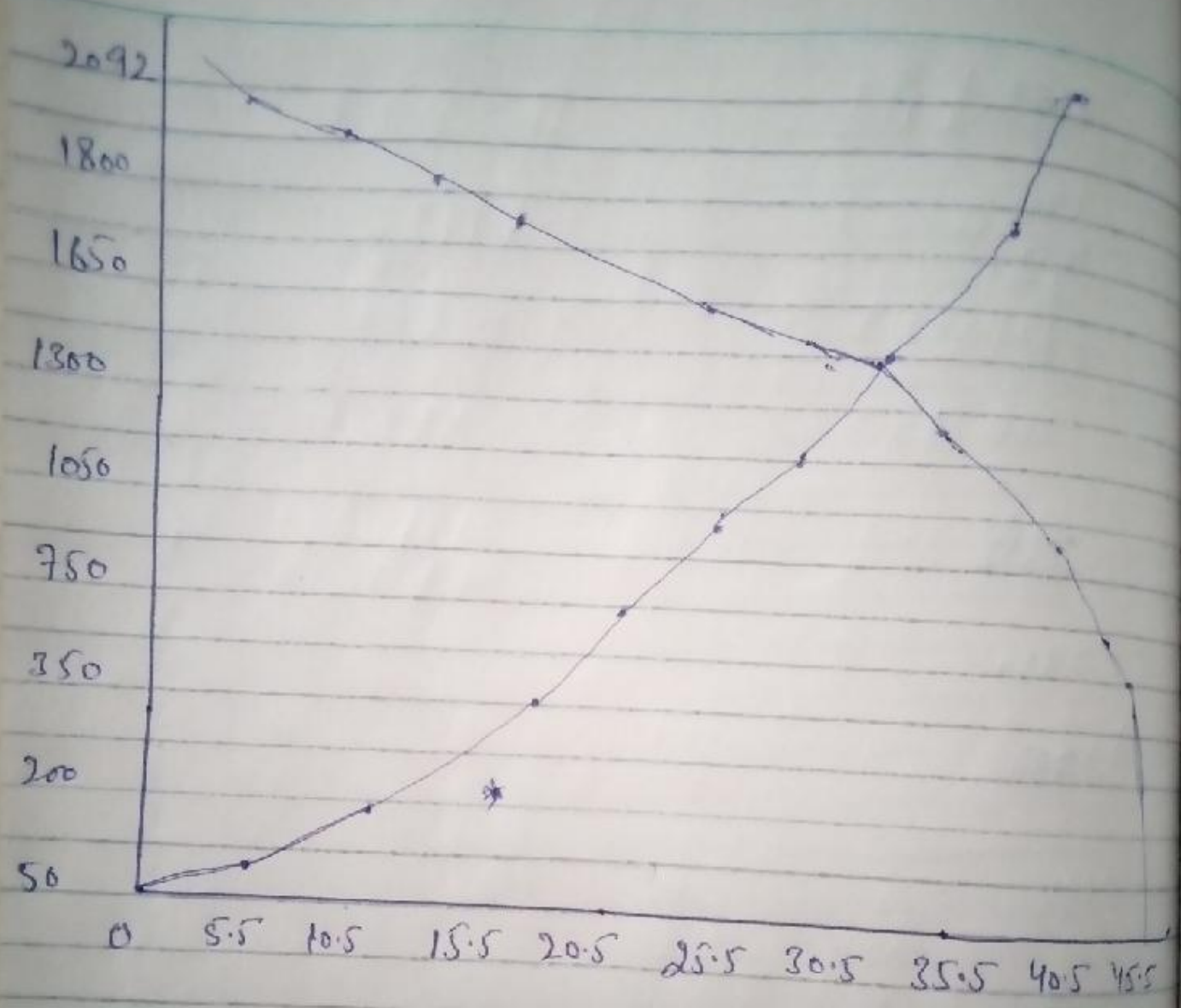


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 Semester 4th
 Paper Probability & Statistics

