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 PAPER PROBABILITY &
Statistics
 DEPARTMENT BSCS

Q 1

Solution:-

class	f	C.B	c.f <	c.f >
0-4	25	4.5	25	2092
5-9	45	4.5-9.5	70	2067
10-14	81	9.5-14.5	151	2022
15-19	143	14.5-19.5	294	1941
20-24	280	19.5-24.5	574	1798
25-29	349	24.5-29.5	923	1518
30-34	374	29.5-34.5	1297	1669
35-39	395	34.5-39.5	1692	795
40-44	400	39.5-44.5	2092	400

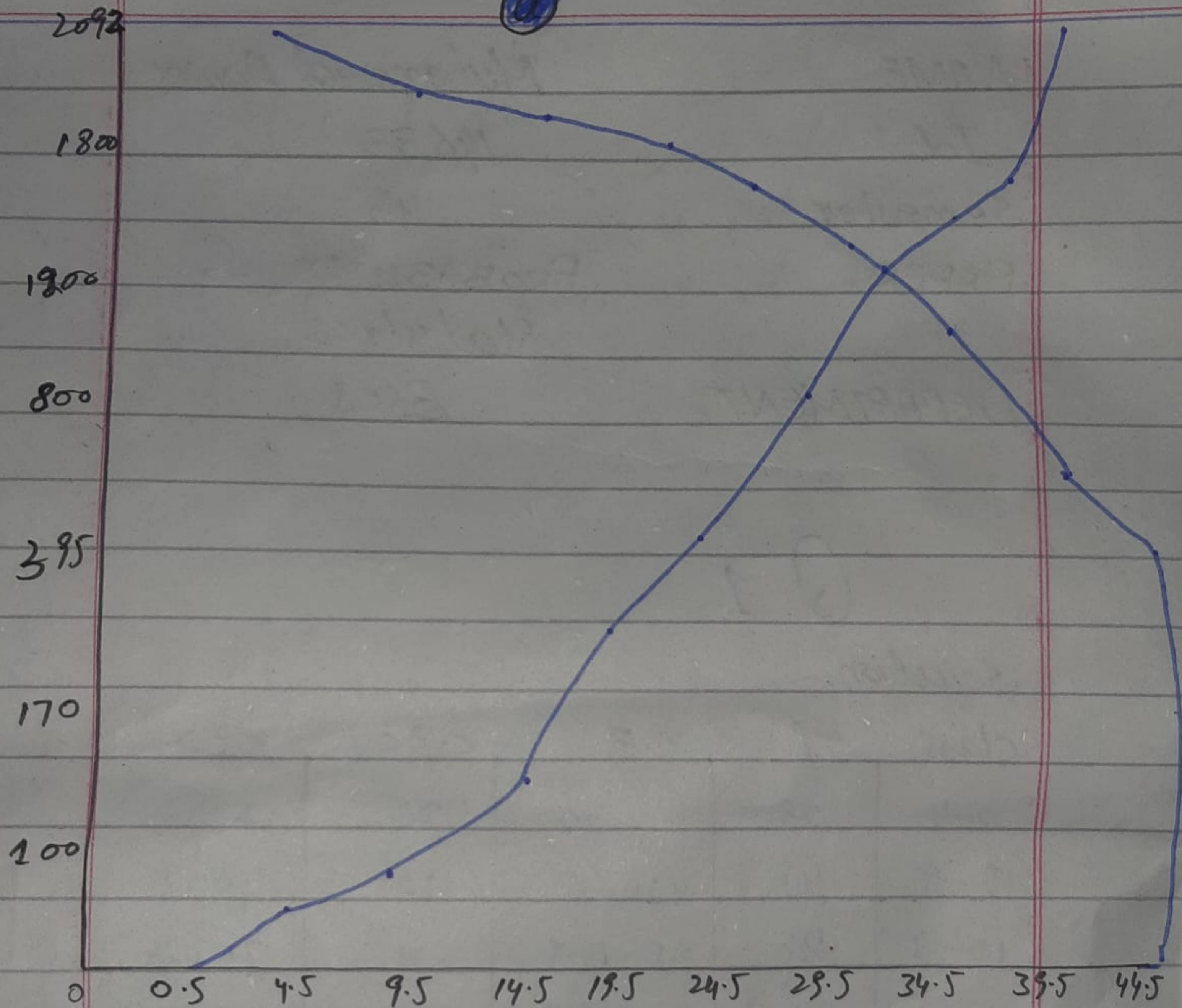
$C.B = \Delta = LCL$ of 2nd class - UCL
 of first class.

