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 SEMESTER 4th
 PAPER PROBABILITY AND
 STATISTIC
 DEPARTMENT BS(CS)

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 = Δ = LCL of 2nd class - Ucl
 of first class

$$C.B = 5 - 4$$

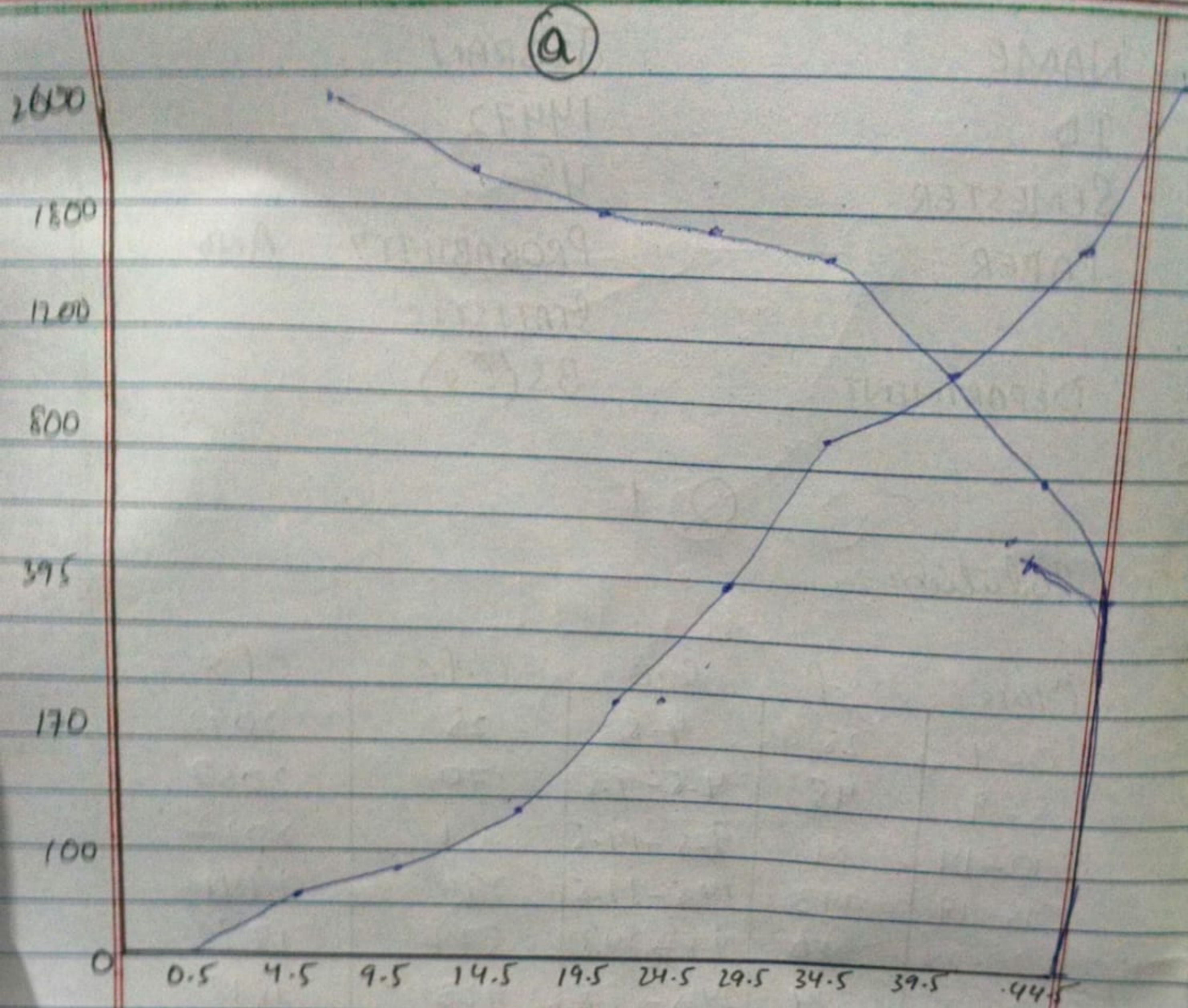
$$C.B = \frac{1}{2}$$

$$C.B = 0.5$$

Day: M T W T F S

Date: ___/___/___

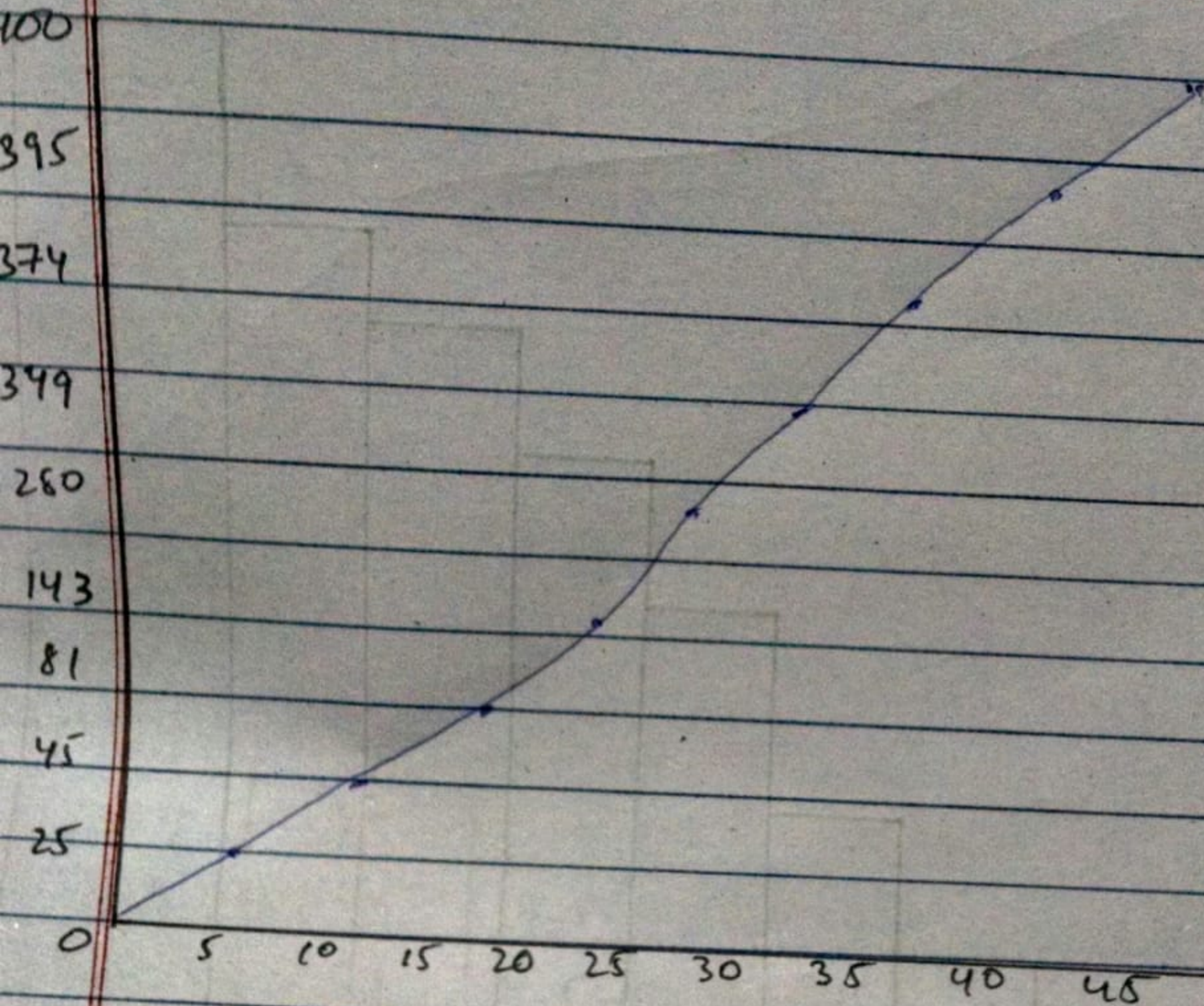
(a)



Day: M T W T F S

Date: ___/___/___

(a)

