

Assignment no.- 1

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Q.1 Construct the frequency distribution for the following data of number of measuring defects observed in the 30 pieces of fabric.

4, 0, 1, 5, 2, 6, 0, 4, 4, 1, 5, 4, 5, 4, 3, 0, 2, 3, 3, 2, 6, 4, 1, 2, 1, 3, 4, 3, 2, 3

+

x	Tally	Frequency	CFL	CFM
0		3	3	30
1		4	7	26
2		5	12	21
3		6	18	15
4		7	25	8
5		3	28	5
6		2	30	3
		30		

Q.2 Construct the ungrouped frequency distribution?

10, 8, 5, 10, 7, 7, 11, 8, 10, 12, 11, 12, 6, 6, 7, 10, 10, 12, 10, 10, 6, 7, 8, 10, 8, 8, 12, 11, 10, 10

+

x	Tally	frequency	CFL	CFM
5		1	1	30
6		3	4	27
7		4	8	23
8		5	13	18
10		10	23	8
11		3	26	5
12		4	30	1
		30		

Q. 3. construct ungrouped frequency.

2, 3, 1, 1, 2, 3, 2, 0, 0, 1, 1, 2, 6, 0, 0, 2, 1, 1,
4, 3, 2, 0, 2, 1, 2, 2, 4, 3, 3, 3, 4.

→

x	Tally	Frequency	CF L	CFM
0		5	5	30
1		6	11	24
2		9	20	15
3		6	26	9
4		3	29	6
5		1	30	5
		30		

Q. 4

Construct grouped frequency dist. using classes

6.00 - 6.20, 6.20 - 6.40
etc

(6.72), (6.52), (6.00), (6.85), (6.68), (6.64), (6.88), (6.91),
(6.35), (6.52), (6.26), 7.20, 7.12, (6.36), (6.82), (6.53),
(6.78), (6.75), (6.49), (6.62)

→

x	Tally	Frequency	CF L	CFM
6.00 - 6.20		2	2	20
6.20 - 6.40		3	5	17
6.40 - 6.60		4	9	13
6.60 - 6.80		5	14	8
6.80 - 7.00		8	18	64
7.00 - 7.20		2	20	2
		20		

Q.5

Following The number of accidents per day observed in a textile mill during a month of 30 days.

4, 3, 3, 4, 2, 2, 1, 2, 0, 2, 3, 4, 1, 1, 2, 0, 0, 5, 2, 1, 0, 0, 2, 3, 2, 1, 1, 3, 2

Construct an ungrouped frequency distribution.

→

number of students accidents	<u>daily marks</u>	Frequency	cfl	cfm
0		5	5	30
1		6	11	25
2		9	20	19
3		6	26	10
4		3	28	4
5		1	30	1
		30		

Q.6)

Thirty pieces of fabrics were observed for the number of defects and following results were obtained.

1, 0, 0, 2, 3, 2, 1, 1, 3, 2, 4, 3, 4, 1, 1, 2, 0, 0, 5, 2, 3, 8, 4, 2, 2, 1, 2, 0, 2, 3

Construct an ungrouped frequency.

number of defective pieces	Tally marks	Frequency	CFL	CFM
0		5	5	80
1		6	11	25
2		9	20	19
3		6	26	10
4		3	29	4
5		1	30	1
$\Sigma F = 30$				

- Q.7 Construct the frequency distribution for the following results of the daily sale (in 100Rs) in a textile firm recorded for a month.
- 21, 21, 21, 22, 22, 26, 20, 20, 20, 21, 21, 20,
 22, 20, 20, 21, 23, 21, 22, 21, 25,
 18, 24, 25, 19, 25, 18, 26, 23, 18,
 24

Daily scale in h.c. firm)	Tally marks	Frequency	CFL	CFM
18		3	3	80
19		1	4	27
20		6	10	26
21		8	18	20
22		3	21	12
23		2	23	9
24		2	25	7
25		3	28	5
26		2	30	2
$\Sigma F = 30$				

Q.8 Thirty linear density tests made on the yarn have shown following results.

14.9, 14.2, 13.8, 13.5, 14.0, 14.2, 14.3, 14.6, 13.9, 14.0, 14.1, 13.2, 13.0, 14.2, 13.5, 13.0, 12.8, 13.9, 14.8, 15.0, 12.8, 13.4, 13.2, 14.0, 13.8, 13.9, 14.0, 14.0, 13.9, 14.8

Construct the grouped frequency distribution by taking class intervals, 12.6 - 13.0, 13.1 - 13.5 f so on

Linear den- sity tests (X)	Tally Marks	Frequency	CFL	cFM
12.6 - 13.0		4	4	80
13.1 - 13.5		5	9	26
13.6 - 14.0		11	20	21
14.1 - 14.5		6	25	10
14.6 - 15.0		5	30	5
$\sum F = 30$				

Q.9 Given below are marks obtained by 20 students in month math out of 25

21, 23, 19, 17, 12, 15, 15, 17, 17, 19, 23, 25, 21, 28, 25, 25, 21, 19, 19, 19

Construct the ungrouped frequency distribution.

X	Tally marks	Frequency	CFL	CFM
12		1	1	20
15		2	3	20 19
17		3	6	17
19		5	11	17 14
21		3	14	14 9
23		4	18	9 6
25		2	20	2

$$\sum F = 20$$

Q.10 The marks obtained by 40 students of class VIII in an examination are given below.

16, 17, 18, 3, 7, 23, 18, 13, 10, 21, 7, 11, 13, 21, 13,
 15, 19, 24, 16, 2, 23, 5, 12, 18, 8, 12, 6, 8, 16, 5, 3
 5, 0, 7, 9, 12, 10, 10, 12, 23