$$C.B = 5 - 4$$

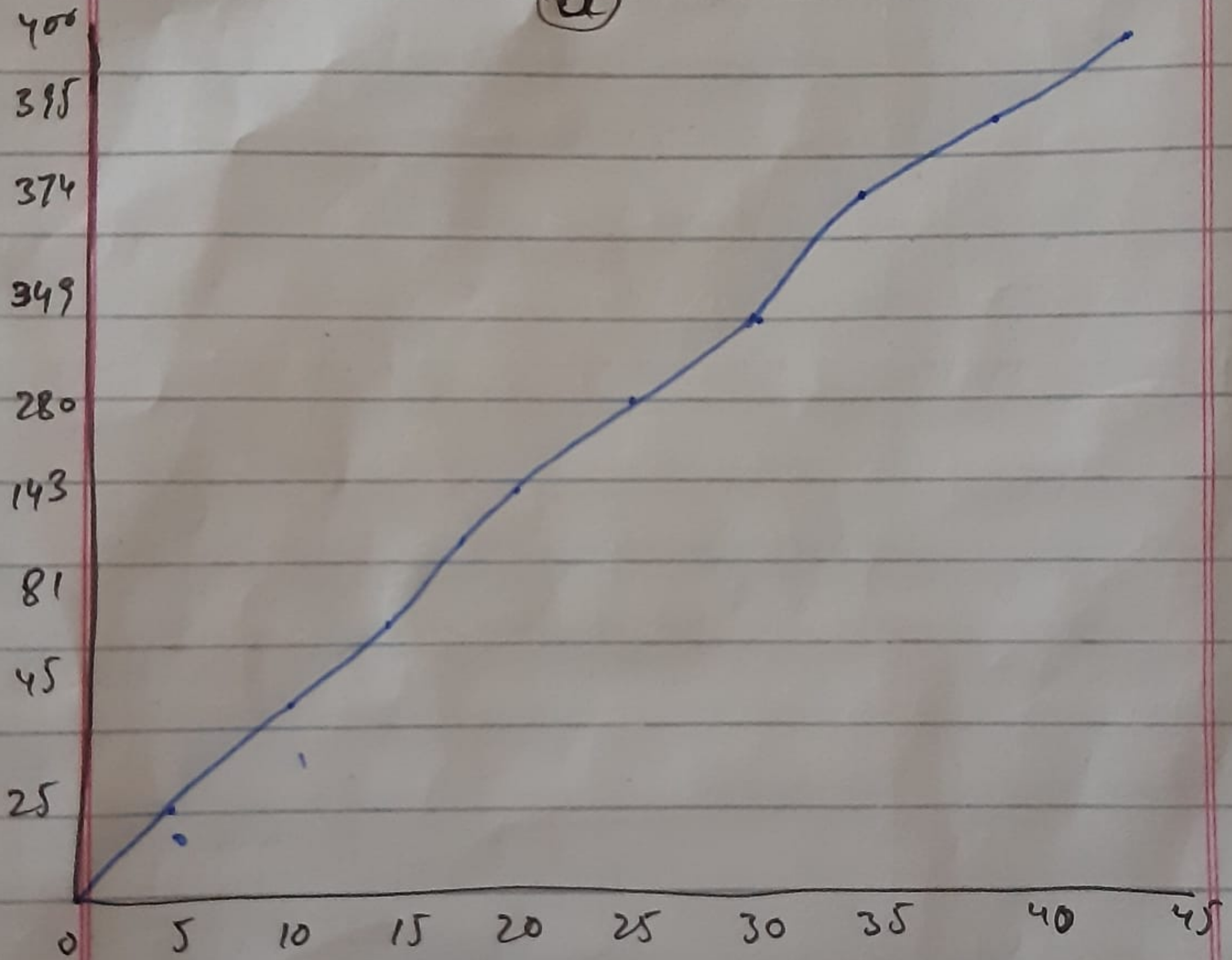
$$C.B = 1/2$$

$$C.B = 0.5$$

0

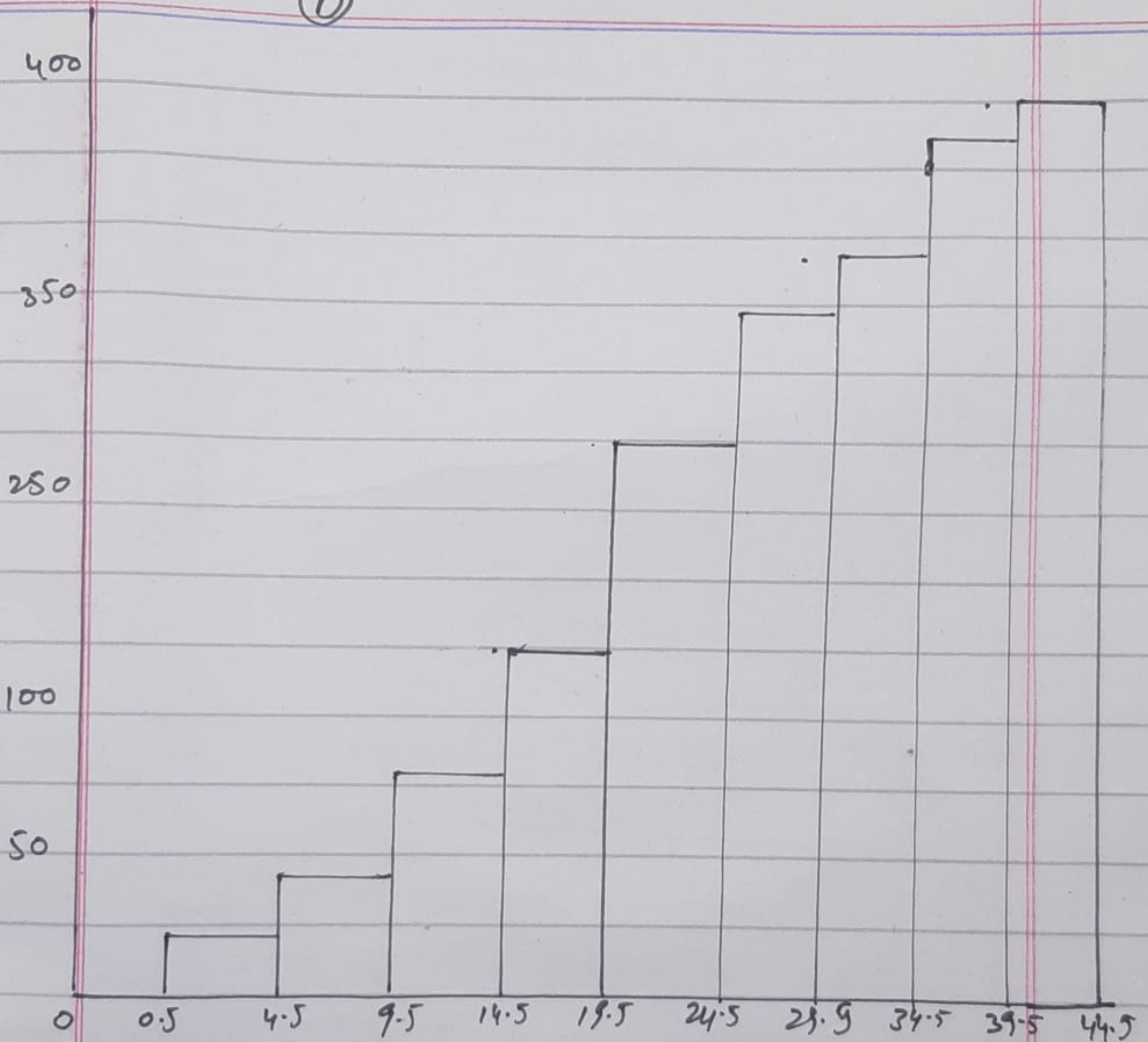


(a)



only two students take less than 18 minutes time.

(b)



Q.2

Q2 Solution:-

$$N = 30$$

$$X_m = 431$$

$$X_0 = 363$$

Range:

$$R = X_m - X_0$$

$$R = 431 - 363$$

$$R = 68$$

No of classes:-

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

$$K = 1 + 3.33 \log(30)$$

$$K = 1 + 3.33 (1.47)$$

$$K = 5.92$$

$$K = 6$$

$$h = \frac{R}{K}$$

$$\frac{68}{6}$$

$$h = 11.33 = 12$$

classes	f	c.B	x	c.f <	Tally
363-374	4	362.5-374.5	368.5	4	IIII
375-386	4	374.5-386.5	380.5	8	IIII
387-398	8	386 .5-398.5	392.5	16	IIIIIIII
399-410	7	398.5-410.5	404.5	23	IIIIII
411-422	4	410.5-422.5	416.5	27	IIII
423-434	3	422.5-434.5	428.5	30	III