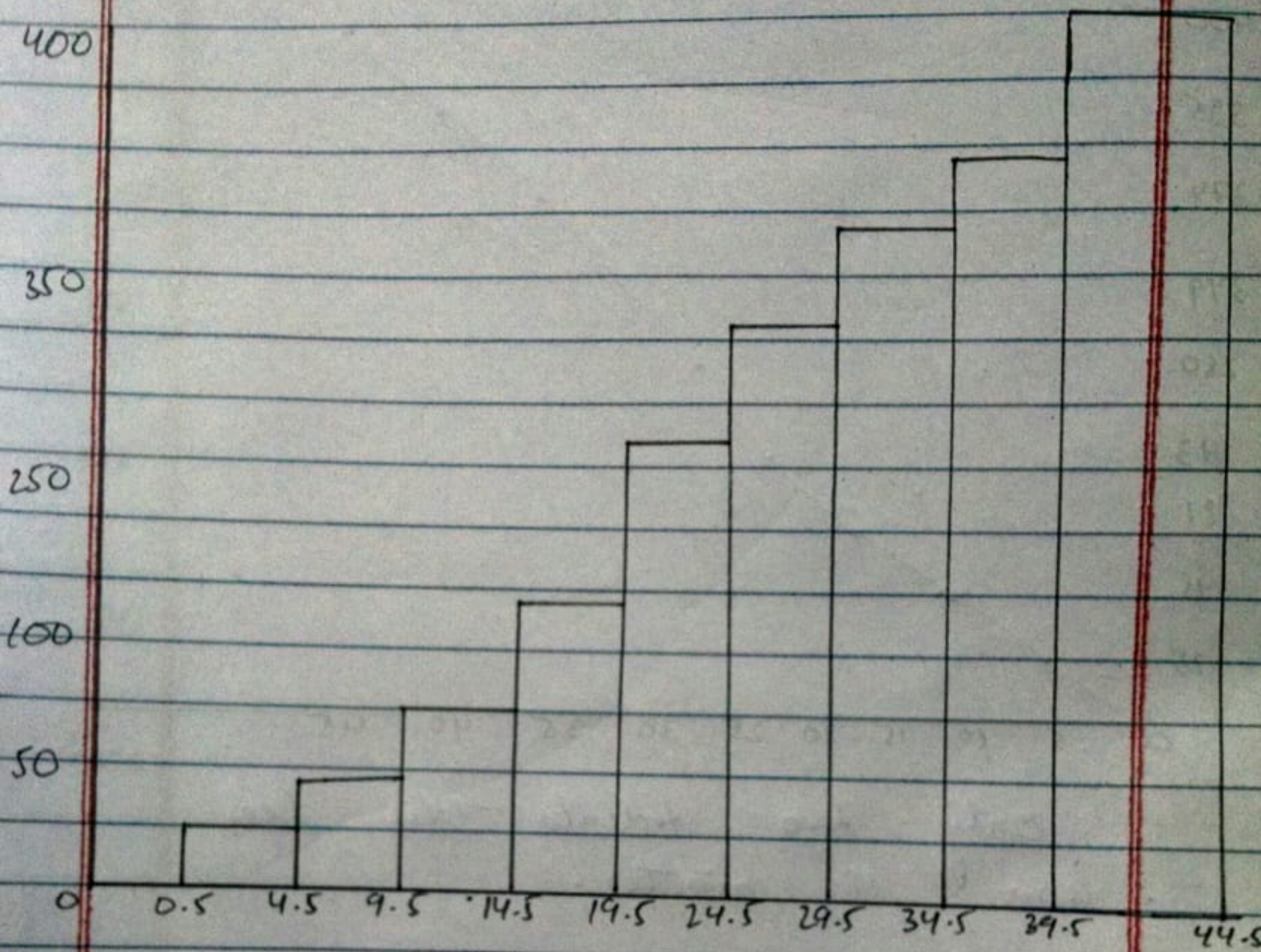


Only two students take less than 18 minutes.

Day. MTWTFSS

Date: ___/___/___

(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:-

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

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

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

$$K = 5.92$$


$$K = 6$$

$$h = R/K$$

$$h = \frac{68}{6}$$

$$h = 11.33 = 12$$

Classes	f	C.B	x	C.f	Tally
363-374	4	362.5-374.5	368.5	4	
375-386	4	374.5-386.5	380.5	8	
387-398	8	386.5-398.5	392.5	16	
399-410	7	398.5-410.5	404.5	23	
411-422	4	410.5-422.5	416.5	27	
423-434	3	422.5-434.5	428.5	30	

Checked By: Parents: Excellent Good 

Date: ___/___/___

MTWTF S

Mean:-

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

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

$$\bar{x} = 397.3$$

Mode:-

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

$$M = 3865 + \frac{8 - 4}{2(8) - 4 - 7} \cdot (398.5) - (386.5)$$

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

$$M = 386.5 + 9.6$$

$$M = 396.1$$

QUARTILES:-

$$Q_1 = \frac{n}{4}$$

$$Q_1 = \frac{30}{4} = 7.5$$

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

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

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

$$Q_1 = 374.5 + 10.5$$

$$\boxed{Q_1 = 385}$$

$$Q_3 = \frac{3n}{4}$$

$$Q_3 = \frac{3(30)}{4} = \frac{90}{4}$$

$$\boxed{Q_3 = 22.5}$$

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

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

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

$$Q_3 = 398.5 + 11.14$$

$$\boxed{Q_3 = 409.64}$$

Q 3

FIRST SET :-

3, 6, 2, 1, 7, 5

Mean = $\frac{\text{Sum of all number}}{\text{total no}}$

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

$$M = 4$$

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

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

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

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

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

$$S.D = 2.16$$

x	x^2
3	9
6	36
2	4
1	1
7	49
5	25
24	124

2nd set :-

11, 17, 9, 7, 19, 15

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

$$M = 13$$

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

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

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

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

$$= \sqrt{18.67}$$

$$S.D = 4.32$$

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

First set Mean = 4

First set S.D = 2.16

2nd set Mean = 13

2nd set S.D = 4.32

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

Q 4

Class	f	x	x ²	fix	fix 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>			11,575.5	1565029.75

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

$$s^2 = \frac{1565029.75}{94} - \left(\frac{11,575.5}{94} \right)^2$$

$$s^2 = \frac{1565029.75}{94} - \frac{133,992,200.25}{8,836}$$

$$s^2 = 16649.25 - 15,164.35$$

$$s^2 = 1484.9$$

for standard deviation taking square root on both side

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

$$s = 38.54$$

Q 5

(a) DEPTH OF RIVER:-

The average depth of the river is 5 feet. 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. Therefore 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.