All DPS Formula:

- **Class Limit:**

If upper Class and lower Class of consecutive Classes are different

i.e 6 → 8
9 → 11

- **Class Boundaries:**

If upper Class and lower Class are same of consecutive classes

i.e 6 → 8
8 → 10

- **Class Marks**

Add upper Class and lower Class of Class Boundaries
Divide it by 2

ie 6 – 8   7
8 → 10   9

- **Class Interval Height**

Difference btw upper Class and Lower Class of Class Boundary

i.e 6 – 8 ⇒ 2
8 – 10 ⇒ 2

Uniform Data

Class Interval for all classes are same

i.e $6 - 8 \rightarrow 2$

$8 - 10 \rightarrow 2$ Uniform Data

Non or Un-Uniform Data

- Class Interval of classes are not same

$6 - 8 \Rightarrow 2$

$8 - 11 \Rightarrow 3$

$11 - 12 \Rightarrow 1$

- So we need Proportional height $= f/h$ $\left(\dfrac{\text{Frequency}}{\text{Class Interval}}\right)$

~~Chart Diagram~~ + Pie Diagram: ⇒ 

→ $\text{Angle} = \dfrac{\text{Component Part}}{\text{Whole Quantity}} \times 360^\circ$

→ Each Component is represent by Unique Key

Histogram ⇒ 

If Data is Uniform We need

- Class Boundaries
- Frequency

If Un-Uniform We need

- Class Boundaries
- Frequency $\rightarrow f$
- Class Interval $\rightarrow h$
- Proportional Height $\rightarrow f/h$

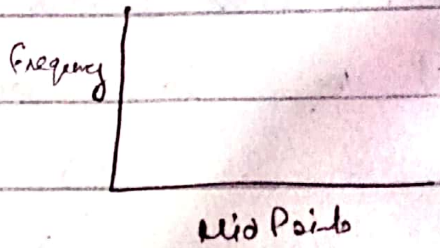
Note :

In Histogram, If data is Un Uniform we need to Graps w.r.t their (heigh \ Class Interval)

Frequeny Polygony:

=> 

- Frequcy
- Mid Points



Measure Of Centeral Tendancy

1) Arithmethic Mean: $\bar{x}$

$$\bar{x} = \frac{\sum x}{n} \qquad \bar{x} = \frac{\sum fx}{\sum f}$$

2) Scale, Change of Origin, Coding

$$u = \frac{x-a}{h}$$

$$\bar{x} = a + \frac{\sum u}{n} \times h \qquad \bar{x} = a + \frac{\sum fu}{\sum f} \times h$$

- We use when Data Uncle is too large so we convert it into Smal Shubams which is easy to Compute and have no effect on Mean

3) Geometric Mean:

$$G = \text{antilog}\left[\frac{1}{n} \times \Sigma \log x\right]$$

$$G = \text{antilog}\left[\frac{1}{\Sigma f} \times \Sigma f \log x\right]$$

4) Harmonic Mean:

$$H = \frac{\Sigma f}{\Sigma f(1/x)} \qquad H = \frac{n}{\Sigma 1/x}$$

Median:

- Value that divides your data in two equal parts.

① Not Necessary, the value is in Data

② Necessary, the value is in Range

i.e 2, 3, 5, 7, 9

5 is median

2, 3, 7, 9

i.e

5 is median

$$\text{median} = l + \frac{h}{f}\left(\frac{n}{2} - c\right)$$ $\Rightarrow$ c, C.f of above Class

$$\text{median Class} = \frac{n}{2}$$ $\Rightarrow$ look in C.f

Mode:-

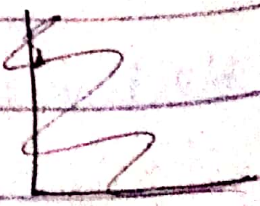
- Most Frequent Value \ Popular Value
- Data having One Mode → Uni-Nodal Data
- Data having Two Node → Bi-Nodel Data

- $$\text{Mode} = l + \frac{f_m - f_1}{(f_m - f_1) + (f_m - f_2)} \times h$$

- Mode Class → highest Frequency occured class

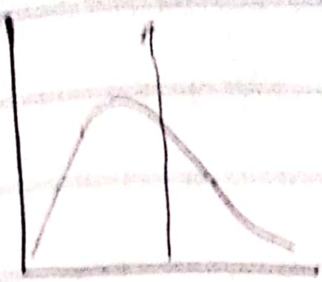
Impeical Relation b/w Mean Median Mode

- Mode = 3 Median - 2 Mean

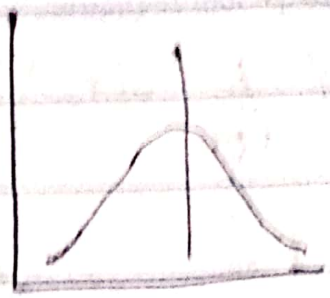


- 3 Possibility

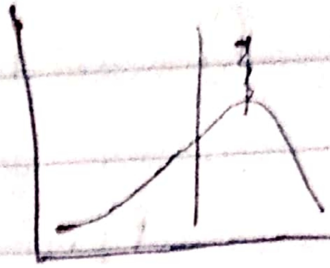
mean > median > mode] Skewed
mean < median < mode]
mean = median = mode - Symetric



