FREQUENCY DISTRIBUTION FOR QUANTITATIVE DATA:

(X)

Variable: Price of cellphones (in thousands)

Raw data: { 44, 43, (87), 33, 18, (15), 22, 33, 34, 37, 19, 20, 22, 25, 37, 38, 40, 60, 60, 67, 37, 42, 57, 76, 78, 79, 60, 62, 53, 68, 53, 52, 50, (89), 62, 63

Here n = 36

Step #01: No of thousands

$$K = 1 + 3.33 \log(n)$$

$$K = 1 + 3.33 \log(36)$$

$$K = 6.18 \simeq 6$$

The difference of Class Boundary is called "Width".

Step # 02: Class Width

$$CW = \frac{Range}{K}$$

$$CW = \frac{Max\ Value - Min\ Value}{K}$$

$$CW = \frac{87 - 15}{6}$$

$$\boxed{CW = 12}$$

{NOTE: "If the "Highest Value doesn't exist in last class Boundary. Then, we will increase one or more interval"}

Tally Marks is the Presentation of the data

Step#03:

Class Boundaries	Tally Marks	Frequency	Relative Frequency	Percentage Frequency
$15 \leq x < 27$	𝍸 ||	$F_1 = 7$	$7/36 = 0.194$	19.4 %
$27 \leq x < 39$	𝍸 ||	$F_2 = 7$	$7/36 = 0.194$	19.4 %
$39 \leq x < 51$	𝍸	$F_3 = 5$	$5/36 = 0.138$	13.8 %
$51 \leq x < 63$	𝍸 𝍸	$F_4 = 10$	$10/36 = 0.277$	27.7 %
$63 \leq x < 75$	|||	$F_5 = 3$	$3/36 = 0.083$	8.3 %
$75 \leq x < 87$	|||	$F_6 = 3$	$3/36 = 0.083$	8.3 %
$87 \leq x < 99$	|	$F_7 = 1$	$1/36 = 0.027$	2.7 %
		$\Sigma F = 36$	$\Sigma RF = 0.996$	$\Sigma PF = 99.6$

Data:

min = 5, max = 30

12·5, 29, 22, 15·5, 5, 23, 19, 26, 30, 23, 29, 23
29, 28·5, 21, 27, 16·5, 10, 24, 27·5, 29, 23,
21·5, 18·5, 29, 19, 26·5, 25·5, 29, 26·5, 26,
12, 28·5, 13, 14·5, 13·5, 9·5, 16·5, 21·5, 19·5

Step#01: $K = 1 + 3.33 \log(40)$

$K = 6.334 \simeq 6$

Step#02: $CW = \frac{\text{Range}}{K}$

$CW = \frac{\text{Max Value} - \text{Min Value}}{K}$

$CW = \frac{30 - 5}{6}$

$CW = 4.166$

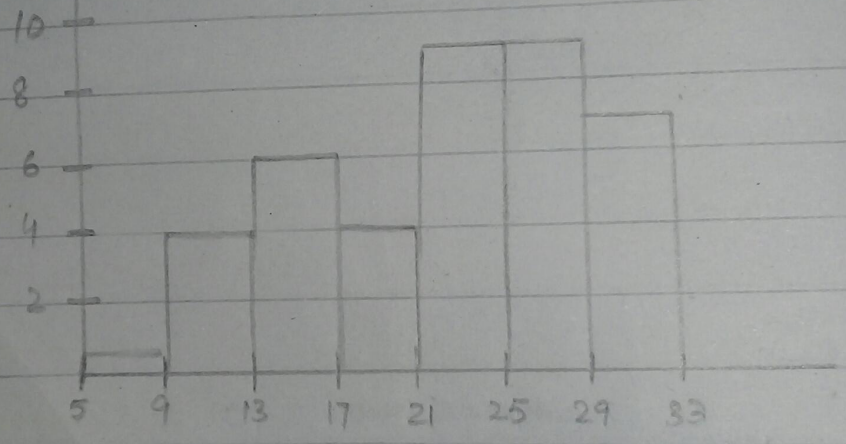
Class Boundaries	Telly Marks	Frequency	Relative Frequency	Percentage Frequency
$5 \leq x < 9$	|	$F_1 = 1$	$1/40 = 0.025$	2.5%
$9 \leq x < 13$	||||	$F_2 = 4$	$4/40 = 0.1$	10%
$13 \leq x < 17$	𝍸 |	$F_3 = 6$	$6/40 = 0.15$	15%
$17 \leq x < 21$	||||	$F_4 = 4$	$4/40 = 0.1$	10%
$21 \leq x < 25$	𝍸 ||||	$F_5 = 9$	$9/40 = 0.225$	22.5%
$25 \leq x < 29$	𝍸 ||||	$F_6 = 9$	$9/40 = 0.225$	22.5%
$29 \leq x < 33$	𝍸 ||	$F_7 = 7$	$7/40 = 0.175$	17.5%
33		$\Sigma f = 40$	$\Sigma RF = 1$	$\Sigma PF = 100\%$