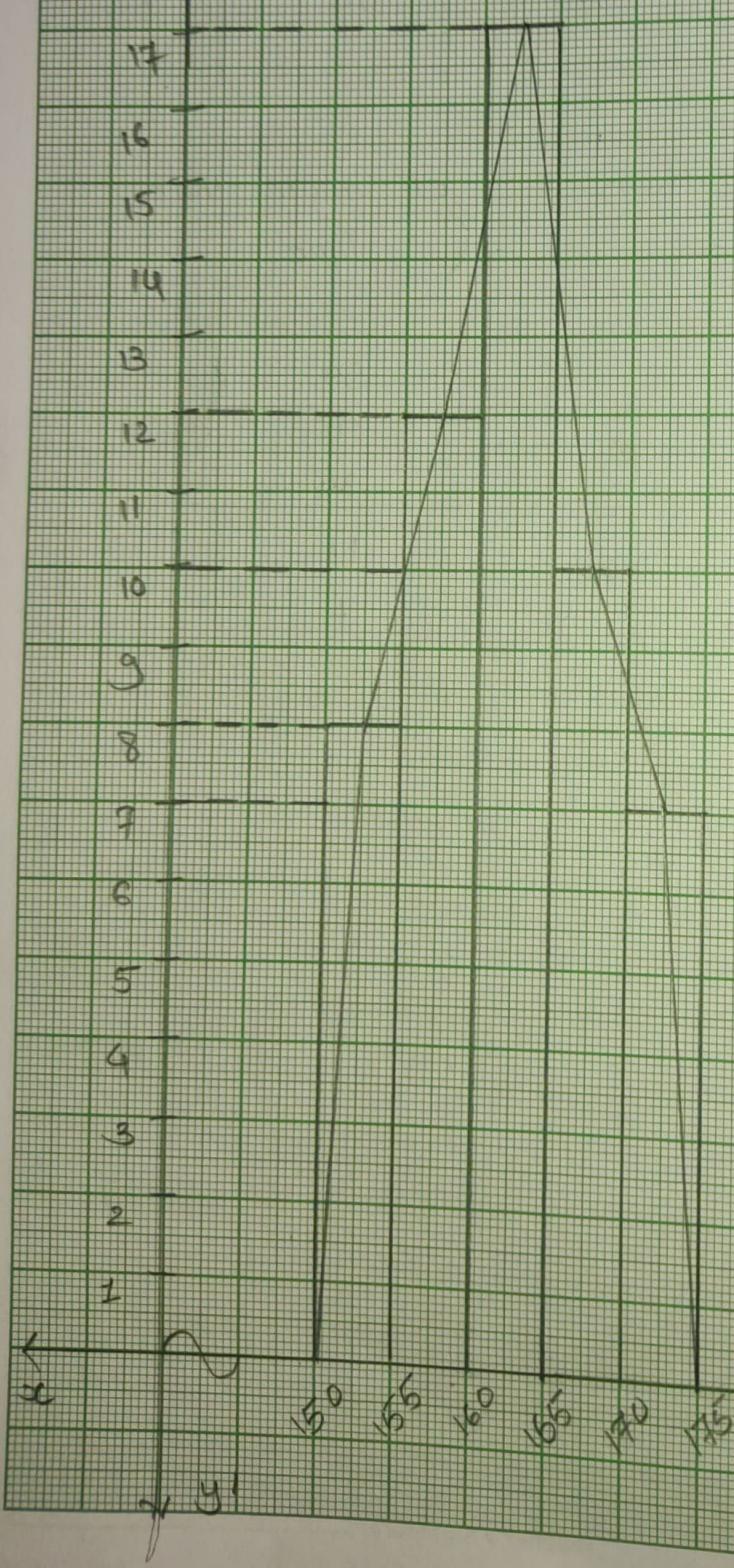
Marks	Tally marks	Frequency	CFL	CFM
0-4	1	6	6	40
5-9		10	10	34
10-14		8	24	24
15-19		9	33	16
20-24		7	40	7

$$\sum F = 40$$

(Q.1) Following is the distribution of heights of students of a class. Draw for above data.

Strength	150 - 155	155 - 160	160 - 165	165 - 170	170 - 175
No. of strength	8	12	17	10	7

x_i	P_i	CF less than type	CF more than type
150 - 155	8	8	54
155 - 160	12	20	46
160 - 165	17	37	34
165 - 170	10	47	17
170 - 175	7	54	7



Scale
on x axis -
 $1\text{ cm} = 5\text{ unit}$
on y axis
 $1\text{ cm} = 1\text{ unit}$