-ve Skewed



Symmetric



+ve Skewed

Quartiles → 4

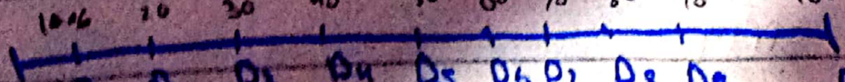
Q_1, Q_2, Q_3 $\qquad$ Q_2 = Median

$$Q_i = l + \frac{h}{f}\left(\frac{i}{4} - c\right)$$

Deciles → 10

$D_1, D_2, \ldots\ldots D_{10}$ $\qquad$ D_5 = Median

$$D_i = l + \frac{h}{f}\left(\frac{i}{10} - c\right)$$



Percentiles: — 100

$$P_i = l + \frac{h}{f}\left(\frac{i}{100} - c\right)$$

$P_1, \ldots\ldots P_{100}$

Variance & Standard Deviation

↳ Absolute Dispersion

- $V = S^2$

- $$S = \sqrt{\frac{\Sigma f x^2}{\Sigma f} - \left(\frac{\Sigma f x}{\Sigma f}\right)^2}$$

- $$S = \sqrt{\frac{\Sigma f u^2}{\Sigma f} - \left(\frac{\Sigma f u}{\Sigma f}\right)^2} \qquad u = \frac{x - a}{h}$$

⇒ • Data Spread kitna Variance yeah Batata

• Max − Min Tells total Spread of Data

Varian & Standard Deviation → Relative Dispersion

To Compare two Data Sets of Different Types

$$C.V = \frac{S}{\bar{x}} \times 100$$

- Coefficient of Variance less means reliable

Moments About Mean

$$M_i = \frac{\Sigma (x-\bar{x})^i}{n} \qquad i = 1, 2, 3, 4$$

$$M_i = \frac{\Sigma f(x-\bar{x})^i}{\Sigma f}$$

- Moments help us to Understand the Shape

M_2 = Variance = V

$V = S^2$

$S = \sqrt{V}$

$B_1 = b_1$

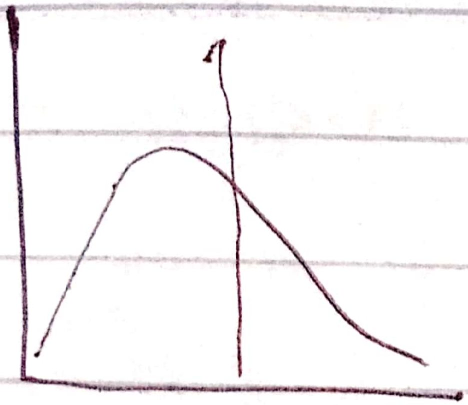
For Large, For Small

$$B_1 = \frac{M_3}{S^3}$$

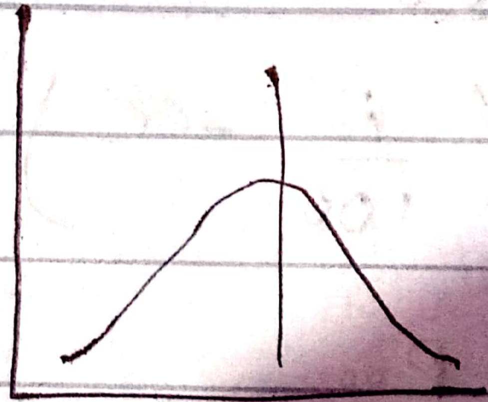
If $B_1 < 0$ → -ve skewed

$B_1 = 0$ → symetric

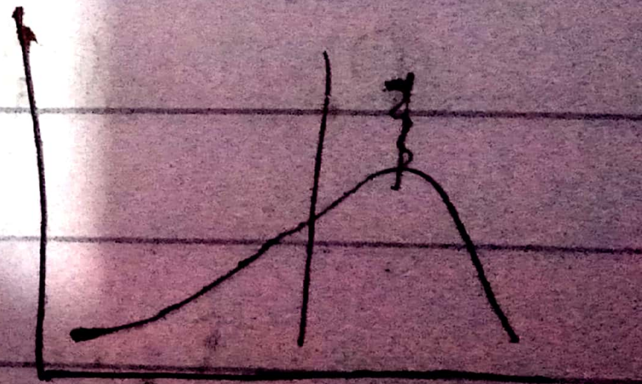
$B_1 > 0$ → +ve skewed



-ve Skewed



Symetric



+ve Skewed

Kurtosis β_2, b_2

$$b_2 = \frac{m_4}{m_2}$$

- If b_2 is mean to 3 data distribution is Normal otherwise Distribution of Differt kind.