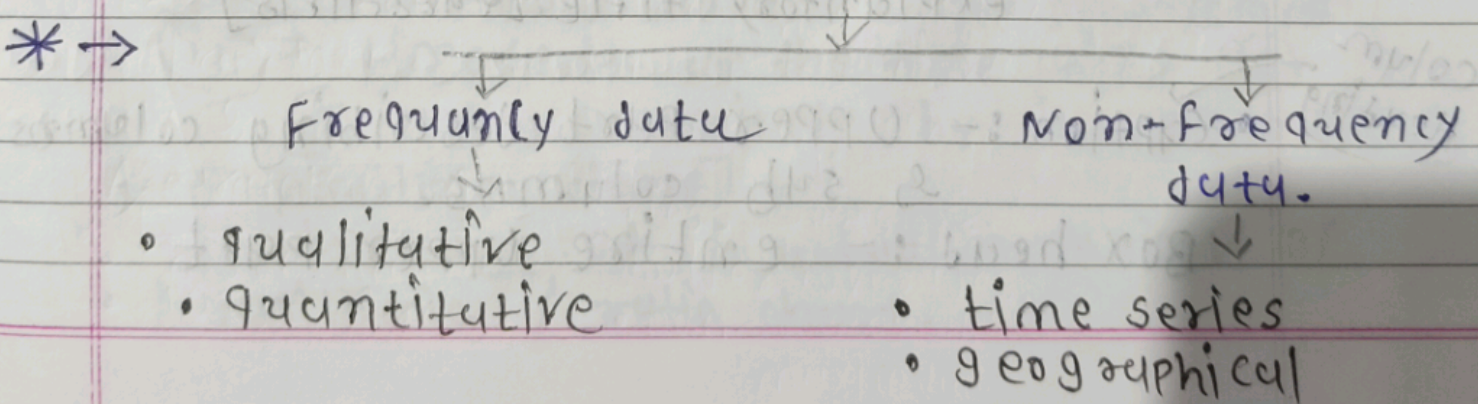
- Statistics depends proper presentation of data.
 - data in neat [सुखर], precise [सुसह], easily understood.
 - comparison possible
 - statistical analysis is possible only for the classified data.

(i) chronological / Temporal / time series data :-
 Sec. successive time points / Intervals.
 ex :- 2000 to 2015 per month CA Final

(ii) geographical / spatial series data :-
 • Arranged in region wise [different place]

(iii) Qualitative / ordinal data :-
 • classified respect of Attribute. [variable]

(iv) quantitative / cardinal data :-
 • In respect of A variable, [height, weight, profit etc.]



* Mode of presentation of output:-

- [Textual, tabular/tabulation, Diagrammatic.]

(i) Textual :- Help → presenting output of a paragraph / number of paragraphs.
 ex:- official report of enquiry commission.

Worst method.

line :- simplicity & layman present data.

- magnitude [अधिक] can be presented
- limitation :- Not preferred [पसंद नहीं], dull, Monotonous, comparison different observation not possible

(ii) * Tabular :- defined :- Sym systematic [Best method] presentation of output
help :- table having rows & columns & complete with reference number, title, description of row & columns, foot notes.

- table Allotted serial number, self explanatory title [स्वयं बताने वाला]

Column Heading

• Caption :- Upper part describing columns & sub columns.

Box head :- entire upper part.

Row Headings

Stylb :- left part of the table rows
 Body :- main data of table [numeric]
 Footnote :- source of data at the bottom of table.

- table \rightarrow balanced length & breadth.
- comparison different figures possible without much labour & time.
- Statistical Analysis without tabulation data is not possible.
- textual & tabulation must be diagrammatic representation.

(iii) Diagrammatic representation of data :-

[Alternative & Attractive] [charts, diagram, maps, sketches, etc.]
 [Used:- educated & uneducated] [pictures]

- tabulation is less accurate.
- Hidden trend.