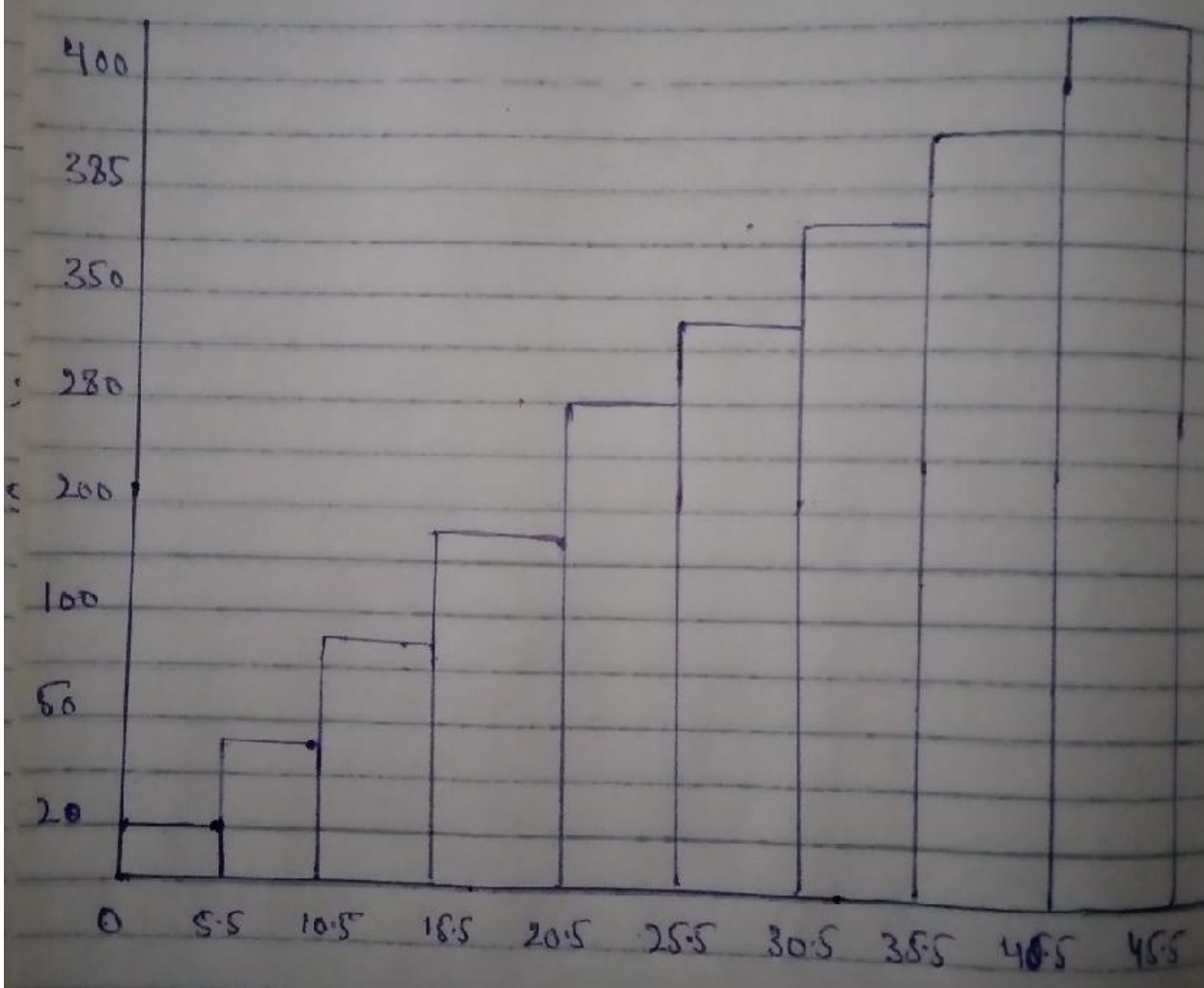
Q 1

Class	f	C.B	cf	
0-5	25	0-5.5	25	2092
5-10	45	5.5-10.5	70	2067
10-15	81	10.5-15.5	151	2022
15-20	143	15.5-20.5	294	1941
20-25	280	20.5-25.5	574	1798
25-30	349	25.5-30.5	923	1518
30-35	374	30.5-35.5	1297	1169
35-40	395	35.5-40.5	1692	795
40-45	400	40.5-45.5	2092	400

