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# Chapter No #1

Q 1.15

- (a) Quantitative
- (b) Quantitative
- (c) Qualitative
- (d) Quantitative
- (e) Quantitative

Q 1.20

- (a) Time Series data
- (b) Time Series data
- (c) Cross-section data
- (d) Cross-section data

Q 1.21

- (a) Cross-section data
- (b) Cross-section data
- (c) Time-series data
- (d) Time-series data

Q 1.33

- (a) Sample
- (b) population
- (c) Sample
- (d) population

Q. 2.14

(2)

Chapter Note

(a)

Class Boundary	(xi) Class Midpoints
-0.5 to 3.5	$\frac{3.5 + (-0.5)}{2} = 1.5$
3.5 to 7.5	$\frac{7.5 + 3.5}{2} = 5.5$
7.5 to 11.5	$\frac{11.5 + 7.5}{2} = 9.5$
11.5 to 15.5	$\frac{15.5 + 11.5}{2} = 13.5$
15.5 to 18.5	$\frac{15.5 + 18.5}{2} = 17$

(3)

(b)

$$\frac{19 - 0}{5} = \frac{19}{5} = |3.8| = 4$$

Yes, all the classes have the same width.

(c)

Relative Frequency	Percentage Distribution
$18/80 = 0.225$	$0.225 \times 100 = 22.5$
$26/80 = 0.325$	$0.325 \times 100 = 32.5\%$
$22/80 = 0.275$	$0.275 \times 100 = 27.5\%$
$11/80 = 0.1375$	$0.1375 \times 100 = 13.75\%$
<del>8</del> $3/80 = 0.0375$	$0.0375 \times 100 = 3.75\%$

$$\sum f = 80$$

(d) ( $X_i \Rightarrow 8$ )

$$27.5 + 13.75 + 3.75 = \\ = 45\%$$

Q 2.18

③ S.D.

(a)

Class Limits	Tally	Frequency
36,000 - 40,999		6
41,000 - 45,999		9
46,000 - 50,999		18
51,000 - 55,999		6
56,000 - 60,999		7
61,000 - 65,999		5

(b)

$$\sum f_i = 51$$

Relative Frequency	Percentage Distribution
$6/51 = 0.118$	$0.118 \times 100 = 11.8\%$
$9/51 = 0.176$	$0.176 \times 100 = 17.6\%$
$18/51 = 0.353$	$0.353 \times 100 = 35.3\%$
$6/51 = 0.118$	$0.118 \times 100 = 11.8\%$
$7/51 = 0.137$	$0.137 \times 100 = 13.7\%$
$5/51 = 0.098$	$0.098 \times 100 = 9.8\%$

(c) skewed because  $\text{avg} = 8.5$  and there is an outlier

(d) ( $X < 56,000$ )

$$\begin{aligned}
 & 11.8 + 17.6 + 35.3 + 11.8 \\
 & = 76.2\%
 \end{aligned}$$

Q2.19

(a)

Class Limits	Tally	Frequency
21 - 23		7
24 - 26		4
27 - 29		9
30 - 32		4
33 - 35		6

(b)  $\sum f = 30$

Relative Frequency	Percentage Distribution
$7/30 = 0.233$	$0.233 \times 100 = 23.3\%$
$4/30 = 0.133$	$0.133 \times 100 = 13.3\%$
$9/30 = 0.30$	$0.30 \times 100 = 30\%$
$4/30 = 0.133$	$0.133 \times 100 = 13.3\%$
$6/30 = 0.20$	$0.20 \times 100 = 20.0\%$
$18.3\% + 13.3\% = 31.6\%$	$31.6\% = 12\text{P}$
$18.3\% + 13.3\% = 31.6\%$	$31.6\% = 12\text{P}$

relative no of right hand =  $2.8 = \text{prob second bonus}$

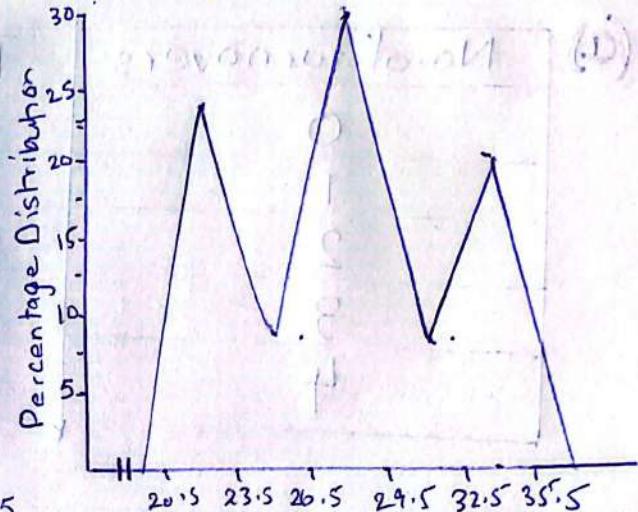
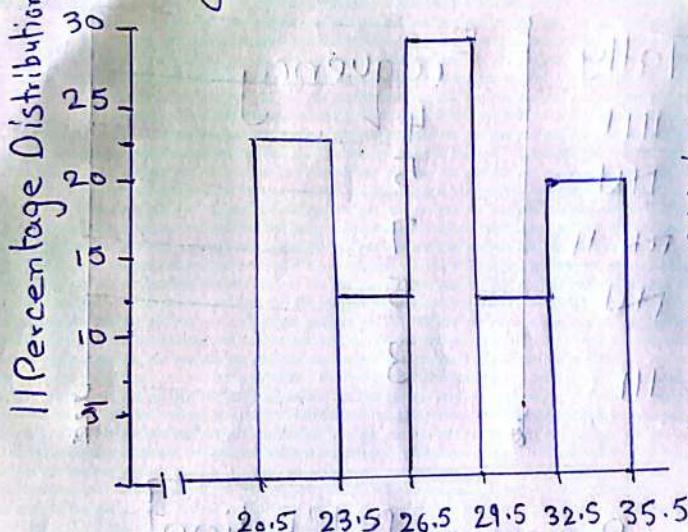
Next page  $\rightarrow$  (Q2.19 part 2)

8.11 + 8.12 + 8.13 + 8.14 + 8.15

8.12 + 8.13 =

(5)

For histogram class boundaries need to be used



(d)

30% of the computers were produced for the interval 27-29.