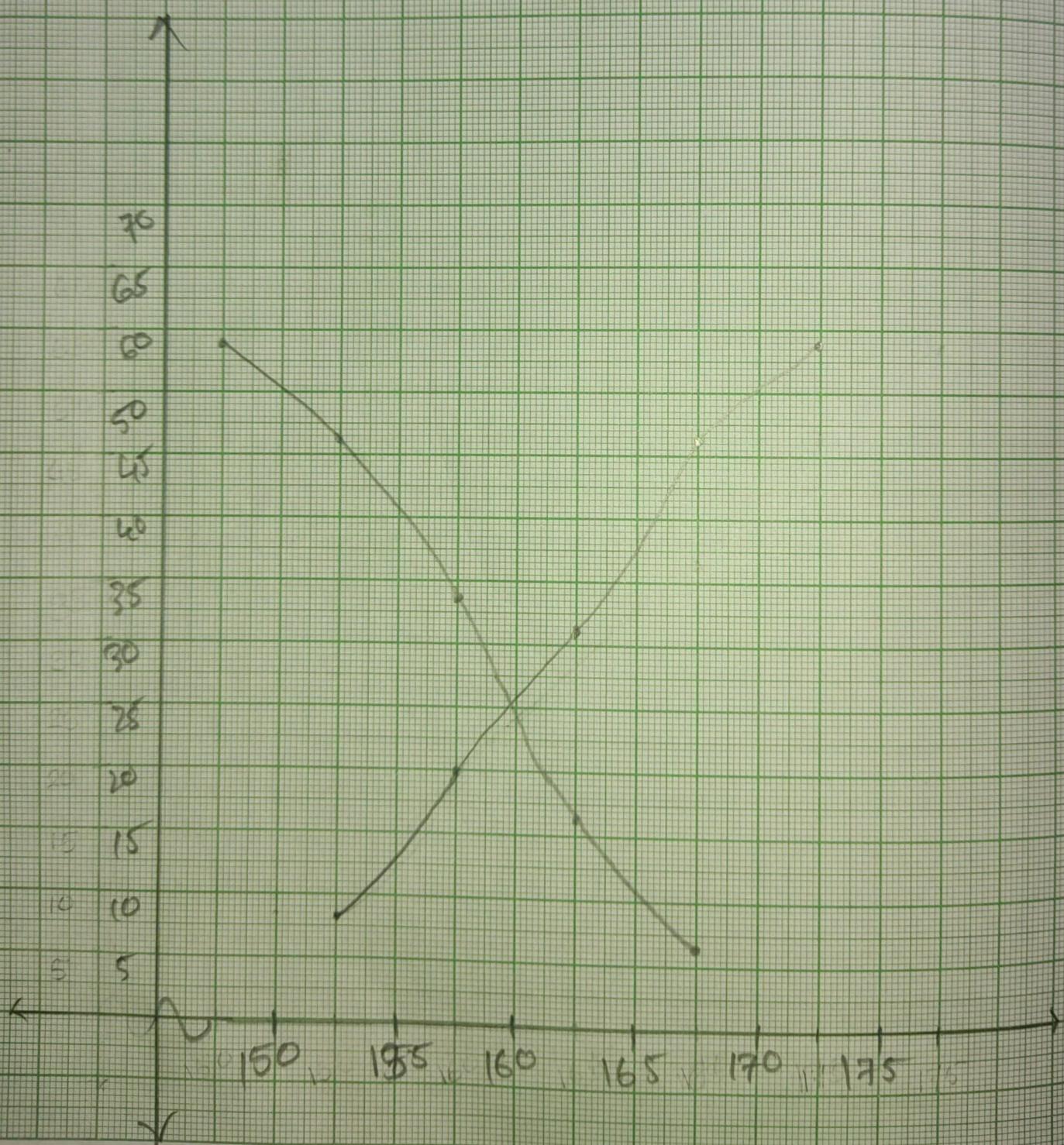
Scale

on x axis

2 cm = 5 unit

on y axis

1 cm = 5 unit



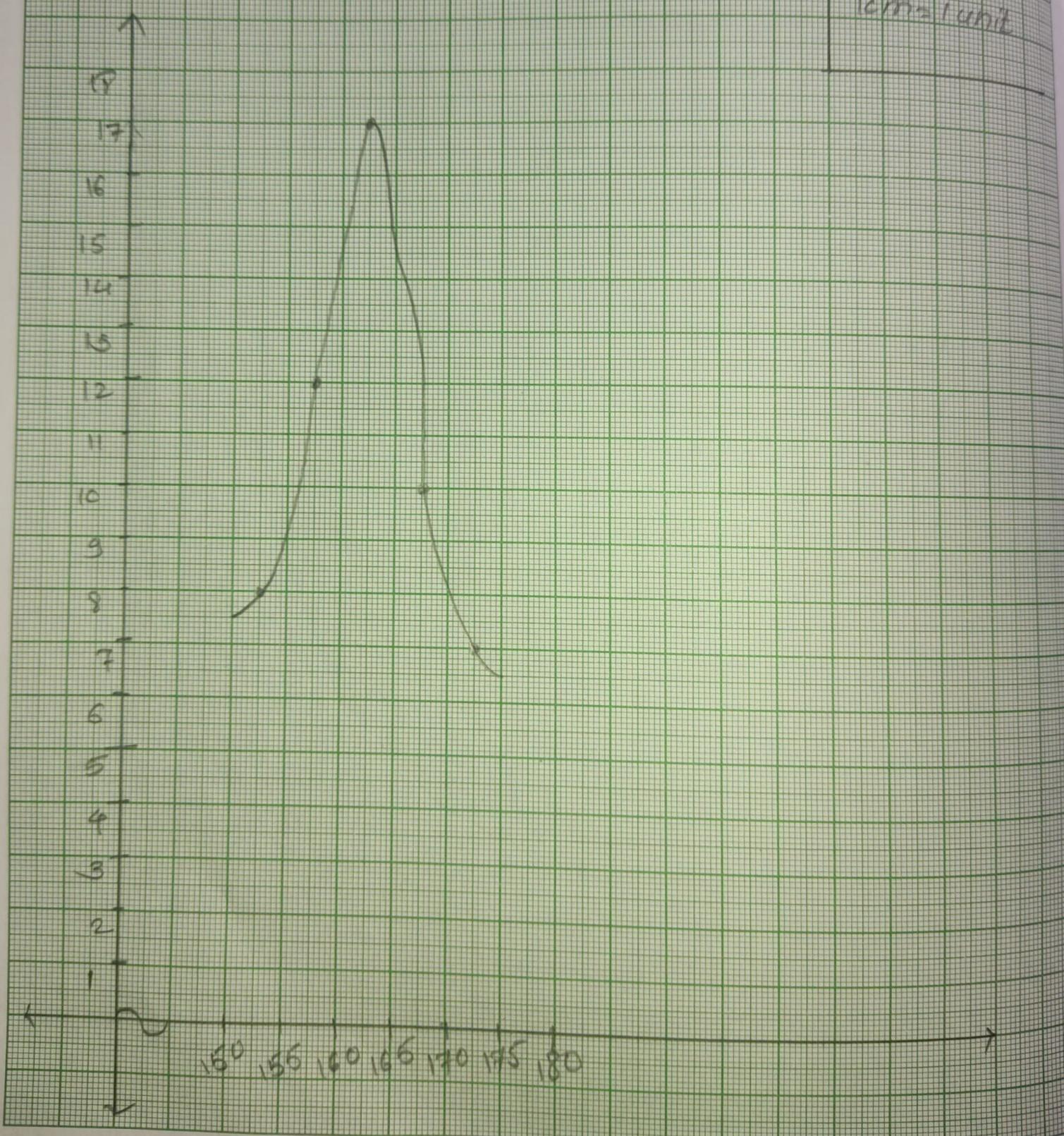
Scale

mm on graph

1cm = 5 units

On y axis

1cm = 1 unit



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Q.2 Draw the frequency polygon for the following frequency distribution table.

No. of students absent	0 - 4	5 - 9	10 - 14	15 - 19	20 - 24
No. of days	45	55	80	20	15

inclusive type - Exclusive type

$$CF = \frac{5-4}{2} = 0.5$$

∴ New C.I are

$$-0.5 - 4.5$$

$$4.5 - 9.5$$

$$9.5 - 14.5$$

$$14.5 - 19.5$$

$$19.5 - 24.5$$

x_i	f_i	CF less than type	CF more than type
-0.5 - 4.5	45	45	165
4.5 - 9.5	55	100	120
9.5 - 14.5	80	130	65
14.5 - 19.5	20	150	35
19.5 - 24.5	15	165	15