C.B = Lcl and second class - Ucl of
 1st class
 $5.5 - 5.5$
 $C.B = 0$



4500
5



Q 2:

Ans:-
Solution:

$$N = 30$$

$$X_m = 431$$

$$X_o = 363$$

Range:

$$R = X_m - X_o$$

$$R = 431 - 363$$

$$R = 68$$

No of classes:

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

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

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

$$K = 5.92$$

$$K = 6$$

$$h = R / K$$

$$h = 68 / 6$$

$$= 11.33$$

$$h = 12$$

Class	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	
423-432	3	422.5 - 432.5	428.5	30	

Mean:

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

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

$$\bar{X} = 397.3$$

Mode:-

$$M = L_1 + \frac{f_1 - f_0}{2 \cdot f_1 - f_0 - f_2} (L_2 - L_1)$$

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

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

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

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$$M = 386.5 + 9.6$$

$$M = 396.1$$

Quartiles:

$$Q_1 = J + h/f \cdot (q_1 - c)$$

$$Q_1 = 398.5 + \frac{12}{7} (7.5 - 16)$$

$$Q_1 = 398.5 + \frac{12}{7} (-8.5)$$

$$Q_1 = 398.5 - 14.57$$

$$Q_1 = 383.93$$

$$Q_3 = J + h/f (q_3 - c)$$

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

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

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

$$q_3 = 22.5$$

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

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

$$Q_3 = 398.5 + 11.14$$

$$Q_3 = 409.64$$

Q3

3, 6, 2, 1, 7, 5

Solution:

$$\text{Mean} = \frac{\text{Sum of all observations}}{\text{Total no}}$$

$$\text{Mean} = \frac{24}{8}$$

$$\text{Mean} = 4$$

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

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

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

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

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

$$S.D = \sqrt{467}$$

$$S.D = 2.16$$

11, 17, 9, 7, 19, 13

$$\text{Mean} = \frac{11+17+9+7+19+13}{6}$$

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

x	x^2
11	121
17	289
9	81
7	49
19	361
13	225

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

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

$$= \sqrt{\frac{672}{36}} = \sqrt{18.67} = 4.32$$

$$S.D = 4.82.$$

first set mean = 4
second set mean = 13

$$\text{first set } S.D = 2.16$$

$$\text{second set } S.D = 4.82$$

Mean of SD of second set is greater than first set.

Q4

Class	f	x	x ²	fx	fx ²
64-84	15	74	5476	1110	82140
85-104	18	94.5	8930.25	1701	160744.5
105-124	27	114.5	13110.25	3091.5	353976.75
125-144	10	134.5	18090.25	1345	180902.5
145-164	6	154.5	23870.25	927	143221.5
165-184	5	174.5	30450.25	872.5	152251.25
185-204	13	194.5	37830.25	2528.5	491793.25

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

$$s^2 = \frac{1565029.75}{94} - \left(\frac{11575.5}{94} \right)^2$$

$$s^2 = \frac{1565029.75}{94} - \frac{133992200.25}{8836}$$

$$s^2 = 16649.25 - 15164.35$$

$$s^2 = 1484.9$$

for standard deviation taking square root on both side

$$\sqrt{s^2} = \sqrt{1484.9} \Rightarrow s = 38.54$$

Q5

Depth of Rivers:-

The average depth of the river is 5 feet. That 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 so therefore he will cross it.

STUDENT:-

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

AVERAGE INCOME:-

No, it is not like that average pay does not mean everyone get paid some. The thing income will be much more than servants.