Q 2.23

(a)

Class limits	Tally	Frequency
47.5 - 51.4		2
51.5 - 55.4		5
55.5 - 59.4		3
59.5 - 63.4		5
63.5 - 67.4		5
67.5 - 71.4		3

(b)

Relative Frequency	Percentage Distribution
$2/22 = 0.091$	$0.091 \times 100 = 9.1\%$
$5/22 = 0.227$	$0.227 \times 100 = 22.7\%$
$3/22 = 0.136$	$0.136 \times 100 = 13.6\%$
$4/22 = 0.182$	$0.182 \times 100 = 18.2\%$
$5/22 = 0.227$	$0.227 \times 100 = 22.7\%$
$3/22 = 0.136$	$0.136 \times 100 = 13.6\%$

Q 2.28

22.53  
key  
stem / n <=

(a)

No. of turnovers	Tally	Frequency
0		4
1		3
2		7
3		5
4		3

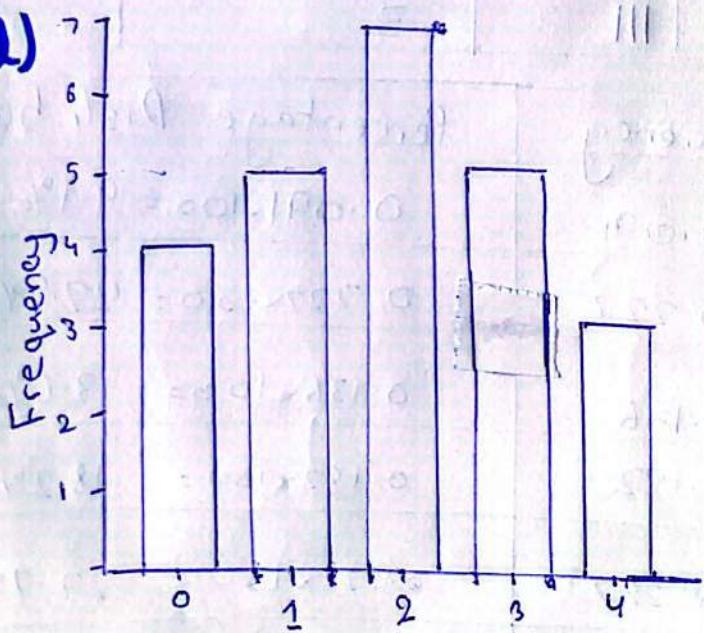
(b)

Relative Frequency	Percentage Distribution
$4/24 = 0.17$	$0.17 \times 100 = 17\%$
$5/24 = 0.21$	$0.21 \times 100 = 21\%$
$7/24 = 0.29$	$0.29 \times 100 = 29\%$
$5/24 = 0.21$	$0.21 \times 100 = 21\%$
$3/24 = 0.13$	$0.13 \times 100 = 13\%$

(c) ( $X \Rightarrow 2$ )

$$2(7) + 3(5) + 4(3) = 41$$

(d)



Q 2.53

(7)

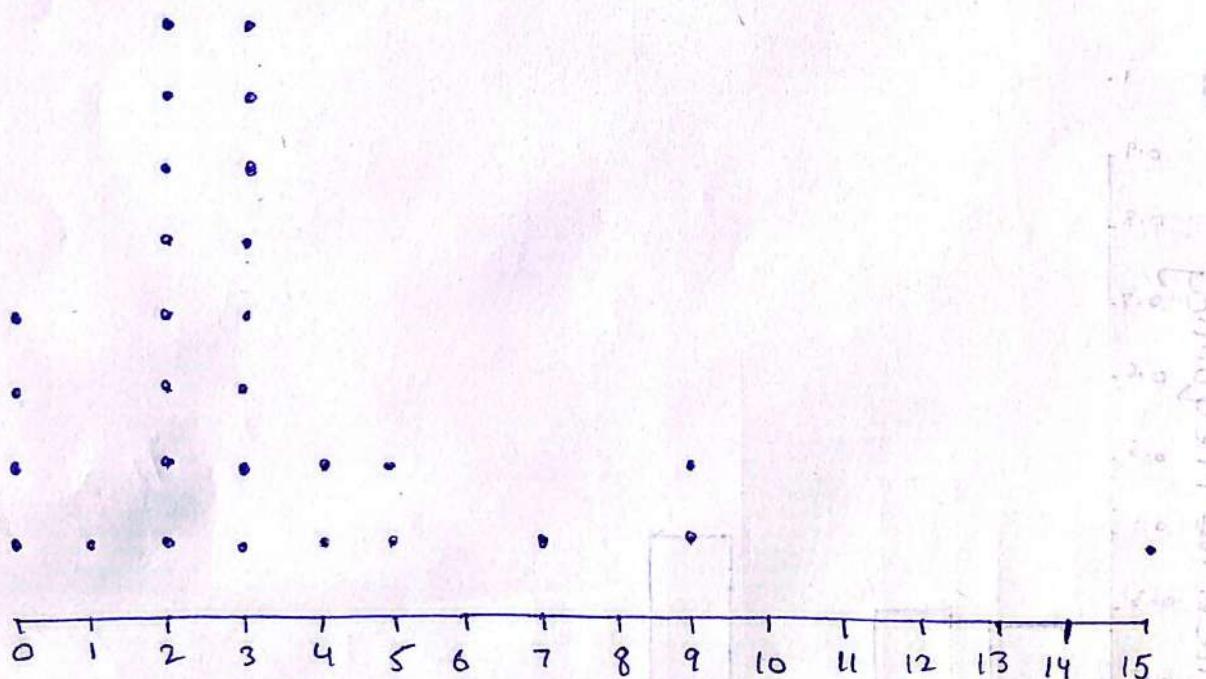
key  
 stem | leaf

means 10

0	5 7
1	0 1 5 7 9
2	1 2 3 6 6 9
3	2 3 9
4	3 8
5	0
6	5

Q 2.62

(8)