Class Boundaries	Tally Marks	Frequency	Relative Frequency	Percentage Frequency
$0 \leq x < 23$	𝍸 𝍸 𝍸 𝍸 𝍸 𝍸	$F_1 = 26$	$26/30 = 0.866$	86.6%
$23 \leq x < 46$	|	$F_2 = 1$	$1/30 = 0.033$	3.3%
$46 \leq x < 69$		$F_3 = 0$	$0/30 = 0$	0%
$69 \leq x < 92$	|	$F_4 = 1$	$1/30 = 0.033$	3.3%
$92 \leq x < 115$		$F_5 = 0$	$0/30 = 0$	0%
$115 \leq x < 138$	|	$F_6 = 1$	$1/30 = 0.033$	3.3%
$138 \leq x < 161$	|	$F_7 = 1$	$1/30 = 0.033$	3.3%
		$\Sigma F = 30$	$\Sigma RF = 0.998$	$\Sigma PF = 99.8\%$

Frequency distribution for Quantitative data

Midterm marks	CF	F
$5 \leq X < 9$	1	1
$9 \leq X < 13$	5	4
$13 \leq X < 17$	11	6
$17 \leq X < 21$	15	4
$21 \leq X < 25$	24	9
$25 \leq X < 29$	33	9
$29 \leq X < 33$	40	7

HISTOGRAM:



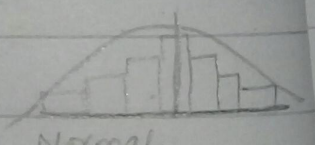
1- Describe the behaviour of data

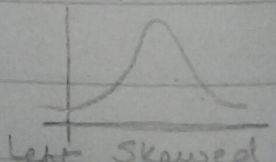
2- Shape of the Distribution

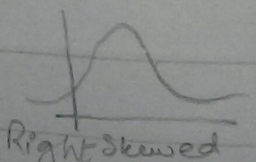
→ When we use statistical inference

- Normal
- Skewed

Parametric & Non-Parametric Methods are applied to Normal & Skewed


Normal distribution


Left Skewed


Right Skewed

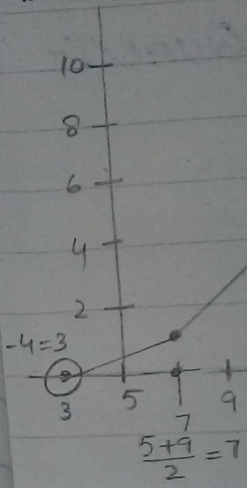
1- $\frac{n}{2}$

Location Y → me

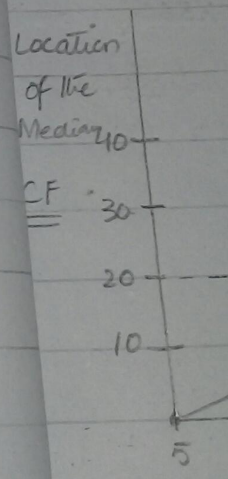
2- Find the Mid

FREQUENC

→ The actual



OGIVE:



50% | 50% Total/2 Top 25%

1- $\frac{n}{2} = 0.5(38) = 19$ → Yaxis axis

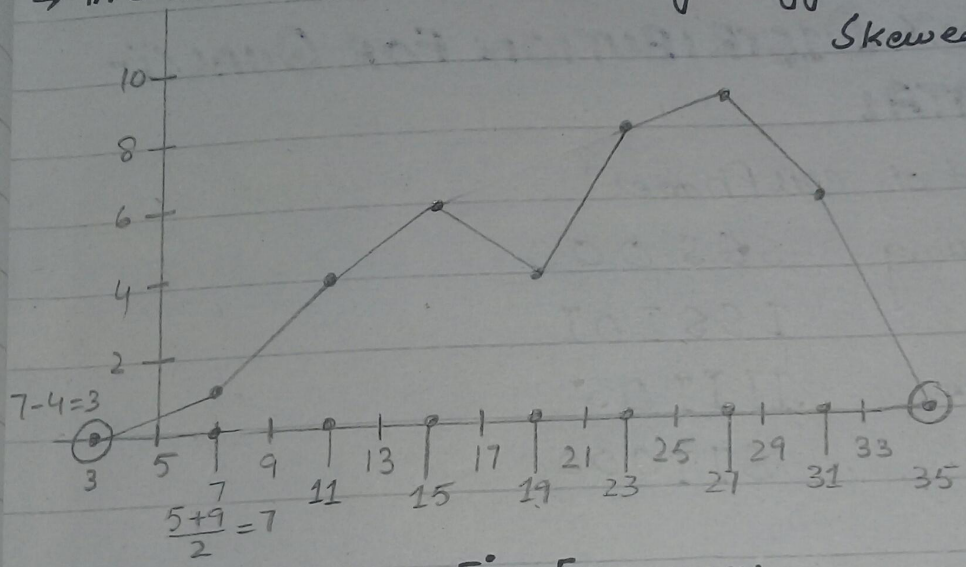
Location Y → median value = x

2- Find the Middle most value = Median

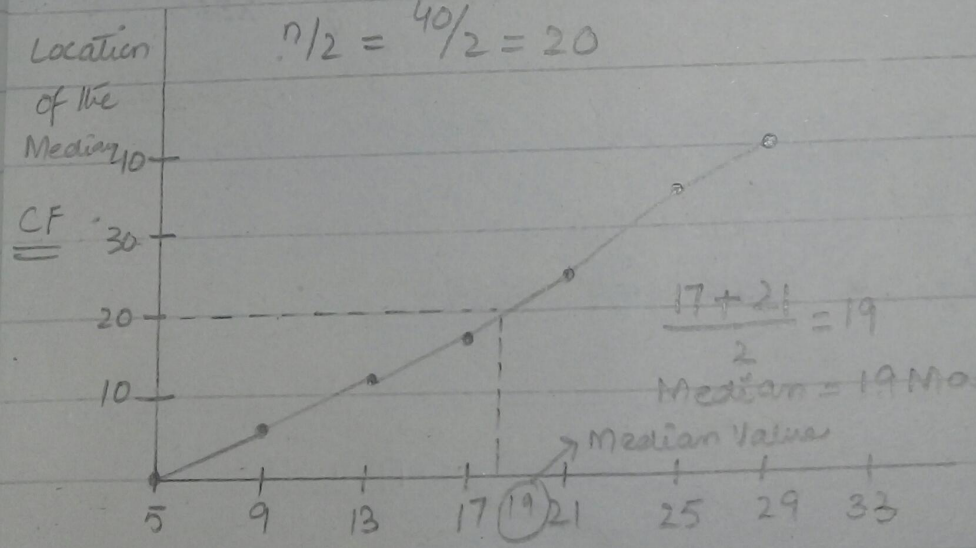
FREQUENCY POLYGON:

→ The actual task of Frequency Polygon is Compairision

Skewed Distribution



OGIVE: ↳ Cumulative Frequency / Aggregate Frequency of



Textbook Author: Allan G Blue Man

The Percentage (rounded to the Nearest whole (Percent) of) persons from each state

FREQUENCY DISTRIBUTION FOR QUALITATIVE DATA:

X = Brand of cellPhones

S = Samsung

O = Oppo

I = Iphone

Data:

S S S O O O

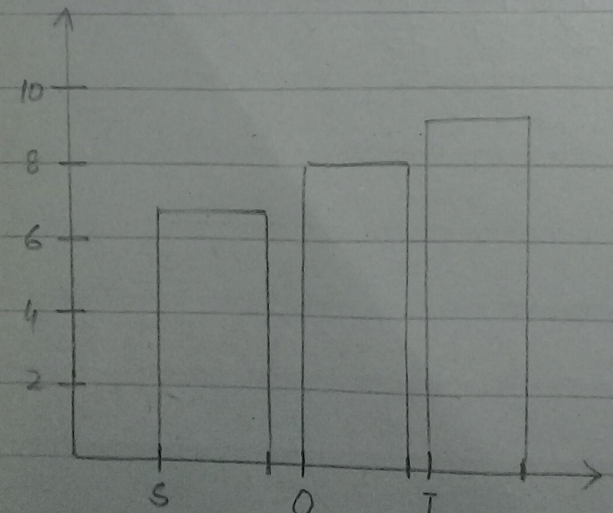
I S S I O I

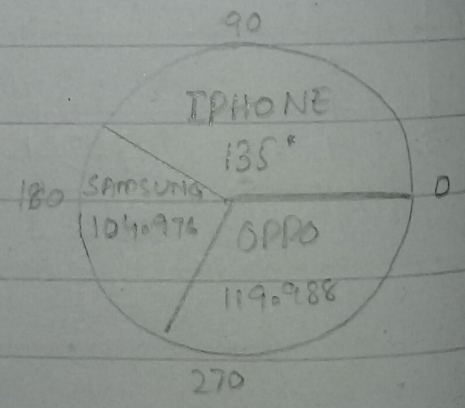
I I I O S

S I I O O O

Brands	Frequency	Relative Frequency	Percentage Frequency	Relative Frequency X360
Samsung	7	$7/24 = 0.2916$	29.16%	104.976
Oppo	8 max	$8/24 = 0.3333$	33.33%	119.988
Iphone	(9)	$9/24 = 0.375$	37.5%	135
	$\Sigma F = 24$	$\Sigma RF = 0.99$	99.99%	

Bar Chart:





Data:

N N T T

N I T N

I N T R

Brands Fre

I

N

T

R

Bar Cha

0

5

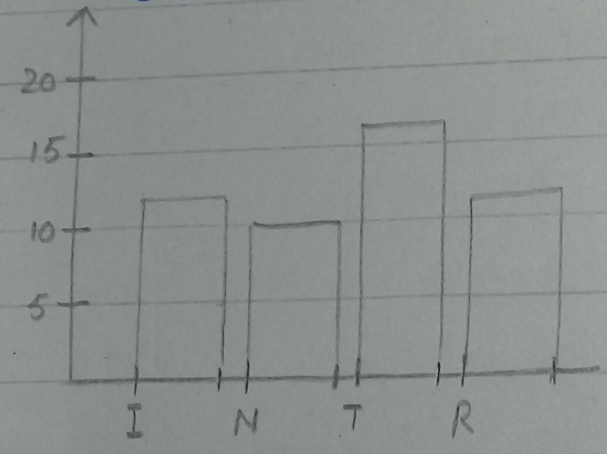
I

Data:

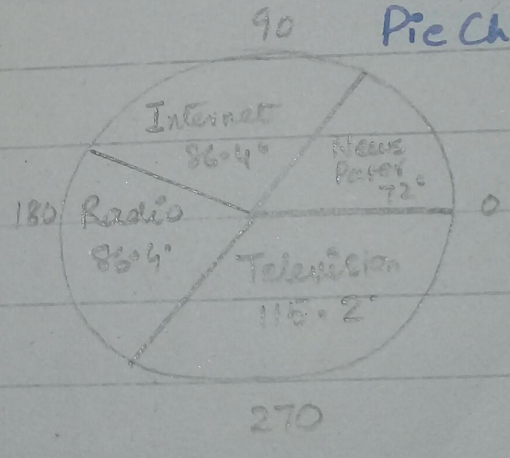
N N T T T I R R I T I N R R I N
N I T N I R T T T T N R R I R R
I N T R T I I T T I N T T I R N R T

