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Subject : Probability and statistics

Date : 29/9/2020.

Summer -20.

Q1. Construct a group distribution table for the following data and calculate Mean, Median, mode and Quartiles.

423, 369, 387, 411, 393, 394, 371, 377, 389, 409, 392,  
408, 431, 401, 363, 391, 405, 382, 400, 381, 399,  
415, 428, 422, 396, 372, 410, 419, 386, 390

Sol:-

Numbers(x)	Tally	Frequency.
360-369	II	2
370-379	III	3
380-389	IIII	5
390-399	IIII II	7
400-409	IIII	5
410-419	IIII	4
420-429	III	3
430-439	I	1
Total		30

Numbers (x)	Midpoint	Freq (f)	$f \times x$
360-369	364.5	2	729
370-379	374.5	3	1123.5
380-389	384.5	5	1922.5
390-399	394.5	7	2761.5
400-409	404.5	5	2022.5
410-419	414.5	4	1658
420-429	424.5	3	1273.5
430-439	434.5	1	434.5
Totals		30	11925

Mean:-

$$X = \frac{\sum X}{n}$$

$$X = \frac{11925}{30}$$

$$X = 397.5$$

$$\text{Mean} = 397.5$$

Mode:-

3

$$L + \frac{f_m - f_{m-1}}{(f_m - f_{m-1}) + (f_m - f_{m+1})} \times w$$

$\Rightarrow L$  is lower class boundary

$\Rightarrow f_{m-1}$  is freq. of group before modal group.

$\Rightarrow f_m$  is the freq. of modal group.

$\Rightarrow f_{m+1}$  is the freq. of group after mode.

$\Rightarrow w$  is the group width.

$$M = 389.5 + \frac{8 - 3/2(8) - 3.5}{(395.5 - 389.5)}$$

$$= 389.5 + \frac{5}{16 - 8(11)}$$

$$= 389.5 / 1 + 55/8$$

$$= 3131/8$$

$$\text{Mode} = 391.8$$

Medium:-

$$= l + \frac{h}{F} (n/2 - C)$$

$$= l + \frac{(\frac{n}{2} - Cf)}{F} \times C$$

(2)



$$= 390 + \left( \frac{30/2 - 10}{7} \right) \times 10$$

$$= 390 + \frac{5}{7} \times 10$$

$$= 390 + 50/7$$

$$= 390 + 7.14$$

$$\text{Median} = 397.14 \text{ Am.}$$

### Quartile:

$$l + h/f (q - c)$$

$$q = n/u = 30/u = 7.5$$

$$Q_1 = 389.5 + 11/3 (7.5 - 7)$$

$$C_1 = 389.5/1 + 5.5/3$$

$$Q_2 = 11535 - 55/3 + 5.5/3 = 1148/3 = 382.66$$

$$l + h/f (q_3 - c)$$

$$Q_3 = 3n/4 = 3 \times 30/4 = 30/4 = 22.4$$

$$Q_3 = 406.5 + 11/5 (22.5 - 20)$$

$$Q_3 = 406.5 + 11/5 (2.5)$$

$$Q_3 = 406.5 + 27.5/5$$

$$= 2032.5 + 27.5/5$$

$$= 2060/5 = 412 \text{ Am}$$

Qo: By multiplying each of the numbers 3, 6, 2, 1, 7, 5 by 2 and then adding 5, we obtain 11, 17, 9, 7, 19, 15. What is the relation between the standard deviation and the means of the two sets.

set A	Set B
3, 6, 2, 1, 7, 5	11, 17, 9, 7, 19, 15
mean = $\frac{3+6+2+1+7+5}{6}$	mean = $\frac{11+17+9+7+19+15}{6}$
= $\frac{24}{6}$	= $\frac{78}{6}$
= 4	= 13

set (A)

$$S.D = \frac{3+6+2+1+7+5}{6}$$

$$= 4$$

$$= (3-4)^2 + (6-4)^2 + (2-4)^2 + (1-4)^2 + (7-4)^2 + (5-4)^2$$

$$= 1 + 4 + 4 + 9 + 9 + 1$$

$$= 28$$

$$= \sqrt{28} = 5.29$$

set (B)

$$= (11-13)^2 + (17-13)^2 + (9+13)^2 + (7-13)^2 + (19-13)^2 + (15-13)^2$$

$$= 4 + 16 + 16 + 36 + 36 + 4$$

$$= 112$$

$$= \sqrt{112}$$

$$= 10.58$$

So, it is clear that standard deviation of (set B) is double.



Q3

Class	Frequency	midpoint $x_i$	$f \cdot x_m$	$f \cdot x_m^2$
64-84	15	74	<del>15</del> 1110	82146
85-104	18	94.5	1701	160744.5
105-124	27	114.5	3091.5	353976.75
125-144	10	134.5	1345	180902.5
145-164	6	154.5	927	143221.5
165-184	5	174.5	872.5	152251.25
185-204	13	194.5	2528.5	491793.25
	<u>94</u>	<u>941</u>	<u>11575.5</u>	<u>1565029.75</u>

