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Semster

4<sup>th</sup>

Paper

Probability &  
& statistics.

(1)

(Q. No. 1)

Solution.

| Classes | f   | C.B       | (fL  | (f > |
|---------|-----|-----------|------|------|
| 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  |

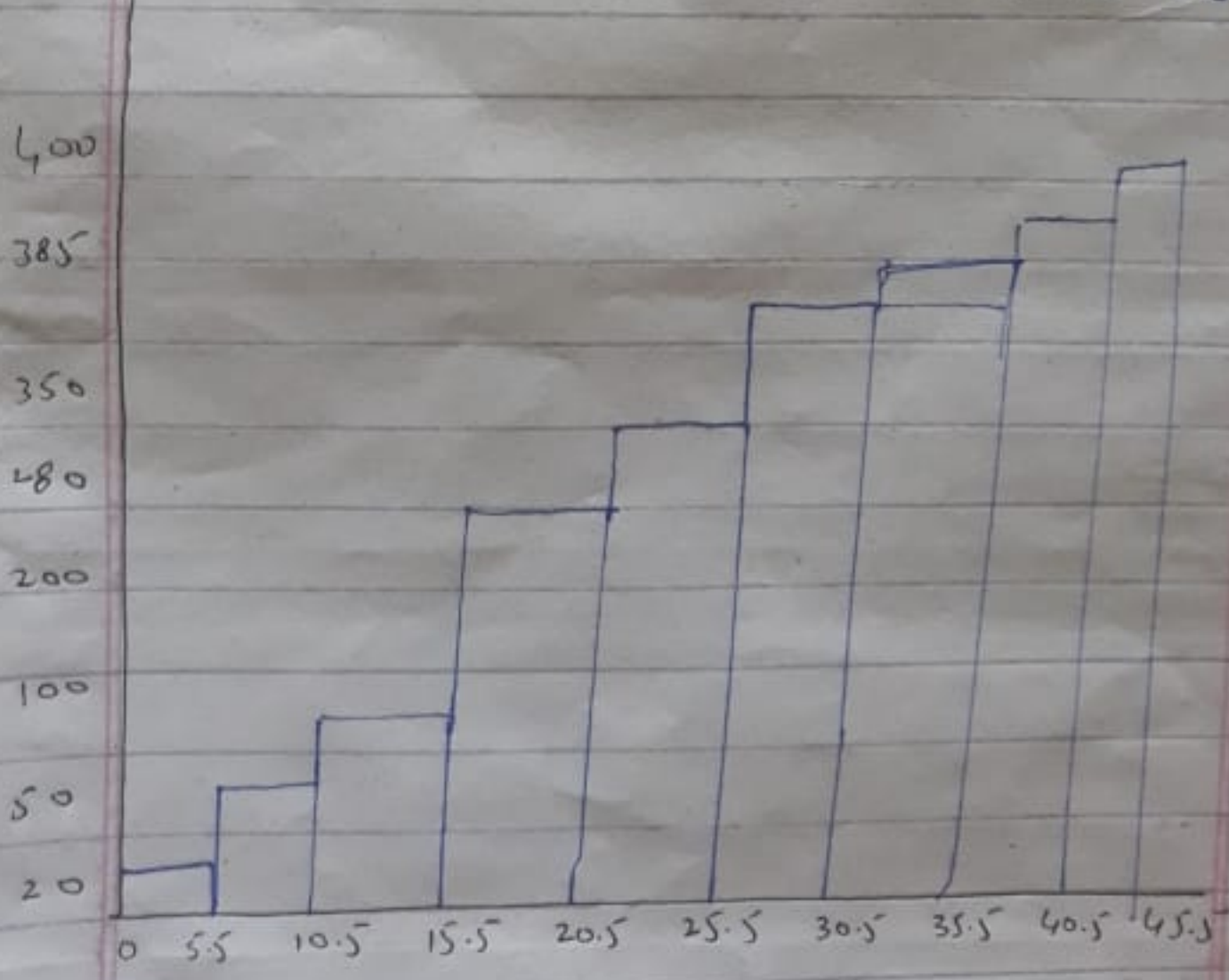
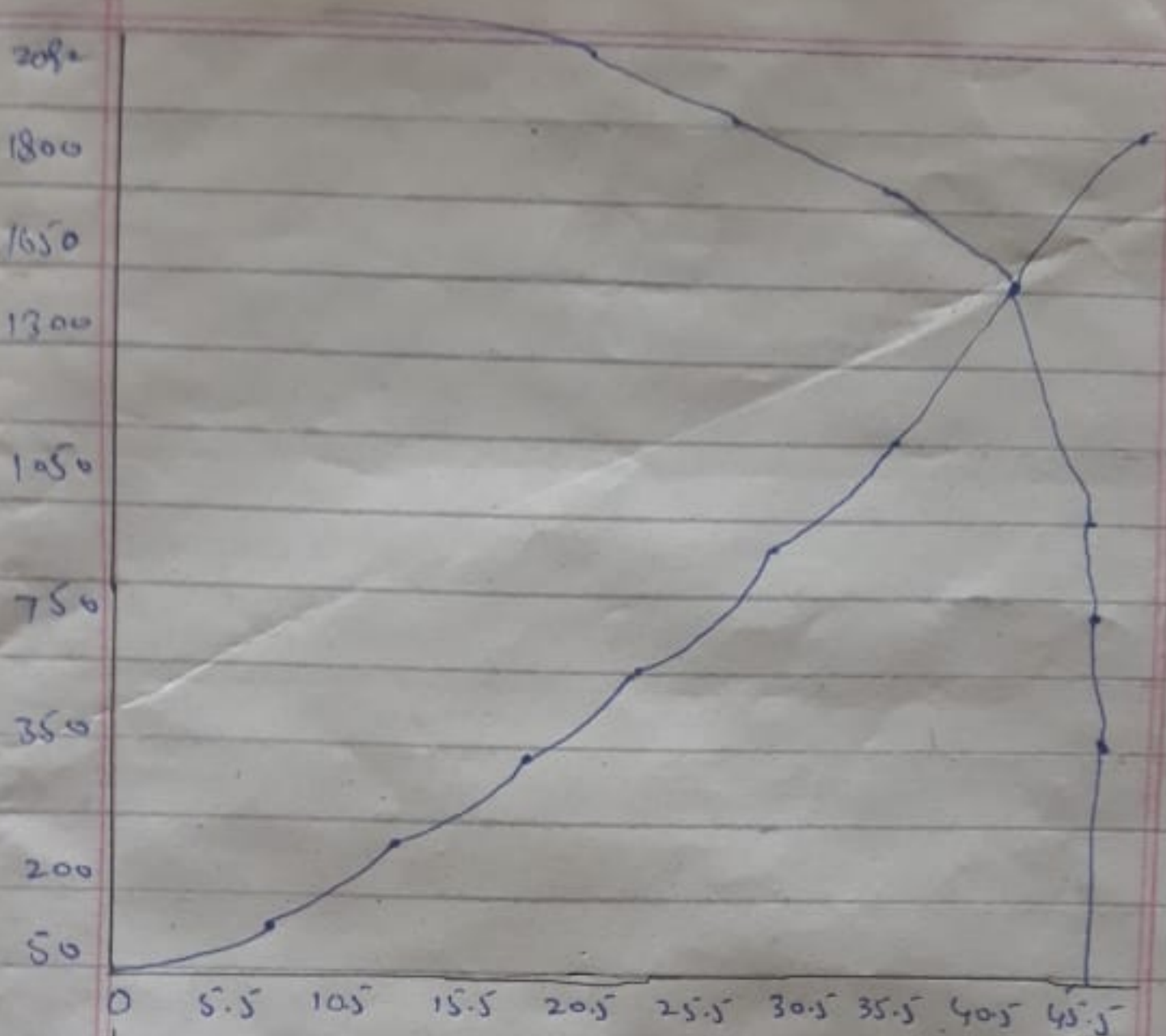
C.B = LCL of 2nd class - Ucl of