Brands	Frequency	Relative Frequency	Percentage Frequency	Relative Frequency * 360
I	12	$12/50 = 0.24$	24%	86.4°
N	10	$10/50 = 0.2$	20%	72°
T	16 more	$16/50 = 0.32$	32%	115.2°
R	12	$12/50 = 0.24$	24%	86.4°
	$\Sigma F = 50$	$\Sigma RF = 1$	$\Sigma PF = 100\%$	

Bar Chart



Pie Chart



Data: 23, 25, 24, 34, 22, 24,
26, 23, (38) max, 24, 24, 17, 28, 23, 30, 25, 30, 22,
33, 24, 28, 36, 24, 19, 25, 31, 24, 31, ~~27~~, 27,
24, 29, 28, 21, 25, 26, (15) min, 26, 22, 27, 21, 25, 28,
24, 21, 25, 26 $n = 50$

$K = 1 + 3.33 \log(n)$

$K = 1 + 3.33 \log(50)$

$K = 6.65 \simeq 7$

$CIN = \frac{\text{Max Value} - \text{Min Value}}{K}$

$CIN = \frac{38 - 15}{7}$

$CIN = 3.28$

Class Boundaries	Frequency	Relative Frequency	Percentage Frequency	CF
$15 \leq X < 18$	|| $F_1 = 2$	$2/50 = 0.04$	4%	2
$18 \leq X < 21$	| $F_2 = 1$	$1/50 = 0.02$	2%	3
$21 \leq X < 24$	~~||||~~ |||| $F_3 = 9$	$9/50 = 0.18$	18%	12
$24 \leq X < 27$	~~||||~~ ~~||||~~ ~~||||~~ |||| $F_4 = (20)$	$20/50 = 0.4$	40%	32
$27 \leq X < 30$	~~||||~~ |||| $F_5 = 8$	$8/50 = 0.16$	16%	40
$30 \leq X < 33$	|||| $F_6 = 4$	$4/50 = 0.08$	8%	44
$33 \leq X < 36$	||| $F_7 = 3$	$3/50 = 0.06$	6%	47
$36 \leq X < 39$	||| $F_8 = 3$	$3/50 = 0.06$	6%	50
39	$\Sigma F = 50$	$\Sigma RF = 1$	$\Sigma PF = 100\%$	

Measure of Central Ten
Mean, Medi
Accur

$X = H$

Data A
1.2
1.4
1.5
1.7
2
2.5

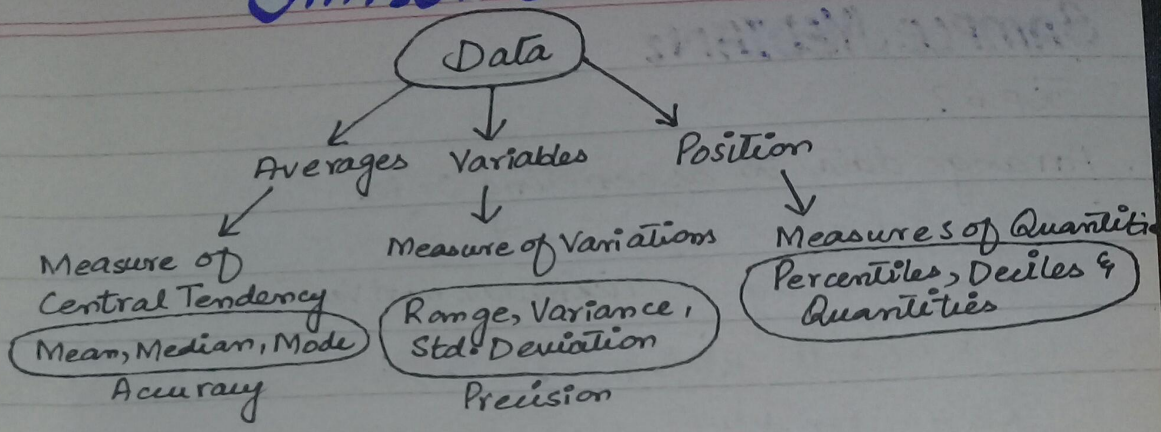
SAM

$\bar{x} =$

$\bar{x}_A$

$\bar{x}$

STATISTICAL MEASUREMENTS:



X = Height of a Laptop (Target 2kg)

Page # 106

Data A	Data B
1.2	2.1
1.4	1.8
1.5	1.9
1.7	2.0
2	1.9
2.5	1.6
	1.2
	1.7

SAMPLE MEAN:

$$\bar{x} = \frac{\sum_{i=1}^{n} x}{n} = \frac{x_1 + x_2 + \cdots\cdots + x_n}{n}$$

$$\bar{x}_A = \frac{1.2 + 1.4 + \cdots\cdots + 2.5}{7} = 1.714 \text{ kg}$$

$$\bar{x}_B = \frac{2.1 + 1.8 + \cdots\cdots + 1.7}{8} = 1.775 \text{ kg}$$

Data B average is more close to target value (2kg) as compared to Data A

SAMPLE MEDIAN:

$\tilde{x}_A = ?$

Arrange data in ascending Order

1- 1.2 + 1.4 + 1.5 + (1.7) + 1.7 + 2 + 2.5

Pick middle most Value

$\tilde{x}_A = 1.7$ kg

2- 1.2 + 1.6 + 1.7 + 1.8 + 1.9 + 2.9 + 2.0 + 2.1

$\tilde{x}_B = \frac{1.8 + 1.9}{2} = 1.85$ kg

SAMPLE MODE:

Most repeated value in the data

$\hat{x}_A = 1.7$ kg

$x_B = 1.9$ kg

SAMPLE RANGE:

Poor $\sum (x_i - \bar{x}) = 0$

R = max Value − Min Value

$R_A = 2.5 - 1.2 = 1.3$ kg

$R_B = 2.1 - 1.2 = 0.9$ kg

SAMPLE VARIANCE:

$$S^2 = \frac{\sum (x_i - \bar{x})^2 + (x_2 - \bar{x})^2 + \cdots + (x_n - \bar{x})^2}{n-1}$$

$$S^2_A = \frac{(1.2 - 1.714)^2 + (1.4 - 1.714)^2 + (1.5 - 1.714)^2 + (1.7 - 1.714)^2 + (1.7 - 1.714)^2 + (2 - 1.714)^2 + (2.5 - 1.714)^2}{7-1}$$

$S^2_A = 0.184$ kg^2

$$S^2B = \frac{(1.2-1.775)^2+(1.6-1.775)^2+(1.7-1.775)^2+(1.8-1.775)^2+(1.9-1.775)^2+(2.9-1.775)^2+(2.0-1.775)^2+(2.1-1.775)^2}{8-1}$$

$S^2B = 0.078 kg^2$

SIMPLE STANDARD DEVIATIONS:

$S = \sqrt{Variance}$

$S_A = \sqrt{0.184}$

$SA = 0.428 kg$

$SB = \sqrt{0.078}$

$SB = 0.279 kg$

CO-EFFEICIENT OF VARIATION:

$$CV = \frac{S}{\bar{x}} * 100$$

$$CVA = \frac{SA}{\bar{x}} * 100$$

$$CVA = \frac{0.428}{1.714} * 100$$

$CVA = 24.9\%$

$$CVB = \frac{SB}{\bar{x}} * 100$$

$$CVB = \frac{0.279}{1.775} * 100$$

$CVB = 15.7\%$

Group A has more Variation as Compared to Group B

Data:

59 52 28 26 19

19 18 17 17 17

SAMPLE MEAN:

$$\bar{x} = \frac{\sum_{i=1}^{n} x}{n} = \frac{x_1 + x_2 + x_3 + \cdots + x_n}{n}$$

$$\bar{x} = \frac{59+52+28+26+19+19+18+17+17+17}{10}$$

$$\bar{x} = 27.2$$

SAMPLE MEDIAN:

$$\tilde{x} = 17+17+17+18+19+19+26+28+52+59$$

$$\tilde{x} = \frac{19+19}{2}$$

$$\tilde{x} = 19$$

SAMPLE MODE:

$$\hat{x} = 17$$

SAMPLE RANGE:

$$R = \text{max Value} - \text{min Value}$$

$$R = 59 - 17$$

$$R = 42$$

MIDRANGE:

$$\text{Mid Range} = \frac{\text{Max} + \text{Min}}{2}$$

$$MR = \frac{59+17}{2}$$

$$MR = 38$$

SAMPLE VARIANCE:

$$S^2 = \frac{\Sigma(x_i - \bar{x})^2 + \ldots + (x_n - \bar{x})^2}{n-1}$$

$$S^2 = \frac{(17-27.2)^2 + (17-27.2)^2 + (17-27.2)^2 + (18-27.2)^2 + (19-27.2)^2 + (19-27.2)^2 + (26-27.2)^2 + (28-27.2)^2 + (52-27.2)^2 + (59-27.2)^2}{10-1}$$

$$S^2 = \frac{2159.6}{9}$$

$$S^2 = 239.95$$

SIMPLE STANDARD DEVIATION:

$$S = \sqrt{239.95}$$

$$S = 15.490$$

CO-EFFICIENT OF VARIATION:

$$CV = \frac{S}{\bar{x}} * 100$$

$$CV = \frac{15.490}{27.2} \times 100$$

$$CV = 56.948$$

CO-EFFICIENT OF SKEWNESS:

$$Sk = \frac{3(\text{mean} - \text{medium})}{\text{Std. deviation}}$$

$$Sk = \frac{3(27.2 - 19)}{(15.490)}$$

$$Sk = 1.5881$$

Question #02

The normal daily high temperatures (in degrees Fahrenheit) in January for 10 selected cities are as follows:

50, 37, 29, 54, 30, 61, 47, 38, 34, 61

The normal monthly precipitation (in inches) for these same 10 cities is listed here

4.8, 2.6, 1.5, 1.8, 1.8, 3.3, 5.1, 1.1, 1.8, 2.5

Compute the mean, median, mode, range, variance & standard deviation for temperatures & precipitation respectively.