* Types of diagrams :-

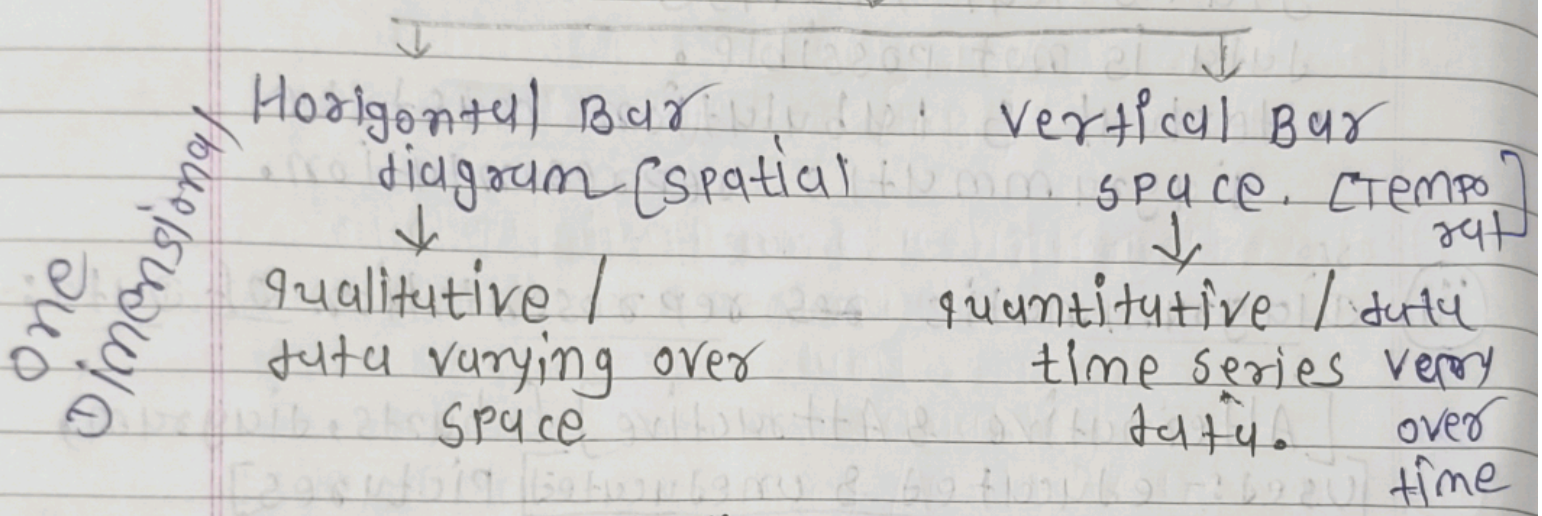
(i) line diagram / Histogram :- vary [over] time

plot each pair value [one dimensional]
 (Y) \rightarrow timeseries at the time point (t)

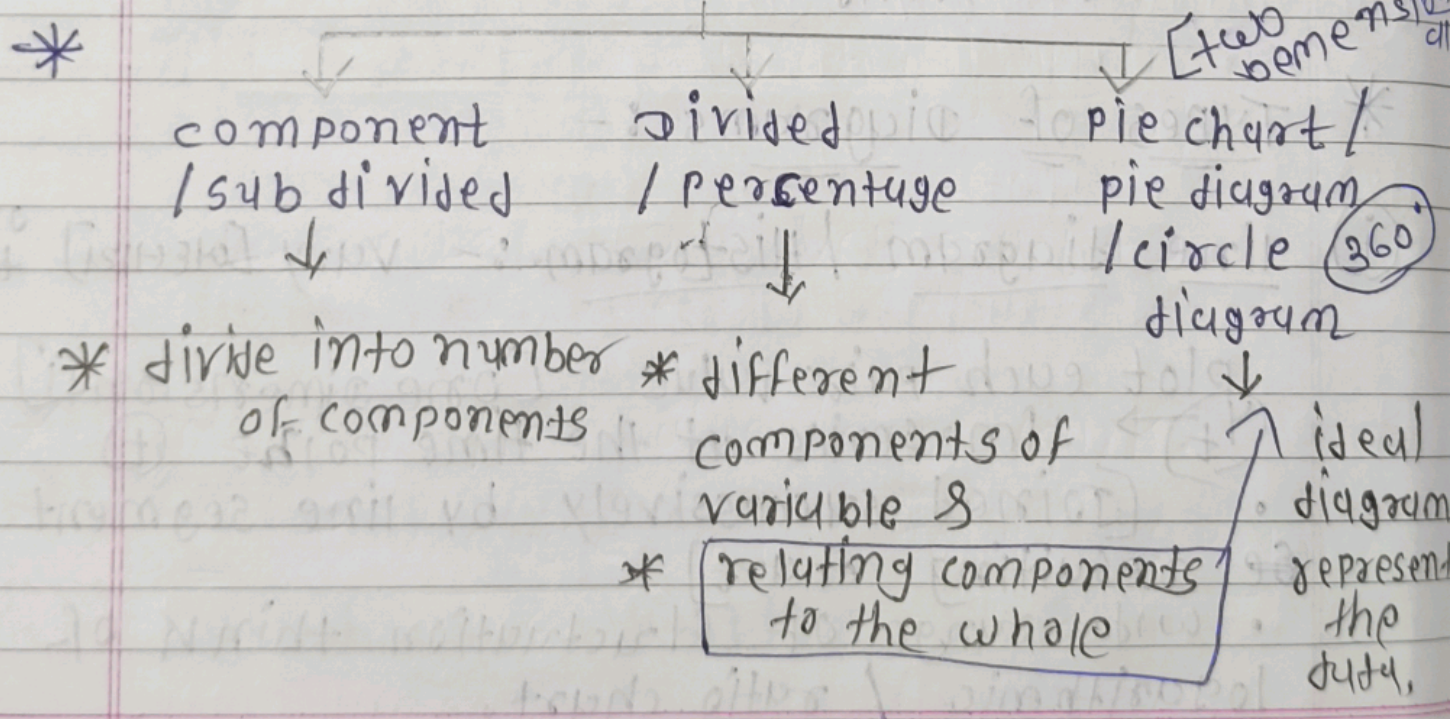
- [Joined successively by line segment & resulting chart]
- wide range of fluctuation think of logarithmic / ratio chart.