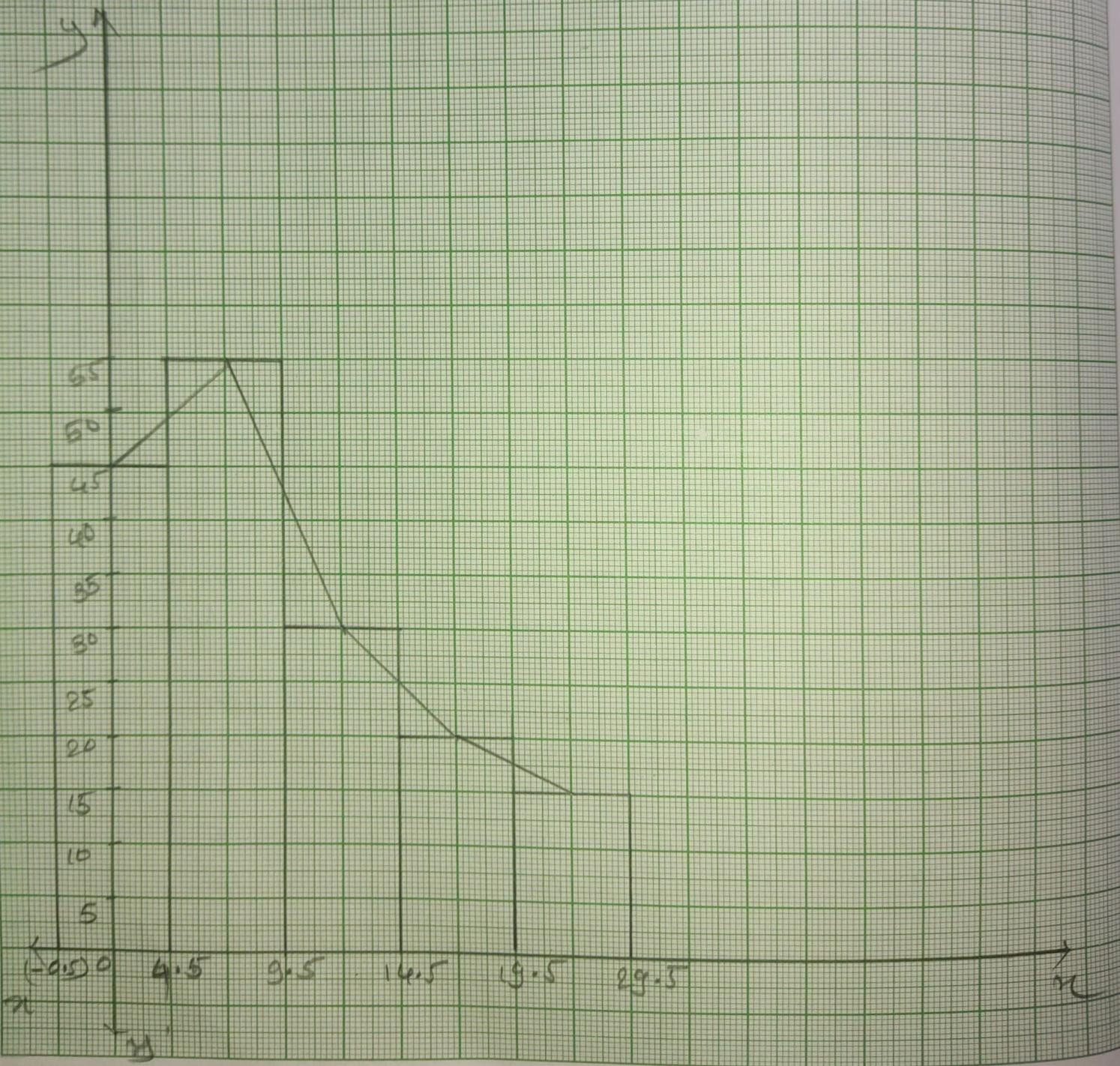
Scale

on x axis

1 cm = 5 unit

on y axis

1 cm = 5 unit



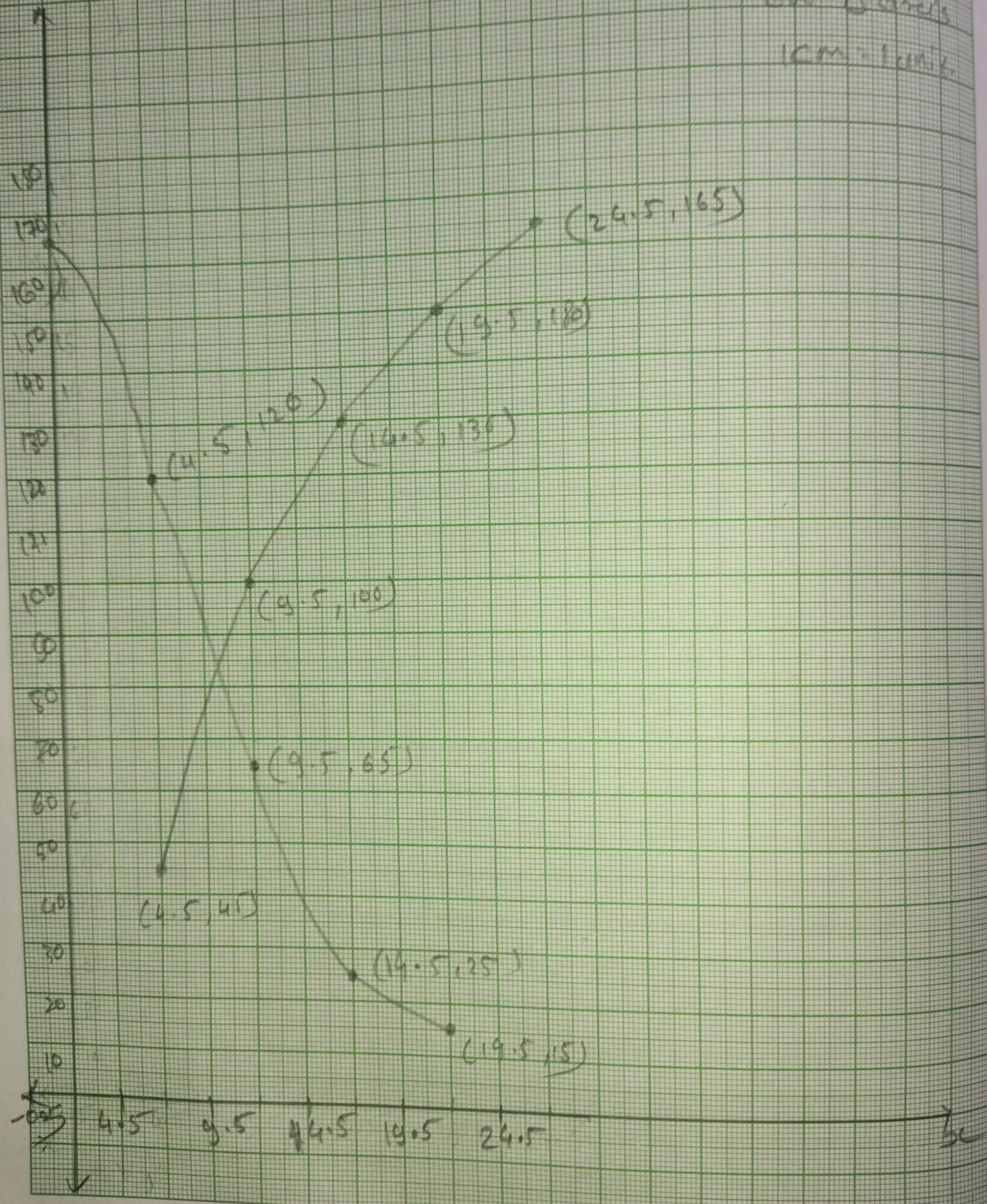
Stable

on Y axis

2 cm = 5 units

cm = 5 mm

1 cm = 1 mm



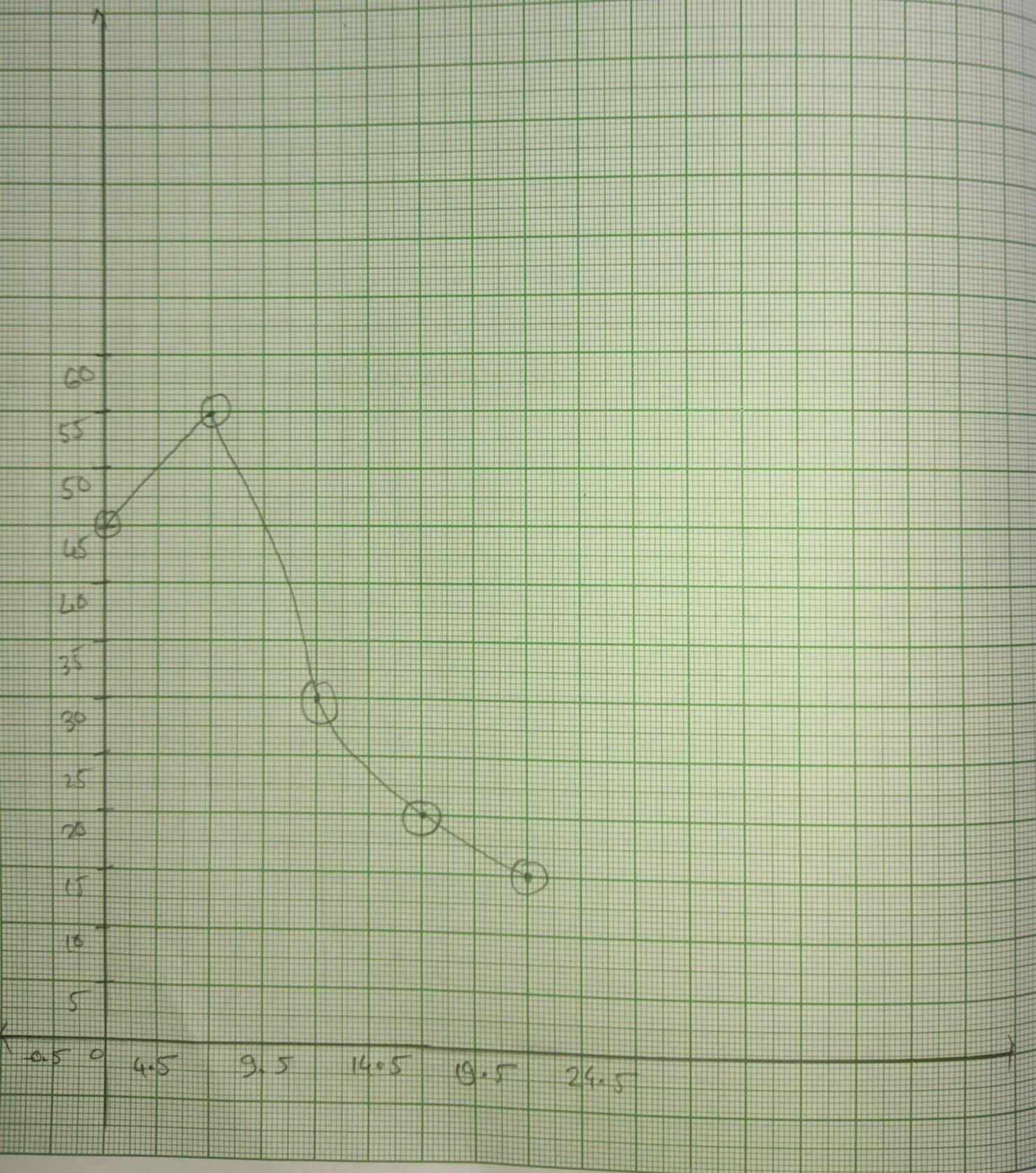
Scale

on x-axis

1cm = 5 unit

on y-axis

1cm = 5 unit



(Q.8) draw the frequency curve for following data of C.V.I.