1st class

$$5.5 = 5.5$$

$$C.D = 0$$

②



(3)

Q. NO: 2

Solution.

$$N = 30$$

$$X_m = 431$$

$$X_o = 363$$

Range.

$$R = X_m - X_o$$

$$R = 431 - 363$$

$$R = 68$$

No of classes.

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

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

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

$$K = 5.92$$

$$K = 6$$

$$h = R/K$$

$$h = \frac{68}{6} = 11.33 = 12$$

| Classes | f | C.D         | x     | Cfx | 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  |       |

$$\text{Mean} = \frac{\sum f_i x_i}{n}$$

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

$$\bar{X} = 397.3$$

(4)

Mode.

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

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

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

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

$$M = 386.5 + 9.6$$

$$M = 396.1$$

Quartiles :

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

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

$$Q = l + \frac{n}{f} (q_1 - c)$$

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

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

$$Q_1 = 374.5 + 10.5$$

$$Q_1 = 385$$

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

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

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

$$Q_3 = 398.5 + 11.14$$

$$Q_3 = 409.64$$

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

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

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

$$q_3 = 22.5$$

(5)

Q. NO. 3

36, 2, 11, 7, 5

11, 17, 9, 7, 19, 15

First Set

$$\text{mean} = \frac{\text{Sum of all number}}{\text{Total number}}$$

$$\bar{x} = \frac{24}{6}$$

$$n = 6$$

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

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

$$= \frac{8744 - 576}{36}$$

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

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

$$S.D = 2.16$$

(6)

(2nd set)

11, 17, 9, 7, 19, 15

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

$$n = 6$$

S.D =

$$\sqrt{\frac{\sum x_i^2}{n} - \left(\frac{\sum x_i}{n}\right)^2}$$

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

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

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

$$= \sqrt{18.67}$$

$$= \sqrt{18.67} \Rightarrow \text{S.D} = 4.32$$

$$\text{First set mean} = 4$$

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

$$\text{2ND Mean} = 13$$

$$\text{S.D} = 4.32$$

Mean  $\text{\textcircled{S}}$  S.D of 2nd set is greater than first set.

99

Q.No: 4.

| class   | f  | x     | x <sup>2</sup> | fx     | fx <sup>2</sup> |
|---------|----|-------|----------------|--------|-----------------|
| 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    | 143,221.25      |
| 165-184 | 5  | 174.5 | 30450.25       | 872.5  | 152,251.25      |
| 185-204 | 13 | 194.5 | 37890.25       | 2528.5 | 491,793.25      |

94      11575.5      1565029.75

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

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

$$S^2 = \frac{165029.75}{94} - \frac{133,992,200.25}{8836}$$

$$S^2 = 16649.25 - 15164.35$$

$$S^2 = 1484.9$$

For standard deviation taking square root on both side

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

$$S = 38.54 \text{ Ans}$$



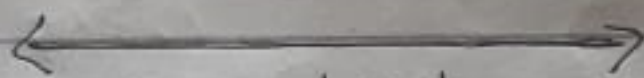
(7)

(Q.No. 5)

(a)

∴ Depth of a river?

The average of 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.



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.

(8)

(C) (Average income)

No, it does not mean like  
that average pay does not mean  
every one get paid same.  
The King's income will be much  
more than Servants.

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