0 to 5 clustered data

15 - outlier

Q 2.67

(a)

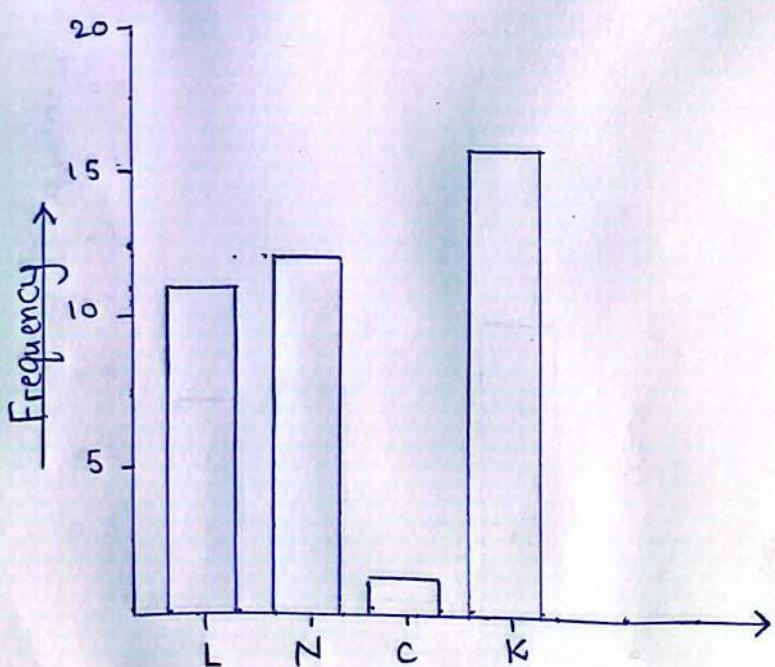
Class	Tally	Frequency
L		11
N		12
C		1
K		16

$$\sum f = 40$$

(b)

Relative Frequency	Percentage Distribution
$11/40 = 0.275$	$0.275 \times 100 = 27.5\%$
$12/40 = 0.30$	$0.30 \times 100 = 30\%$
$1/40 = 0.025$	$0.025 \times 100 = 2.5\%$
$16/40 = 0.40$	$0.40 \times 100 = 40\%$

(c)



(c) Conversion in degrees

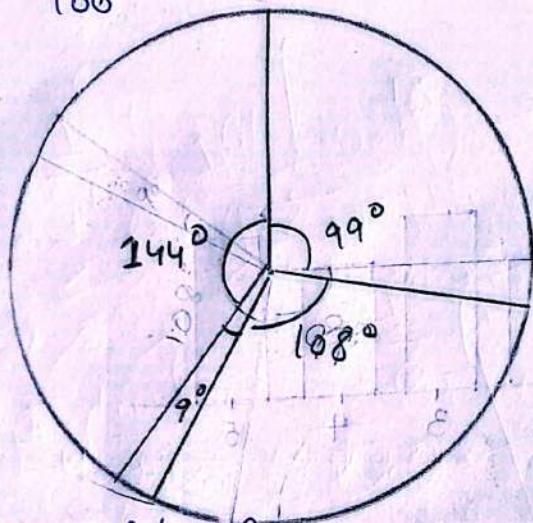
(S x 9)

$$\frac{27.5}{100} \times 360^\circ = 99^\circ = F.H + D.S + F.d$$

$$\frac{30}{100} \times 360^\circ = 108^\circ$$

$$\frac{2.5}{100} \times 360^\circ = 9^\circ$$

$$\frac{40}{100} \times 360^\circ = 144^\circ$$



(d) 27.5% said too liberal

Q2.69

Correct Names	Tally	Frequency
BAJU		1
1		3
2		4
3		5
4		4
5		6

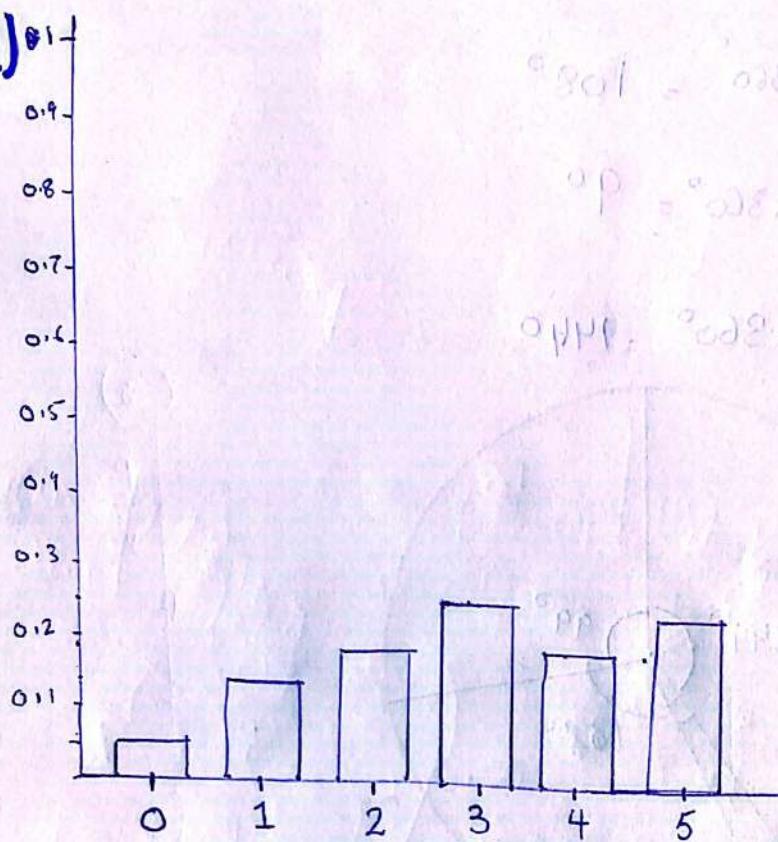
(b)