SAMPLE MEAN:

$$\bar{x} = \frac{\sum_{i=1}^{n} x}{n} = \frac{x_1 + x_2 + \cdots + x_n}{n}$$

$$\bar{x}_T = \frac{50+37+29+54+30+61+47+38+34+61}{10}$$

$$\bar{x}_T = 441/10$$

$$\boxed{\bar{x}_T = 44.1}$$

$$\bar{x}_i = \frac{4.8+2.6+1.5+1.8+1.8+3.3+5.1+1.1+1.8+2.5}{10}$$

$$\bar{x}_i = 26.3/10$$

$$\boxed{\bar{x}_i = 2.63}$$

SAMPLE MEDIAN:

$$x_T = 29+30+34+37+38+47+50+54+61+61$$

$$x_T = \frac{38+47}{2}$$

$x_T = 42.5$

$xi = 1.1 + 1.5 + 1.8 + 1.8 + 1.8 + 2.5 + 2.6 + 3.3 + 4.8 + 5.1$

$xi = \frac{1.8 + 2.5}{2}$

$xi = 2.15$

SAMPLE MODE:

$x_T = 61$

$xi = 1.8$

SAMPLE RANGE:

R = max value − min value

$R_T = 61 - 29$

$R_T = 32$

$R_i = 5.1 - 1.1$

$R_i = 4$

S.VARIANCE

$$S^2 = \frac{\Sigma_i (xi - \bar{x})^2 + \cdots (x_n - \bar{x})^2}{n-1}$$

$$S_T^2 = \frac{(29 - 44.1)^2 + (30 - 44.1)^2 + (34 - 44.1)^2 + (37 - 44.1)^2 + (38 - 44.1)^2 + (47 - 44.1)^2 + (50 - 44.1)^2 + (54 - 44.1)^2 + (61 - 44.1)^2 + (61 - 44.1)^2}{10 - 1}$$

$$S_T^2 = \frac{1363.71}{9}$$

$S_T^2 = 151.52$

$$S_i^2 = \frac{(1.1 - 2.63)^2 + (1.5 - 2.63)^2 + (1.8 - 2.63)^2 + (1.8 - 2.63)^2 + (1.8 - 2.63)^2 + (2.5 - 2.63)^2 + (3.3 - 2.63)^2 + (4.8 - 2.63)^2 + (5.1 - 2.63)^2}{9}$$

$Si^2 = \frac{16.9601}{9}$

$Si^2 = 1.884$

SIMPLE STANDARD DEVIATION:

$ST = \sqrt{151.52}$

$ST = 12.3093$

$Si = \sqrt{1.884}$

$Si = 1.3725$

Question #03 → Use #02 dataset

→ Compute the coefficient of variation for temperature & precipitation respectively. Comments which data set has more variation

$$CV = \frac{S}{\bar{x}} * 100$$

$CVT = \frac{12.3093}{44.1} * 100$

$CVT = 27.912$

$CVi = \frac{1.3725}{2.63} * 100$

$Cvi = 52.186$

Comments =

b) Compute the coefficient of skewness for temperature & precipitation respectively Comments about the shape of the distribution either (Skewed or Normal)

$$Sk = \frac{3(\text{mean} - \text{median})}{\text{Std. deviation}}$$

↳ All clear
S-Var

$$SK_T = \frac{3(44.1 - 42.5)}{12.3093}$$

$$SK_T = \frac{4.8}{12.3093}$$

$$\boxed{SK_T = 0.3899}$$

$$SK_i = \frac{3(2.63 - 2.15)}{1.3725}$$

$$SK_i = \frac{3(0.48)}{1.3725}$$

$$\boxed{SK_i = 1.049}$$

Comments =

CO-EFFICIENT OF SKEWNESS

$$SK = \frac{3(\text{mean} - \text{median})}{\text{Std. deviation}}$$

Shape of the distribution:

- Normal: $-1 \leq SK \leq +1$
- Skewed
  - $SK < -1$
  - $SK > +1$

Data: (Page # 173)

Attack	71	64	61	65	57
Deaths	1	4	4	7	4

SAMPLE MEAN:

$$\bar{x} = \frac{\sum_{i=1}^{n} x}{n} = \frac{x_1 + x_2 + \cdots + x_n}{n}$$

$$\bar{x}_A = 71 + 64 + 61 + 65 + 57 \,/\, 5 = 63.6$$

$$\bar{x}_D = 1 + 4 + 4 + 7 + 4 \,/\, 5 = 4$$

SAMPLE MEDIAN:

$x_A = 57 + 61 + 64 + 65 + 71$

$\boxed{x_A = 64}$

$x_D = 1 + 4 + 4 + 4 + 7$

$\boxed{x_D = 4}$

SAMPLE MODE:

$\bar{x}_A$ = NOT Available

$\bar{x}_D = 4$

SAMPLE RANGE:

R_A = max value − min Value

$R_A = 71 - 57$

$\boxed{R_A = 14}$

$R_D = 7 - 1$

$\boxed{R_D = 6}$

SAMPLE VARIANCE:

$$S_A^2 = \frac{\Sigma_i (x_i - \bar{x})^2 + \dots (x_n - \bar{x})^2}{n-1}$$

$$S^2_A = \frac{(57-63.6)^2 + (61-63.6)^2 + (64-63.6)^2 + (65-63.6)^2 + (71-63.6)^2}{5-1}$$

$$S_A^2 = \frac{107.2}{4}$$

$\boxed{S^2_A = 26.8}$

$$S^2_B = \frac{(1-4)^2 + (4-4)^2 + (4-4)^2 + (4-4)^2 + (7-4)^2}{5-1}$$

$$S^2_D = \frac{45}{4}$$

$\boxed{S^2_D = 11.25}$

SAMPLE STANDARD DEVIATION:

$S = \sqrt{\text{variance}}$

$S_A = \sqrt{\text{variance}}$

$S_A = \sqrt{26.8}$

$S_A = 5.176$

$S_D = \sqrt{\text{variance}}$

$S_D = \sqrt{11.25}$

$S_D = 3.354$

CO-EFFICIENT OF VARIATION:

$$C_{VA} = \frac{S_A}{\bar{x}_A} * 100$$

$$C_{VA} = \frac{5.176}{63.6} * 100$$

$C_{VA} = 8.138$

$$C_{VD} = \frac{S_D}{\bar{x}_D} \times 100$$

$$C_{VD} = \frac{3.354}{4} * 100$$

$C_{VD} = 83.85$

CO-EFFICIENT OF SKEWNESS:

$$Sk_A = \frac{3(\text{mean} - \text{median})}{\text{std. deviation}}$$

$$Sk_A = \frac{3(63.6 - 64)}{5.176}$$

$$Sk_A = \frac{-2.4}{5.176}$$

$Sk_A = -0.4636$

$$Sk_D = \frac{3(\text{mean} - \text{median})}{\text{Std. deviation}}$$

$$Sk_D = \frac{3(4 - 4)}{3.354}$$

$$Sk_D = \frac{0}{3.354}$$

$Sk_D = 0$

$(7-4)^2$

Score	Frequency	x_i	$x_i f_i$	$x_i^2 f_i$
478-504	4	$478+504/2$ 491	1964	964324
505-531	6	518	3108	1609944
532-558	2	545	1090	594050
559-585	2	572	1144	654368
586-612	2	599	1198	717602
	$\Sigma F = 16$	$\Sigma x = 2725$	$\Sigma x_i f_i =$ 8504	$\Sigma x_i^2 f_i =$ 4540288

$$\bar{x} = \frac{\Sigma x}{n}$$

$$\bar{x} = \frac{\Sigma x_i f_i}{n}$$

Variance

$$S^2 = \frac{n(\Sigma x^2 i f_i) - (\Sigma x_i f_i)^2}{n(n-1)}$$

$$\bar{x} = \frac{2725}{16} = 170.3$$

$$\bar{x} = \frac{8504}{16} = 531.5$$

Model Class = 6 → CB = 505 − 531 =

Variance

$$S^2 = \frac{16(4540288) - (8504)^2}{16(16-1)}$$

$$S^2 = \frac{326592}{240}$$

$$S^2 = 1360.8$$

$$S = \sqrt{1360.8}$$

$$S = 36.889$$

Data

12.5 - 27.

27.5 - 42

42.5 - 57

57.5 - 72

72.5 - 87

87.5 - 102

$\bar{x}$ =

$\bar{x}$ =

variance

S^2

Data	Frequency	xi	xifi	xi^2fi
12.5 - 27.5	6	20	120	2400
27.5 - 42.5	3	35	105	3675
42.5 - 57.5	5	50	250	12500
57.5 - 72.5	8	65	520	33800
72.5 - 87.5	6	80	480	38400
87.5 - 102.5	2	95	190	18050
	$\Sigma F = 30$	$\Sigma x = 345$	$\Sigma xifi =$ 1665	$\Sigma xi^2fi =$ 108825

$$\bar{x} = \frac{\Sigma x}{n}$$

$$\bar{x} = \frac{\Sigma xifi}{n}$$

Variance

$$S^2 = \frac{n(\Sigma x^2 ifi) - (\Sigma xfi)^2}{n(n-1)}$$

$$\bar{x} = \frac{345}{30} = 11.5$$

$$\bar{x} = \frac{1665}{30} = 55.5$$

3640464

$$S^2 = \frac{30(108825) - (1665)^2}{30(30-1)}$$

$$S^2 = 566.12$$

$$S = \sqrt{566.12}$$

$$S = 23.79$$

This Price of cellphones is 25% more than the total cellphones Price

MEASURE OF QUANTILES:

- Percentiles (Divide data into 2 equal Parts)
- Deciles (Divide data into 10 equal Parts)
- Quantiles (Divide data into 4 equal Parts)

Example 1:

X = Price of cellphones (in thousand)

38, 44, 45, 65, 90, 92, 35, 57

Find Q1 = ?

First Step: Arrange in ascending order

: 35, 38, 44, 45, 57, 65, 90, 92

Second Step: $LQ1 = \frac{i}{4}(n)$

$LQ1 = \frac{1}{4}(8)$

$LQ1 = 2$

$Q1 = \frac{38 + 44}{2}$

$Q1 = 41$ thousand

The Price of cellphones is 25% higher from the total cellphone price

Find Q2 = ?

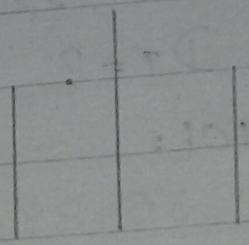
$LQi = \frac{i}{4} \times (n)$

$LQ2 = \frac{2}{4}(8)$

$LQ_2 = 4$

$$Q_2 = \frac{45 + 57}{2}$$

$Q_2 = 51$ thousand



Find $Q_3 = ?$

$$LQ_i = \frac{i}{4} \times (8)$$

$$LQ_3 = \frac{3}{4}(8)$$

$LQ_3 = 6$

$$Q_3 = \frac{65 + 90}{2}$$

$Q_3 = 77.5$ thousand

Find $Q_4 = ?$

$$LQ_i = \frac{i}{4} * (n)$$

$$LQ_4 = \frac{4}{4}(8)$$

$LQ_4 = 8$

$Q_4 = 92$ thousand

X = Price of cellphones (in thousand)

38, 44, 45, 65, 90, 92, 35, 57

Find D_1 = ?