C.V.I.	3.0 - 3.4	3.5 - 3.9	4 - 4.5	4.5 - 4.9	5.0 - 5.4
No. of tests	4	10	25	16	10

Inclusive type - Exclusive type

$$CF = \frac{3.5 - 3.4}{2} = 0.05$$

∴ New C.I. are

$$2.95 - 3.45$$

$$3.45 - 3.95$$

$$3.95 - 4.45$$

$$4.45 - 4.95$$

$$4.95 - 5.45$$

x_i	f_i	CFI	CFM
2.95 - 3.45	4	4	65
3.45 - 3.95	10	14	61
3.95 - 4.45	25	39	51
4.45 - 4.95	16	55	26
4.95 - 5.45	10	65	10

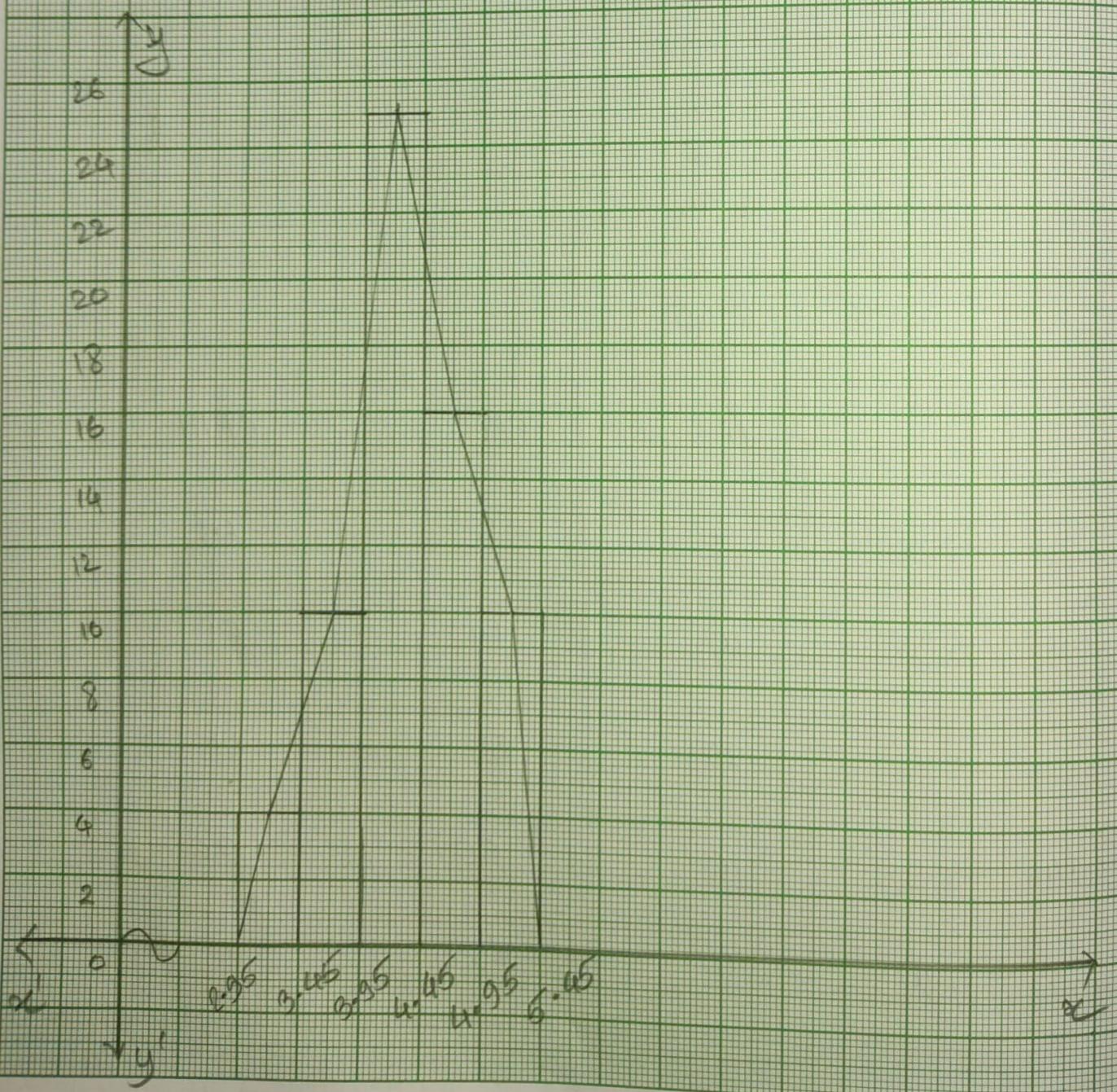
Scale

on x axis

$$1\text{cm} = 0.5 \text{ unit}$$

on y axis

$$1\text{cm} = 2 \text{ unit}$$



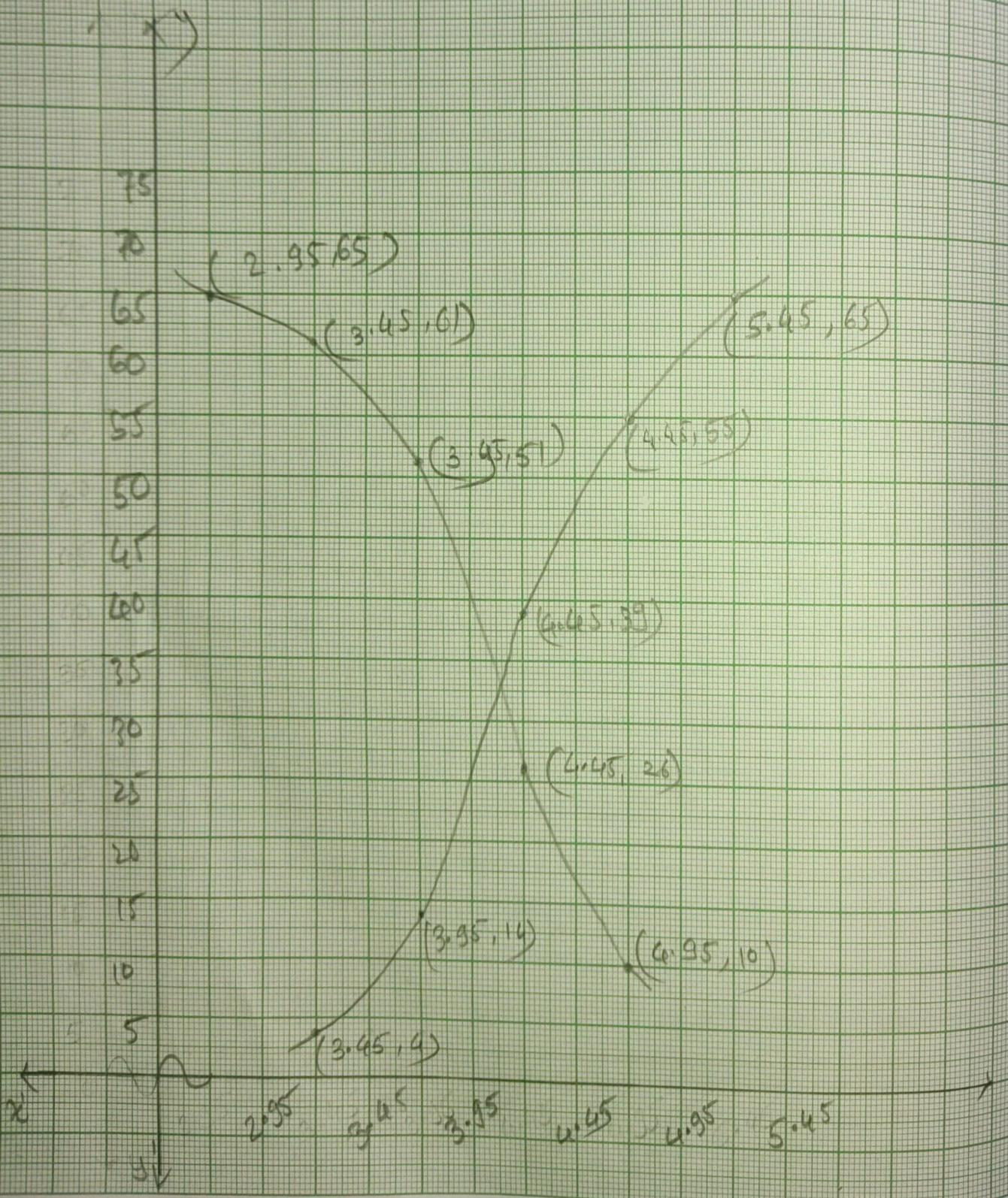
scale

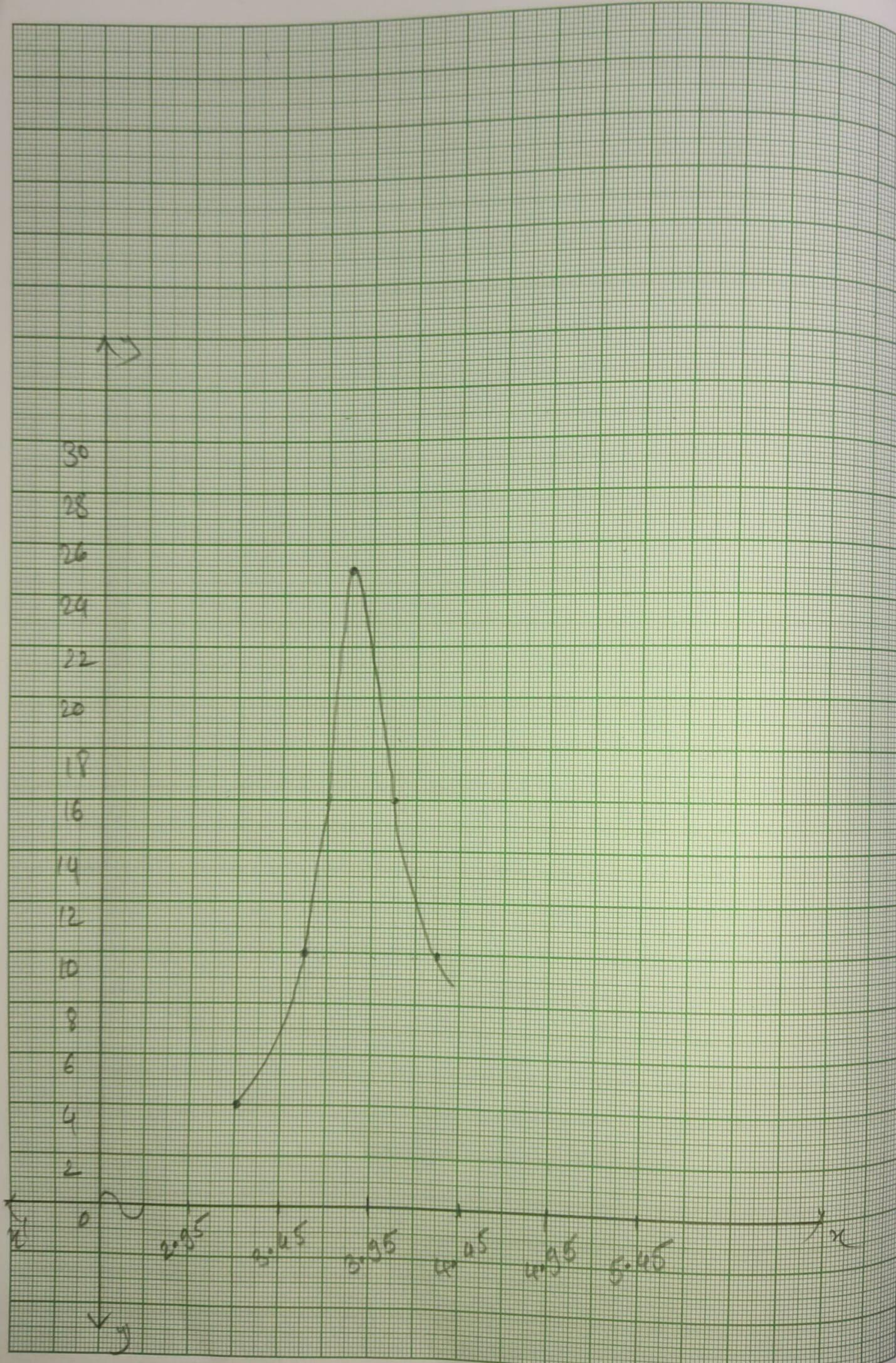
on x axis

$$25 \text{ m} = 0.5 \text{ cm}$$

on y axis

$$10 \text{ m} = 1 \text{ unit}$$





Q.4.

Draw the more than type ogive curve and less than ogive curve type given for following data of number of absent worker.

Marks obtained	0 - 9	10 - 19	20 - 29	30 - 39	40 - 49	50 - 59
No. of days	7	17	22	15	7	2

Inclusive type - Exclusive type

$$C.F. = \frac{10 - 9}{2} = 0.5$$

-0.5 - 9.5

9.5 - 19.5

19.5 - 29.5

29.5 - 39.5

39.5 - 49.5

49.5 - 59.5

ocf	fi	CFL	cFM
-0.5 - 9.5	7	7	70
9.5 - 19.5	17	24	63
19.5 - 29.5	22	46	46
29.5 - 39.5	15	61	24
39.5 - 49.5	7	68	9
49.5 - 59.5	2	70	2

Scale

on x axis

1cm = 10 units

on y axis

1cm = 5 units

↑ y

65

60

55

50

45

40

35

30

25

20

15

10

5

x 0.5

9.5

19.5

29.5

39.5

49.5

59.5

↓ y

Scale

on x-axis

2cm : 10 units

y axis 1 cm = 5 units

Δ

45

40

35

30

25

20

15

10

5

(-0.5)