Relative Frequency	Percentage Distribution
$1/24 = 0.0417$	$0.0417 \times 100 = 4.17\%$
$3/24 = 0.125$	$0.125 \times 100 = 12.5\%$
$4/24 = 0.167$	$0.167 \times 100 = 16.7\%$
$6/24 = 0.25$	$0.25 \times 100 = 25\%$
$4/24 = 0.167$	$0.167 \times 100 = 16.7\%$
$6/24 = 0.25$	$0.25 \times 100 = 25\%$

(c) ( $x < 2$ )

$$16.7 + 12.5 + 4.7 = 33.9\%$$

(d)



Q 2.73

(a)

Class Boundaries	Tally	Frequency
1 - 1400		11
1401 - 2800		10
2801 - 4200		2
4201 - 5600		3
5601 - 7000		4

Note  
Q 2.70 on  
~~next~~ page

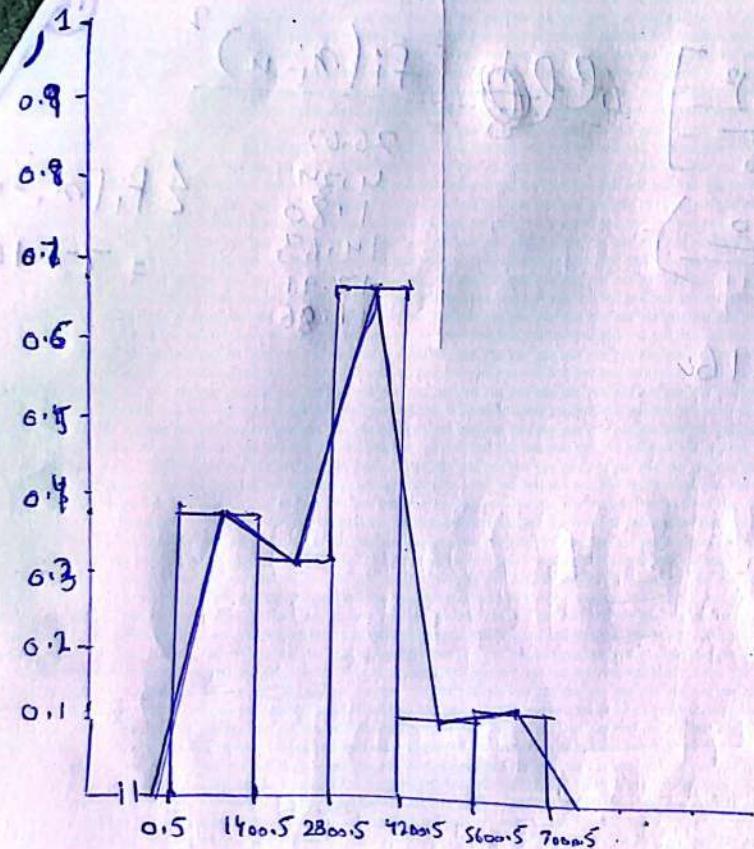
26 8 27)

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Second  
Last

(b)

Relative Frequency	Percentage Distribution
$11/30 = 0.367$	$0.367 \times 100 = 36.7\%$
$10/30 = 0.333$	$0.333 \times 100 = 33.3\%$
$2/30 = 0.667$	$0.667 \times 100 = 66.7\%$
$3/30 = 0.100$	$0.100 \times 100 = 10\%$
$4/30 = 0.133$	$0.133 \times 100 = 13.3\%$



(ii)

$$(d) 4200.5 - 5600.5$$

$$\text{Class width} = 5600.5 - 4200.5 \\ = 1400$$

### Chapter # 03

#### Q 3.70

mean :-

$$m = \frac{11(0) + 14(1) + 9(2) + 7(3) + 4(4) + 1(5)}{11 + 14 + 9 + 7 + 4 + 1}$$

$$m = \frac{0 + 14 + 18 + 21 + 12 + 5}{45} = \frac{70}{45} = 1.556 \text{ errors/match}$$

Variance :-

$x_i$	Frequency	$f_i x_i$	$x_i^2$	$f_i x_i^2$	$(x_i - \bar{x})^2$	$\sum f_i x_i^2 = 180$	$f_i(x_i - \bar{x})^2$
0	11	0	0	0	-1.556	12.42 x 11	0.31 x 14
1	14	14	1	14	-0.556	12.42 x 14	0.20 x 9
2	9	18	4	36	0.444	12.42 x 9	2.09 x 7
3	7	21	9	63	1.444	12.42 x 7	5.97 x 3
4	4	12	16	48	2.444	12.42 x 4	11.86 x 1
5	1	5	25	25	3.444	12.42 x 1	

$$\text{Q1} = \frac{1}{6} \left[ 186 - \frac{(70)^2}{6} \right] \quad \cancel{6^2} = \cancel{6} \times \cancel{f_i(n_i-u)}^2$$

$$6^2 = \frac{1}{6} \left[ 186 - \frac{4900}{6} \right]$$

$$6^2 = \frac{1}{6} \times 77.16$$

$$6^2 = 12.86$$

Standard Deviation

$$\sqrt{6^2} = \sqrt{12.86}$$

$$6 = 3.59$$

Q3.92

a) Arrange data using stem and leaf

4	5   4 . 7 . 8 . x . 8 . 9 . 8 . 8 . 8 . 9 x 2 8 . 7
5	x 2 8 1 8 8 2 1 2 0 4 3
<u>Reordering data</u>	
4	1, 2, 3, 4, 5, 6, 6, 7, 7, 8, 8, 8, 9,
5	0, 0, 1, 1, 2, 2, 2, 3, 3, 4, 6.