Step #01:

35, 38, 44, 45, 57, 65, 90, 92

Step #02:

$$LDi = \frac{i}{10}(n)$$

$$LDi = \frac{1}{10}(8)$$

$$LDi = 0.8$$

$$D_1 = \frac{57 + 65}{2}$$

D_1 = 61 thousand

Find D_3 = ?

$$LDi = \frac{i}{10}(n)$$

$$LDi = \frac{3}{10}(8)$$

$$LDi = 2.4$$

$$D_3 = \frac{38 + 44}{2}$$

D_3 = 41 thousand

Find D_5 = ?

$$LDi = \frac{i}{10}(n)$$

$$LD5 = \frac{5}{10_2}(8)$$

$$LD5 = 4$$

$$D5 = \frac{57+65}{2}$$

$$D5 = 51 \text{ Thousand}$$

D9 = ?

$$LDi = \frac{i}{10}(n)$$

$$LDi = \frac{9}{10}(8)$$

$$LDi = 7.2$$

$$D9 = \frac{90+92}{2}$$

$$D9 = 91 \text{ Thousand}$$

JMiddle most Value Finding Method

x = Price of cellphones (in thousands)

38, 44, 45, 65, 90, 92, 35, 57

Find P_{50}

$$LPi = \frac{i}{100}(n)$$

$$LP_{50} = \frac{50}{100}(36)$$

$$LP_{50} = 4$$

$$P_{50} = \frac{45 + 57}{2}$$

P_{50} = 51 thousand

QUESTION #05

259, 300, 310, 329, 329, 330, 332, 360, 360,
375, 410, 425, 430, 434, 447, 450, 470, 525,
532, 545, 560, 600, 605, 652, 710, 722, 729,
800, 850, 865, 926, 1036, 1243, 1310, 1979, 2315

Find Q_1, Q_2, Q_3?

$L_{Qi} = \frac{i}{4}(n)$

$L_{Q1} = \frac{1}{4}(36)$

$L_{Q1} = 9$

$Q_1 = \frac{360+375}{2}$

$Q_1 = 367.5$

$L_{Q2} = \frac{2}{4}(36)$

$L_{Q2} = 18$

$Q_2 = \frac{525+532}{2}$

$Q_2 = 528.5$

$L_{Q3} = \frac{3}{4}(36)$

$L_{Q3} = 27$

$Q_3 = \frac{729+800}{2}$

$Q_3 = 764.5$

Find D_4, D_9, D_5,?

$L_{Di} = \frac{i}{10}(n)$

$L_{Di} = \frac{4}{10}(36)$

$L_{Di} = 14.4$

$D_4 = \frac{434+447}{2}$

$D_4 = 440.5$

$L_{D5} = \frac{5}{10}(36)$

$L_{D5} = 18$

$D_5 = \frac{525+532}{2}$

$D_5 = 528.5$

$L_{D9} = \frac{9}{10}(36)$

$L_{D9} = 32.4$

$D_9 = \frac{1036+1243}{2}$

$D_9 = 1139.5$

Find P_{80}, P_{60}, P_{10}?

$L_{Pi} = \frac{i}{100}(n)$

$L_{P80} = \frac{80}{100}(36)$

$L_{P80} = 28.8$

$P_{80} = \frac{800+850}{2}$

$P_{80} = 825$

$L_{P60} = \frac{60}{100}(36)$

$L_{P60} = 21.6$

$P_{60} = \frac{560+600}{2}$

$P_{60} = 580$

$L_{P10} = \frac{10}{100}(36)$

$L_{P10} = 3.6$

$P_{10} = \frac{310+329}{2}$

$P_{10} = 319.5$

Introduction to Probability:

What is Probability?

→ Chance, Possibility or likelihood of an event (interested)

Probability is a Numerical Value

$$0 \leq P(E) \leq 1$$

1- Sample Probability:

$$P(A) = \frac{x}{n}$$

$\frac{x}{n}$ = no of favourable outcome related to event A / total no of outcome

1- Sample Space

Laptop	Black	White	Red	Total
HP	29	30	10	69
DELL	45	15	16	76
Toshiba	18	20	5	43
TOTAL	92	65	31	188

→ If we select a laptop at random. Find the Probability that a laptop colour will be:

(a) Black ⇒ $P(\text{Black}) = \frac{92}{188} = 0.4893$

(b) White ⇒ $P(\text{White}) = \frac{65}{188} = 0.3457$

(c) Red ⇒ $P(\text{Red}) = \frac{31}{188} = 0.1648$

(d) HP = $\frac{69}{188}$ = 0.3670

(e) DELL = $\frac{76}{188}$ = 0.404

(f) TOSHIBA ⇒ P(Toshiba) = $\frac{43}{188}$ = 0.228

2- JOINT PROBABLITY:

two events (A and B)

$$P(A \text{ and } B) = \frac{\text{Interaction Frequency}}{\text{Total No of outcomes}}$$

(g) White and HP ⇒ P(W and HP) = $\frac{30}{188}$ = 0.1595

(h) Red and DELL ⇒ P(R and Dell) = $\frac{16}{188}$ = 0.0851

(i) White and Toshiba ⇒ P(W and Toshiba) = $\frac{20}{188}$ = 0.1063

imp

(j) Dell & HP ⇒ P(Dell and HP) = $\frac{0}{188}$ = 0

3- CONDITIONAL PROBABLITY:

$$P(A \text{ given that } B) = \frac{P(A \text{ and } B)}{P(B)}$$

(k) Black given that Toshiba

$$= \frac{P(\text{Black and Toshiba})}{P(\text{Black})}$$

$$= \frac{18/188}{43/188}$$