3.5

19.5

28.5

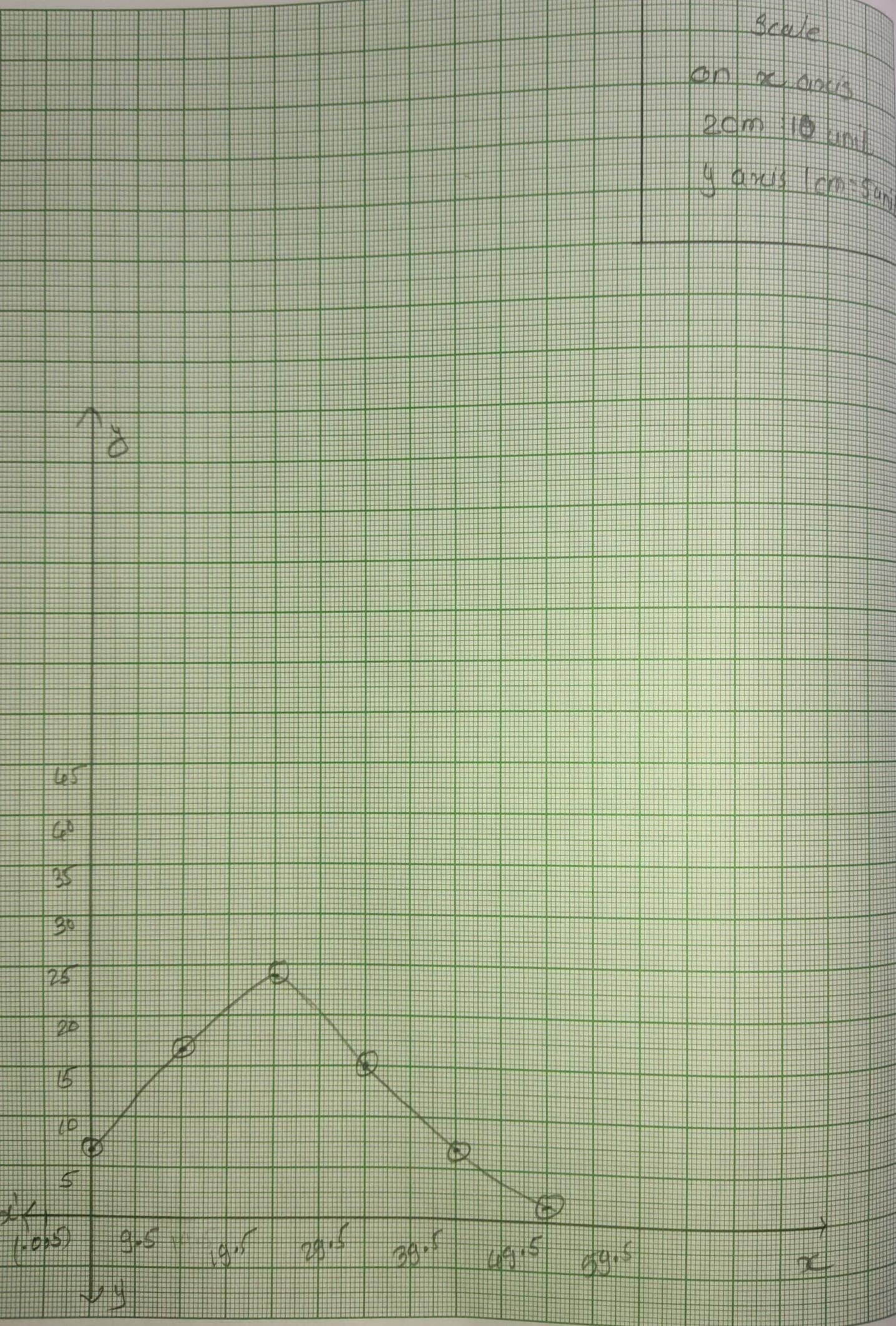
38.5

49.5

59.5

x

$\sqrt{3}$



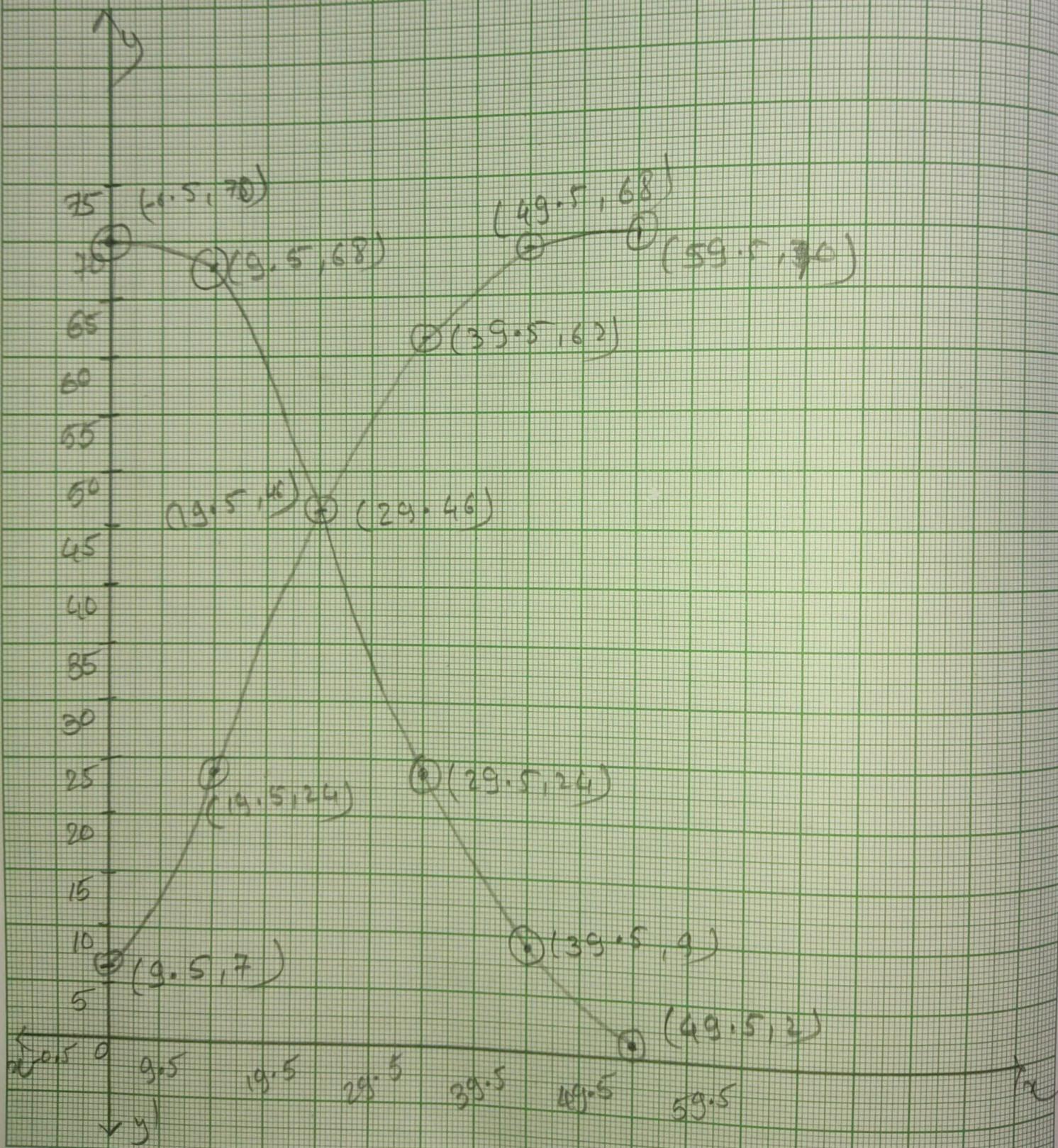
Scale

on x axis

2cm = 100mib

on y axis

1cm = 5mild



Exercise - 1.3

Q.1 Calculate the AM for the following data of breaking strength of yarn and comment on it.