Key

4 | 1

means 41

$$\text{Q}_2 = \frac{25+1}{2} = \frac{13}{2} = 13^{\text{th}} \text{ Class} \leftarrow \text{median (2nd Quartile)}$$

$$= 48$$

$$\text{Q}_1 = \left( \frac{n+1}{4} \right) = \frac{26}{4} = 6.5$$

$$\frac{45+46}{2} = 45.5$$

(13)

$$Q_3 = \frac{3(25+1)}{4} = \frac{3(26)}{4} = 19, 5^{\text{th}} \text{ Class}$$

$$\frac{52+52}{2} = 52$$

Inter Quartile Range

$$52 - 45.5 = \\ = 6.5$$

(b)  $\frac{53 \times 25}{100} = 13.25^{\text{th}} \text{ Class}$

$$= 48$$

(c)  $\frac{\text{No. of values less than } Q_1}{\text{Total values in dataset}} \times 100$

$$\frac{14}{25} \times 100 = 56\%$$

Q 3.97

Stem and Leaf

3	5 6
4	22 30 68 94
5	33 77
6	00 04 17 25 28 39 47 90
7	62 28 47 49 72 91
8	05

Key  
stem 8 | leaf  
means 805

(8)

$$\text{Q}_1 = \frac{1}{4} \left[ \frac{22}{2} + \left( \frac{22}{2} + 1 \right) \right] = \frac{11+1}{2} = \frac{12}{2} = 6$$

$\frac{1}{4} [625.5 + 628] = 312.5$  Below median  
 $= 533$

$$\text{Q}_2 = \frac{3}{4} \left[ \frac{22}{2} + \left( \frac{22}{2} + 1 \right) \right] = \frac{1}{2} [11 + 12] = 11.5^{\text{th}} \text{ Class}$$

$$= \frac{625 + 628}{2} = 626.5$$

$$\text{Q}_3 = \frac{3}{4} \left[ \frac{3 \times 22}{2} + \left( \frac{3 \times 22}{2} + 1 \right) \right] = \frac{(n+1)}{2} = \frac{11+1}{2} = 6$$

$$= \frac{3}{4} [16.5 + 17.5] = \frac{12}{2} = 6^{\text{th}} \text{ Class}$$

$25.5^{\text{th}} \text{ class}$  Above median 6<sup>th</sup> class  
 $= 728 \checkmark$

$$\text{Inter Quartile Range} = 728 - 533 = 195$$

$$(b) \frac{30 \times 22}{100} = 6.6$$

$$\frac{572 + 533}{2} = 552.5$$

$$(c) \frac{5}{22} \times 100 = 22.73\%$$

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on next page

Q3.99

(15)

### Arrang Data (Stem and Leaf method)

2	4 2 8 5	2 4 5 8
3	6 1 2 5 4	1 2 4 5 6
4	3 2 1 7 9	2 3 7 9
5	5 2 8 9	2 5 8 9
6	3 1 5 1	1 1 3 5
7	3	3
8	8	8
9		

$$\text{Median} = \frac{1}{2} \left[ \frac{24+12}{12} + \left( \frac{12+1}{2} + 1 \right) \right] = \frac{12+13}{2} = 12.5$$

$$\frac{43+47}{2} = 45$$

Q1 = Half below median

$$\frac{1}{2} \left( \frac{12+16}{12} + \left( \frac{12+1+1}{2} + 1 \right) \right) = \frac{1}{2} [15+17] = 16$$

$$\text{P1} = \frac{32+34}{2} = 33$$

Q3 = Half above median

$$\begin{aligned} \text{P3} &= \frac{59+61}{2} = 60 \\ \text{IQR} &= 60 - 33 = 27 \end{aligned}$$

$$\text{Inter Quartile Range} = 60 - 33 = 27$$

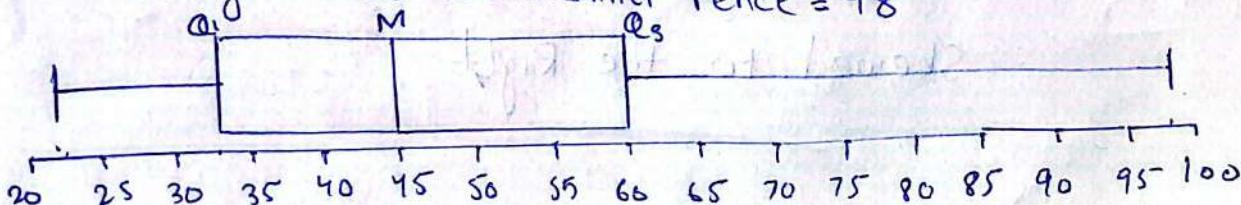
$$1.5 \times \text{IQR} = 40.5$$

$$\text{Lower Inner Fence} = 33 - 40.5 = -7.5$$

$$\text{Upper Inner Fence} = 60 + 40.5 = 100.5$$

Smallest value within Inner Fence = 22

Largest value within Inner Fence = 98



There are no outliers

Q3.105

Key

3.118

means 318

stem and Leaf arranging

3	18 36 37 39 62 63 66 69 72 75 78 81
3	84 85 86 87 90 93 95
4	03 05 09 17 31 33 34 38 44 61 80