Mean:-

$$\bar{x} = \frac{\sum f_i \cdot x_i}{n}$$

$$\bar{x} = \frac{11919}{30}$$

$$\bar{x} = 397.3$$

Mode:

$$M = l_1 + \frac{f_1 - f_0}{2 \cdot f_1 - f_0 - f_2} \cdot (l_2 - l_1)$$

$$M = 386.5 + \frac{8-4}{2(8)-4-7} \cdot (398.5-386.5)$$

$$M = 386.5 + \frac{4}{16-11} \cdot (12)$$

$$M = 386.5 + \frac{4}{5} \cdot (12)$$

$$M = 386.5 + 9.6$$

$$M = 396.1$$

QUARTILES:-

$$q_1 = \frac{n}{4}$$

$$q_1 = \frac{30}{4} = 7.5$$

$$Q_1 = l + \frac{h}{f} (q_1 - c)$$

$$Q_1 = 374.5 + \frac{12}{4} (7.5 - 4)$$

$$Q_1 = 374.5 + 3(3.5)$$

$$Q_1 = 374.5 + 10.5$$

$$\boxed{Q_1 = 385}$$

$$q_3 = \frac{3n}{4}$$

$$q_3 = \frac{3(30)}{4}$$

$$q_3 = \frac{90}{4}$$

$$\boxed{q_3 = 22.5}$$

$$Q_3 = l + \frac{h}{f} (q_3 - c)$$

$$Q_3 = 398.5 + \frac{12}{7} (22.5 - 16)$$

$$Q_3 = 398.5 + \frac{12}{7} (6.5)$$

$$Q_3 = 398.5 + 11.14$$

$$\boxed{Q_3 = 409.64}$$

Q 3

FIRST SET:- 3, 6, 2, 1, 7, 5

$$\text{Mean} = \frac{\text{sum of all nu}}{\text{total no}}$$

$$M = \frac{24}{6}$$

$$M = 4$$

$$S.D = \sqrt{\frac{\sum x_i^2}{N} - \left(\frac{\sum x_i}{N}\right)^2}$$

$$S.D = \sqrt{\frac{124}{6} - \frac{576}{36}}$$

$$= \sqrt{\frac{744 - 576}{36}}$$

$$= \sqrt{\frac{168}{36}}$$

$$S.D = \sqrt{4.67}$$

$$S.D = 2.16$$

x	x^2
3	9
6	36
2	4
1	1
7	49
5	25
$\frac{5}{24}$	$\frac{25}{124}$

2ND set = 11, 17, 9, 7, 19, 15

$$\text{Mean} = \frac{78}{6}$$

$$\boxed{M=13}$$

$$S.D = \sqrt{\frac{\sum x_i^2}{N} - \left(\frac{\sum x_i}{N}\right)^2}$$

$$S.D = \sqrt{\frac{1126}{6} - \frac{6084}{36}}$$

$$S.D = \sqrt{\frac{6756 - 6084}{36}}$$

$$= \sqrt{\frac{672}{36}}$$

$$= \sqrt{18.67}$$

$$S.D = 4.32$$

First set Mean = 4

First set S.D = 2.16

2ND set Mean = 13

2ND set S.D = 4.32

Mean & S.D of 2nd set is greater than First set.

x	x^2
11	121
17	289
9	81
7	49
19	361
15	225
<u>78</u>	<u>1126</u>

Q.4

class	f	x	x ²	f _i x	f _i x ²
64-84	15	74	5476	1110	82,140
85-104	18	94.5	8930.25	1701	160,744.5
105-124	27	114.5	13110.25	3091.5	353,976.75
125-144	10	134.5	18090.25	1345	180,902.5
145-164	6	154.5	23870.25	927	143,221.5
165-184	5	174.5	30450.25	872.5	152,251.25
185-204	13	194.5	37830.25	2528.5	491,793.25
	<u>94</u>			<u>11,575.5</u>	<u>1,565,029.75</u>

$$s^2 = \frac{\sum fx^2}{n} - \left(\frac{\sum fx}{n} \right)^2$$

$$s^2 = \frac{1,565,029.75}{94} - \left(\frac{11,575.5}{94} \right)^2$$

$$s^2 = \frac{1,565,029.75}{94} - \frac{133,992,200.25}{8,836}$$

$$s^2 = \frac{16,649.25}{1} - 15,164.35$$

$$s^2 = 1484.9$$

For standard deviation taking square root on both side.

$$\sqrt{s^2} = \sqrt{1484.9}$$

$$s = 38.54$$

Q5

a- DEPTH OF RIVER :-

The average depth of the river is 5 feet then it is not obviously that all the people have height 5 feet easily cross it. if he did not know swimming, important fact is river is not deep uniformly. It is 2 feet at some points while 7 feet on other point. So therefore he will cross it.

b- STUDENTS :-

No, it does not mean every student is hopeless. There would be students whose marks are less than 30, while there can be few students whose marks might be 60 or more.

C- AVERAGE INCOME :-

No, it is not like that,

Average pay does not mean everyone get paid same.

The king income will be much more than servants.