Breaking strength	190-195	195-200	200-205	205-210	210-215
No. of sample	15	30	50	20	10

→ i) Mean

x	f_i	xf_i	$\sum xf_i$	CFL
190 - 195	15	192.5	2887.5	15
195 - 200	30	197.5	5925	45
200 - 205	50	202.5	10125	95
205 - 210	20	207.5	4150	115
210 - 215	10	212.5	2125	125

$$\sum f_i = 125$$

$$\sum xf_i = 25212.5$$

$$i) \text{ mean} = \frac{\sum xf_i}{\sum f_i}$$

$$= \frac{25212.5}{125} = 201.7$$

$$ii) \text{ median} = L + \frac{h}{F} \left[\frac{N}{2} - CF(P) \right]$$

$$\frac{N+1}{2} = 63, L = 200, h = 5, F = 50, N = 125, CF(P) = 45$$

$$\begin{aligned} \therefore \text{median} &= 200 + \frac{5}{50} \left[\frac{125 - 45}{2} \right] \\ &= 200 + 0.1 [62.5 - 45] \\ &= 201.75 \end{aligned}$$

mode -

$$\text{mode} = L + h \left[\frac{f_m - f_o}{2f_m - f_o - f_i} \right]$$

$L = 200, h = 5, f_m = 50, f_o = 30, f_i = 20$

$$\therefore \text{mode} = 200 + 5 \left[\frac{50 - 30}{100 - 30 - 20} \right]$$

$$= 202$$

Q.2 Find AM for the following data of fabric production
3 comment on it.

production	390-395	395-400	400-405	405-410	410-415	415-420	420-425
No. of days	10	20	35	50	40	30	15

 \rightarrow ~~mean~~

x _i	f _i	x _i	x _i f _i	CFL
390-395	10	392.5	3925	10
395-400	20	397.5	7950	30
400-405	35	402.5	14,087.5	65
405-410	50	407.5	20,375	115
410-415	40	412.5	16,500	155
415-420	30	417.5	12,525	185
420-425	15	422.5	6,337.5	200

$$\sum f_i = 200$$

$$\sum x_i f_i = 81700$$

1) mean

$$\text{mean} = \frac{\sum x_i f_i}{\sum f_i} = \frac{81700}{200} = 408.5$$

2) media

$$\frac{N}{2} = \frac{200}{2} = 100$$

\therefore median class = 405-410

$L = 405, h=5, F=50, CF(P)=65$

$$\begin{aligned}\text{median} &= L + \frac{h}{F} \left[\frac{N}{2} - CF(P) \right] \\ &= 405 + \frac{5}{50} \left[\frac{200}{2} - 65 \right] = 408.5\end{aligned}$$

3) mode

model class = 405-410

$F_m = 50, L = 405, h=5, F_0 = 35, F_1 = 40$

$$\begin{aligned}\text{mode} &= 405 + 5 \left[\frac{50 - 35}{100 - 35 - 40} \right] \\ &= 405 + 5 \left[\frac{15}{25} \right] \\ &= 408\end{aligned}$$

Q3 determine the mode from the frequency distribution comment.

length of fibre	10-15	15-20	20-25	25-30	30-35	35-40
No. of fibre	12	19	26	21	15	9
x	F _i	x _i	x _i F _i	CFL		
10-15	12	12.5	150	12		
15-20	19	17.5	332.5	31		
20-25	26	22.5	585	57		
25-30	21	27.5	577.5	78		
30-35	15	32.5	487.5	93		
35-40	9	37.5	937.5	102		

$$\sum F_i = 102$$

$$\sum x_i F_i = 2470$$

$$\text{1) mean} = \frac{\sum x_i f_i}{\sum f_i} = \frac{2470}{102} = 24.21$$

2) median =

$$\frac{N}{2} = \frac{102}{2} = 51,$$

median class = 20 - 25

$L = 20, h = 5, F = 26, N = 102, CF(P) = 31$

$$\begin{aligned}\text{median} &= L + \frac{h}{F} \left[\frac{N}{2} - CF(P) \right] \\ &= 20 + \frac{5}{26} \left[\frac{102}{2} - 31 \right] \\ &= 20.39\end{aligned}$$

3) mode =

model class = 20 - 25

$L = 20, h = 5, F_m = 26, F_0 = 19, F_1 = 21$

$$\begin{aligned}\text{mode} &= 20 + \frac{h}{2f_m - f_0 - f_1} [d_m - d_0] \\ &= 20 + \frac{5}{52 - 19 - 21} [26 - 19] \\ &= 20.87\end{aligned}$$

Q.4

Compute median & mode for the data

Daily salary	50-60	60-70	70-80	80-90	90-100
No. of workers	4	6	10	18	12

⇒

x	f	x _i	x _i f _i	CFL
50-60	4	55	220	4
60-70	6	65	390	10
70-80	10	75	750	20
80-90	18	85	1530	38
90-100	12	95	1140	50

$$\sum f_i = 50$$

$$\sum f_i x_i = 4030$$

i) mean

$$\text{mean} = \frac{\sum f_i x_i}{\sum f_i} = \frac{4030}{50} = 80.6$$

ii) median

$$\text{median} = \frac{N}{2} = \frac{50}{2} = 25$$

median class = 80-90

$$L = 80, h = 10, f = 18, CF(P) = 20$$

$$\begin{aligned}\therefore \text{median} &= L + \frac{h}{f} \left[\frac{N}{2} - CF(P) \right] \\ &= 80 + \frac{10}{18} \left[25 - 20 \right] \\ &= 82.77\end{aligned}$$

iii) mode -

mode class = 80-90

$$L = 80, h = 10, F_m = 18, F_0 = 10, F_1 = 12$$

$$\begin{aligned}\therefore \text{mode} &= 80 + 10 \left[\frac{18 - 10}{36 - 10 - 12} \right] \\ &= 85.71\end{aligned}$$

Q.7) Following frequency distribution represents marks obtained by 100 students in examination compute median & comment on it.

Marks	0-9	10-19	20-29	30-39	40-49
No. of Student	5	12	32	40	11

Given distribution is not continuous

$$\therefore \text{Correction Factor} = \frac{10-9}{5} = 0.5$$

x_i	f_i	$x_i f_i$	$x_i f_i f_i$	CFL
0.5 - 9.5	5	5	25	5
9.5 - 19.5	12	15	180	17
19.5 - 29.5	32	25	800	49
29.5 - 39.5	40	35	1400	89
39.5 - 49.5	11	45	495	100
$\sum f_i = 100$		$\sum x_i f_i = 2900$		

$$1) \text{ mean} = \frac{\sum x_i f_i}{\sum f_i} = \frac{2900}{100} = 29$$

2) median

$$\frac{N}{2} = 50$$

$$\text{median class} = 29.5 - 39.5 \\ L = 29.5, h = 10, f = 40, CF(P) = 49$$

$$\begin{aligned} \text{median} &= L + \frac{h}{f} \left[\frac{N}{2} - CF(P) \right] \\ &= 29.5 + 10 \left[\frac{50 - 49}{40} \right] \\ &= 29.5 + \frac{1}{4} \\ &= 29.75 \end{aligned}$$

mode =

$$\begin{aligned} \text{mode class} &= 29.5 - 39.5 \\ L = 29.5, h = 10 &= F_m = 40, F_0 = 32, F_1 = 11 \\ \text{mode} &= L + h \left[\frac{F_m - F_0}{2F_m - F_0 - F_1} \right] = 29.5 + 10 \left[\frac{40 - 32}{8 - 32 - 11} \right] = 51.66 \end{aligned}$$

(Q.10) What is central tendency? what are different measures of central tendency.

→ Central Tendency - Generally in statistics, the observation of the data collected are concentrated around the central value of the data. This tendency of data observation is called as central tendency.

Measures of central tendency are

1) Mean - it is defined as sum of observation to the total number of observation

$$AM = \frac{\text{sum of all observation}}{\text{Total number of observation}}$$

2) Median - It is defined as observation, which divides the data into two parts of equal size

3) Mode - It is the value or the observation of the data, which occurs maximum number of times, that is, which has maximum frequency.