Median =

$$\frac{1}{2} \left[ \frac{\frac{15}{15}}{12} + \left( \frac{\frac{15}{15}}{12} + 1 \right) \right] = \frac{1}{2} [15 + 16] = 15.5$$

$\frac{386+387}{2} = 386.5$

$$Q_1 = \frac{15+1}{2} = \frac{16}{12} = 8^{\text{th}} \text{ Class}$$

$= 369$

$Q_3 = 417$

$$\text{Inter Quartile Range} = 417 - 369$$

$= 48$

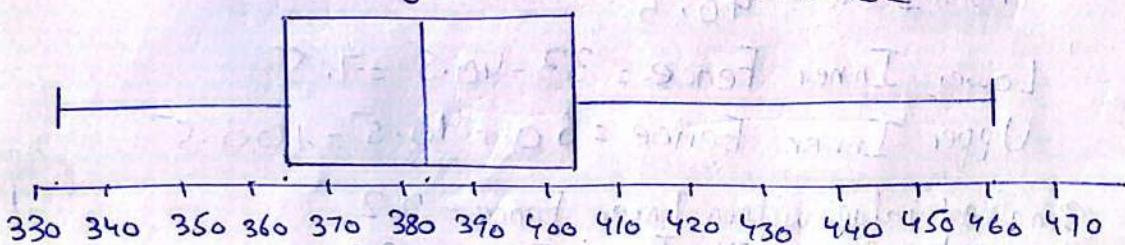
$1.5 \times IQR = 72$

Lower Inner Fence =  $\frac{369 - 48}{2} = 321$

Upper Inner Fence =  $417 + 48 = 465$

Smallest within Innerfence = 336

Largest within Innerfence = 461



Skewed to the Right

Q. 3.123

$$\frac{75+69+87+x}{5} = 80$$

(Total 60)

$$\frac{231+x}{5} = 80$$

$$231+x = 400$$

$$x = 400 - 231$$

$$x = 169 \text{ marks}$$

Q. 3.124

$$(a) \frac{5 \times 12,000 + x}{6} = 20,000$$

$$60,000 + x = 120,000$$

$$x = 120,000 - 60,000$$

$$x = \$60,000$$

(b) You can take median to avoid the influence of outliers.

Q. 3.125

$$(a) \text{Range} = 11 + 2 = 13$$

$$\text{Median} = 78$$

$$\text{Mean} = \frac{78 + 4m}{5} = \frac{78 + 4(76)}{5} = 76.4$$

(b) Only mean can be determined

$$\text{mean} = \frac{4(76) + 72}{5} = 75.2$$

$$\text{S.P.} = \frac{50}{8} = \frac{25}{4} = 6.25$$

Q 3.138

(a) Total weight = 12,372

Avg = 51.55 pound/piece

$$\frac{12,372}{f} = 51.55$$

$$f = \frac{12,372}{51.55}$$

f = 240 pieces in total

(b) Total Friends = 7  
avg = 81

$$\frac{81+25+93+88+82+85+71}{7} = 81$$

$$567 + x = 567$$

$$567 + x = 567 - 504 \quad (d)$$

$$x = 63$$

## Comprehensive Problems

### Problem 1

$$\begin{aligned}(a) \text{ Range} &= R_{\max} - R_{\min} \\ &= 120 - 23 \\ &= 97\end{aligned}$$

$$\text{Number of Classes} = 1 + 3.5 \log(97)$$

$$= 7.95 \approx 8$$

$$\text{Height} = \frac{R}{N} = \frac{97}{8} = 12.125 \approx 13$$

(19)

(c)

Class Limits	Class Boundary	Tally	Frequency
23 - 35	22.5 - 35.5		9
36 + 48	35.5 - 48.5		15
49 - 61	48.5 - 61.5		22
62 - 74	61.5 - 74.5		17
75 - 87	74.5 - 87.5		12
88 - 100	87.5 - 100.5		16
101 - 113	100.5 - 113.5		3
114 - 126	113.5 - 126.5		2
			$\sum f = 96$

(b)

Stem	Leaf
2	3 8
3	0 0 0 1 4 4 5 8 8 8 9 9
4	0 0 0 0 0 0 0 5 5 5 5
5	0 0 0 0 0 3 5 5 6 6 6 6 6 6 8 9
6	0 0 0 0 0 0 4 5 5 6 6 6 6 7 7 7 8
7	0 0 0 0 0 3 5 5 6 7 7 8 8 8 9
8	0 0 5 8 8 9
9	0 0 0 0 0 0 (0) 2 5 6 9 9
10	0 0 1 5 9 1 1 2 0 1 0 1
11	0 5
12	0