- ① log / ratio chart Used for multiple line chart relating time series in the same unit
- ② multiple axis chart the variable expressed in different units more than one and

② Bar diagram :- [only length matters]



• Bar & vertical consider multiple or grouped Bar diagram.



* Frequency Distribution :-

- classify :- variable / Attribute.
- defined :- tabulation representation of statistical data in ascending order
- Individual / group values
- qualitative characteristics - divided into number of categories / class which mutually exclusive & exhaustive
- Frequently particular class :- Frequency of that class
- Statistical table distribution Total Frequency to a number of classes

- Simple frequency distribution / ungrouped / Discrete :- tabulation done respect discrete random variable
- Grouped Frequency distribution :- characteristic condition continuous variable

- * continuous variable in range :- largest - smallest observation
- No. of class interval \times class length \cong range
 - present the class / class interval \rightarrow frequency distribution table

<u>Exclusive</u>	<u>Inclusive</u>
CI 0-2	CI 1-6
2-4	7-12
4-6	13-18

Frequency Density = $\frac{\text{Frequency of class interval}}{\text{class length}}$

* width / size / class interval

UCB - LCB

* cumulative Frequency

- value = discrete variable corresponding class boundary for continuous variable

more than cumulative

less than cumulative

* Relative Frequency / Percentage Frequency
class interval

Class Frequency : Total Frequency

$\frac{\text{class Frequency}}{\text{Total Frequency}} \times 100 (\%)$

ADD → unity, ADD = 100

between 0 and 1

* Graphical Representation of A frequency distribution :-

- ① Histogram / Area diagram → 2 dimension
- ② Frequency polygon → one dimension
- ③ Ogives or cumulative frequency graphs → one dimension

Area diagram

① Histogram: - very convenient [easy] way of ~~represent~~ representing frequency distribution.

Help: - idea of the frequency curve of the variable

- Statistical measure
- comparison the frequencies different class intervals is possible
- mode of diagrammatic representation.

• Draw a histogram :-

- ① class limit cover the class boundaries
- ② series adjacent rectangles one against class interval

- mode using ... • continuous frequency distribution

② Frequency polygon: - single frequency distribution

- Frequency curve regarded to limiting to Frequency polygon.

- two extreme end point = $(x_0, 0)$ $(x_{n+1}, 0)$

Use: - For grouped class also but only length are even.

③ Ogive: - Against class boundaries.

less than type of ogive: - less than cumulative frequency vertical axis.

more than type ogives :- more than cumulative frequency on the vertical axis

- ogive considered quartiles graphically.
- point of Intersection two ogives on the horizontal line segment point given as the value of median.
- Q_2 (middle quartile) ogive can be put use for making short term projection.

$$Q_2 = \text{median}$$

* Frequency Curve :- Free hand curve

- Smooth curve the total area taken to be unity.
 - limiting histogram / frequency polygon.
 - mid point of the upper sides of the rectangle forming the histogram.
- • Bell shaped, U shaped, J shaped, mixed curve
- most commonly used Bell shaped curve
(height, weight, mark, profit)
→ starting for the low value, reaches maximum value, central part, decrease lowest value.

U shaped curve :- Frequency minimum near the central part

of frequency slowly steadily [सम] reaches maximum two extremities.

J shaped curve :- start minimum frequency gradually reaches maximum other extremity. [examples:- metro population] [time base]

• combination of frequency curve = mixed curve

cumulative frequency curve [ogive]