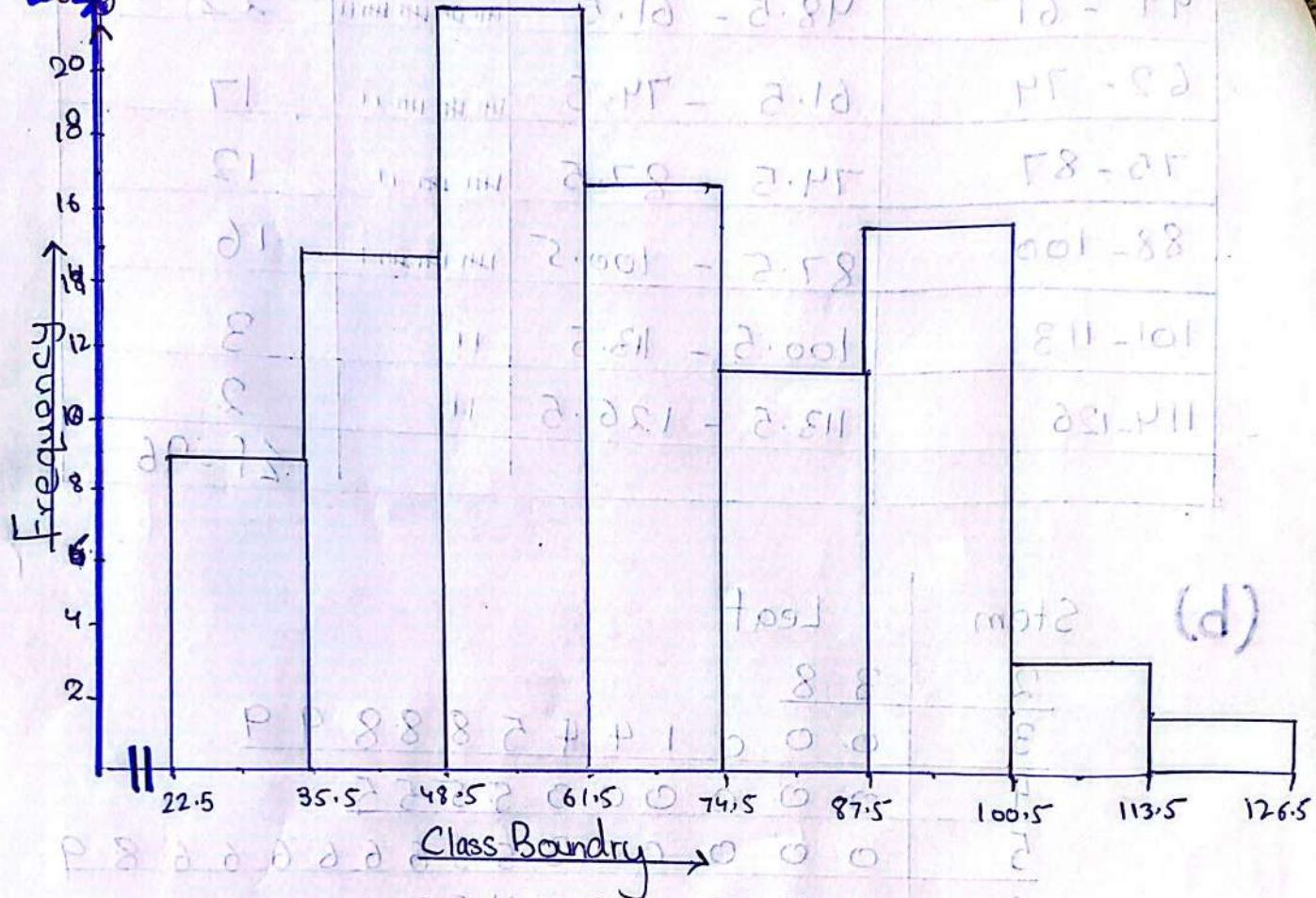
Key:

1 | 2 means 12

10 | 0 means 100

 $\Delta P \cdot H = \frac{P_{\text{ref}} - P}{\rho g} \cdot H = \text{mean sediment, A}$

(C)



c. Interpretation

This histogram is approximately symmetric

(d)

## Problem 2

Arithmetic Mean

(i) Class Midpoint ( $X_i$ )

10 10.5 11 11.5 12 12.5

$$\sum_{i=1}^n f_i = 28 + 87 + 190 + 304 + 211 + 85 \\ = 905$$

$$\sum_{i=1}^n f_i x_i = 10(28) + (10.5)87 + 11(190) + 11.5(304) + 12(211) + 12.5(85) \\ = 280 + 913.5 + 2090 + 3496 + 2522 + 1062.5 \\ = 10,374$$

Arithmetic mean =  $\frac{10,374}{905} = 11.46$

## Median

i- Trace Median Class

$$\tilde{X}_{\text{class}} = \frac{(905+1)}{2} = \frac{906}{2} = 453^{\text{rd}} \text{ Class}$$

(21)

Defined Table

Class Limits	Class Boundary	Frequency	$X_i$	$f_i X_i$	C.P
9.8 - 10.2	9.75 - 10.25	28	10	280	28
10.3 - 10.7	10.25 - 10.75	87	10.5	913.5	115
10.8 - 11.2	10.75 - 11.25	190	11	2090	305
11.3 - 11.7	11.25 - 11.75	304	11.5	3496	609 - Median Class
11.8 - 12.2	11.75 - 12.25	211	12	2532	820
12.3 - 12.7	12.25 - 12.75	85	12.5	1062.5	905

$$11.25 + \frac{0.5}{304} \left( \frac{905}{2} - 305 \right)$$

$$= M.H$$

$$= 11.25 + \frac{0.5}{304} (147.5)$$

$$= 11.25 + 0.2426$$

$$= 11.4926 = M.H$$

## Model

(iii) Find Model Class with frequency = 304

$$11.25 + \frac{(304-190)}{(304-190)+(304-211)}$$

$$\times 0.5$$

$$11.25 + \frac{114}{114+93} \times 0.5$$

$$11.25 + \frac{114}{207} \times 0.5$$

$$11.25 + 0.2754 \Rightarrow 11.5254 \text{ short tons/cable}$$

(iv)

#### (iv) Geometric Mean

$$G.M = \text{Antilog} \left( \frac{1}{n} \sum_{i=1}^n f_i \log x_i \right)$$

$x_i$	$f_i$	$\log x_i$	$f_i \log x_i$	$f_i (\frac{1}{x_i})$	$\frac{1}{x_i}$
10	28	1	28	2.8	0.1
10.5	87	1.02	88.74	8.265	0.095
11.	190	1.04	197.6	17.29	0.091
11.5	304	1.06	322.24	26.448	0.087
12.	211	1.08	227.88	17.513	0.083
12.5	85	1.10	93.5	18.68	0.08

$$\sum_{i=1}^n f_i \log x_i = 957.96$$

$$\text{Antilog} \left( \frac{1}{905} \times 957.96 \right) = 11.44$$

$$G.M = 11.44 \text{ short tons/cable}$$

#### (v) Harmonic Mean

$$H.M = \frac{n}{\sum_{i=1}^n f_i \left( \frac{1}{x_i} \right)} = \frac{n}{\sum_{i=1}^n f_i \left( \frac{1}{x_i} \right)} = 79.116$$

$$H.M = \frac{905}{79.116} = 11.44$$

$$11.44 \text{ short tons/Cable} \quad (iii)$$

#### (vi) 3rd Quartile

$$Q_3 \text{ class} = \left| \frac{3n}{4} \right| + 1$$

$$\left| \frac{3(905)}{4} \right| + 1$$

$$[678.75] + 1$$

### (viii) 63<sup>rd</sup> Percentile

(23)

Find Class

$$\left| \frac{63n}{100} \right| + 1 = \left( 5 - \frac{0.5}{118} \right) \frac{2.0 + 25.11}{118}$$

$$\left| \frac{63 \times 905}{100} \right| + 1 = \left( 5 - \frac{0.5}{118} \right) \frac{2.0 + 25.11}{118}$$

$$\left| 570.15 \right| + 1 = \left( 5 - \frac{0.5}{118} \right) \frac{2.0 + 25.11}{118}$$

$$570 + 1 = \left( 5 - \frac{0.5}{118} \right) \frac{2.0 + 25.11}{118}$$

$$571^{\text{th}} \text{ Class} = 2.0 + 25.11$$

Apply Formula  $l + \frac{f}{N} \times P.P.D.$

$$= 11.25 + \frac{0.5}{304} \left( \frac{63 \times 905}{100} - 305 \right)$$

$$= 11.25 + \frac{0.5}{304} (265.15)$$

$$= 11.25 + 0.4361$$

$$= 11.6861 + (2.882)$$

### (ix) Range

Upper Boundary of highest Class - Lower Boundary of 1<sup>st</sup> Class

$$12.75 - 9.75$$

$$= 3$$

### (x) Variance and Standard Deviation

$$\sigma^2 = \frac{1}{n-1} \left[ \sum f_i x_i^2 - \frac{(\sum f_i x_i)^2}{n} \right]$$

Table on next page →

$$= 678 + 1 \\ = 679^{\text{th}} \text{ Class}$$

(24)

$$\text{LCB} + \frac{h}{f} \left( \frac{3n}{4} - C \right) \quad \text{cf of previous class}$$

$$11.75 + \frac{0.5}{211} \left( \frac{3 \times 905}{4} - 609 \right)$$

$$11.75 + \frac{0.5}{211} (69.75)$$

$$11.75 + 0.1653$$

$11.9153 \approx 11.92$  short tons

### (vii) 7<sup>th</sup> Decile

$$D_7 \text{ class} = \left| \frac{7n}{10} \right| + 1 = \left| \frac{7 \times 905}{10} \right| + 1 =$$

$$\left| \frac{633.5}{10} \right| + 1 = 63.35 + 1 =$$

$$633.5 + 1 = 634^{\text{th}} \text{ class}$$

634<sup>th</sup> Class

(xi)

$$11.75 + \frac{0.5}{211} \left( \frac{7 \times 905}{10} - 609 \right)$$

$$11.75 + \frac{0.5}{211} (24.5)$$

$$11.75 + 0.0581$$

$$11.8081 \text{ short tons}$$

Next Page

(25)

$x_i$	$f_i$	$x_i^2$	$f_i x_i$	$f_i x_i^2$
10	28	100	280	2800
10.5	87	110.25	913.5	9591.75
11	190	121	2090	22,990
11.5	304	132.25	3496	40,204
12	211	144	2532	30,384
12.5	85	156.25	1062.5	13,281.25

$$\sum_{i=1}^n f_i x_i = 10,374$$

$$\sum_{i=1}^n f_i x_i^2 = 119,251$$

$$S^2 = \frac{1}{(905)} \left( 119,251 - \frac{(10374)^2}{905} \right)$$

$$\frac{1}{905} (119,251 - 118,916,9901)$$

$$\frac{1}{905} (334.01)$$

$$S^2 = 0.000334 \quad 0.3695$$

Standard Deviation

$$\sqrt{S^2} = \sqrt{0.3695}$$

$$S = 0.607$$

### (xi) Coefficient of Variation

$$\frac{0.607}{11.46} \times 100$$

$$5.297 \%$$

$\xleftarrow{Q_1, Q_3, M} Q_2.70$  Next page

Q 2.70

(26)

width = 200

(ii) No. of Class

~~Width~~ 200

$$\text{Range} = 808 - 6 = 802$$

$$200 = \frac{802}{k}$$

$$k = \frac{802}{200}$$

$$k = 4.01 \approx 5$$

Table

(a)

Class Limits	Frequency	Tally
1 - 200	20	
201 - 400	4	
401 - 600	3	
601 - 800	2	
801 - 1000	1	

(b)

Relative Frequency	Percentage Distribution
$20/30 = 0.67$	$0.67 \times 100 = 67\%$
$4/30 = 0.13$	$0.13 \times 100 = 13\%$
$3/30 = 0.10$	$0.10 \times 100 = 10\%$
$2/30 = 0.067$	$0.067 \times 100 = 6.7\%$
$1/30 = 0.033$	$0.033 \times 100 = 3.3\%$

(C)  $(\% \times \$400)$

(27)

$$= 3+2+1 / 30 \times 100$$

$$= 0.2 \times 100$$

$$= 20\%$$

← End →

Interest	Compound	Simple	Total
Interest	Interest	Interest	Interest
"	"	"	"
"	"	"	"
"	"	"	"

Individual options	Compound interest	(a)
\\$50 = 100000	\\$100000	
\\$100 = 100000	\\$100000	
\\$150 = 100000	\\$100000	
\\$200 = 100000	\\$100000	