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

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

$$V = S^2 = 16649.25 - 15164.35$$

$$S^2 = 1484.9$$

$$S = 38.53$$



Q4

Sol: The Sample Space  $S$  is represented by the following 36 outcomes

$$S = \{(1,1), (1,2), (1,3), (1,4), (1,5), (1,6) \\ (2,1), (2,2), (2,3), (2,4), (2,5), (2,6) \\ (3,1), (3,2), (3,3), (3,4), (3,5), (3,6) \\ (4,1), (4,2), (4,3), (4,4), (4,5), (4,6) \\ (5,1), (5,2), (5,3), (5,4), (5,5), (5,6) \\ (6,1), (6,2), (6,3), (6,4), (6,5), (6,6)\}$$

1. Let  $A$  be the event that double six occurs

$$A = \{(6,6)\} \text{ and thus}$$

$$P(A) = 1/36$$

2. Let  $B$  denotes that a sum of 8 or more dots occurs

$$B = \{(2,6), (3,5), (3,6), (4,4), (4,5), \\ (4,6), (5,3), (5,4), (5,5), (5,6), (6,2), (6,3), \\ (6,4), (6,5), (6,6)\}$$

Hence

$$P(B) = 15/36 = \underline{\underline{5/12}}$$

Q5

Sol:

$$P(H_2 | C_1) = 3 \left(\frac{9}{10}\right)^2 \left(\frac{1}{10}\right)$$

$$P(H_2 | C_2) = 3 \left(\frac{1}{10}\right)^2 \left(\frac{9}{10}\right)$$

$$P(H_3 | C_1) = \left(\frac{9}{10}\right)^3$$

$$P(H_3 | C_2) = \left(\frac{1}{10}\right)^3$$

using the law of probability.  $P(C_1) = P(C_2) = \frac{1}{2}$ , we have

$$P(H_2 \cup H_3) = P(H_2) + P(H_3)$$

$$= P(C_1) P(H_2 | C_1) + P(C_2) P(H_2 | C_2) +$$

$$P(C_1) P(H_3 | C_1) + P(C_2) P(H_3 | C_2)$$

$$= \frac{1}{2} \cdot \frac{1}{1000} \cdot (3 \cdot 81 + 27 + 729 + 1)$$

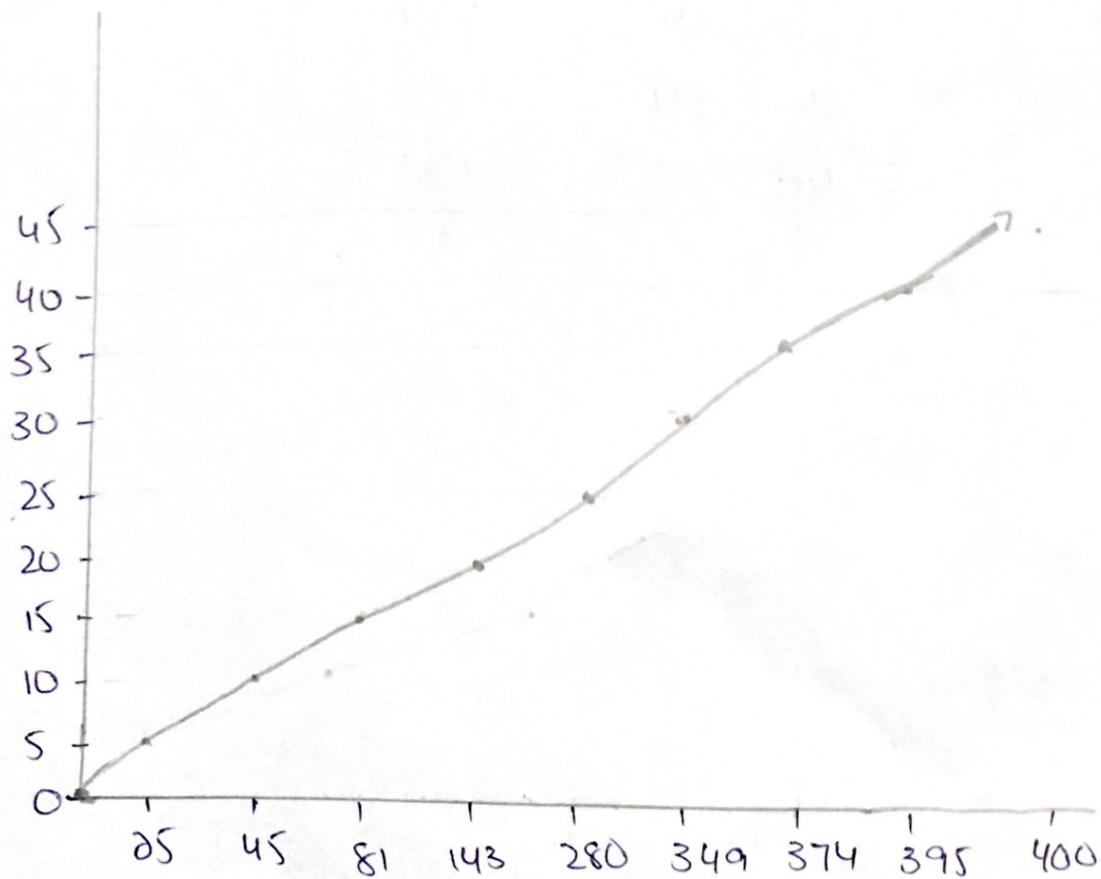
$$= \frac{1}{2}$$

→ X

Q6: students were asked how long it took them to walk to school on a particular morning. A cumulative frequency distribution was formed.

Q9 Draw a cumulative frequency curve and estimate how many students took less than 18 minutes.

Frequency	25	45	81	143	280
C.F	25	70	151	294	574

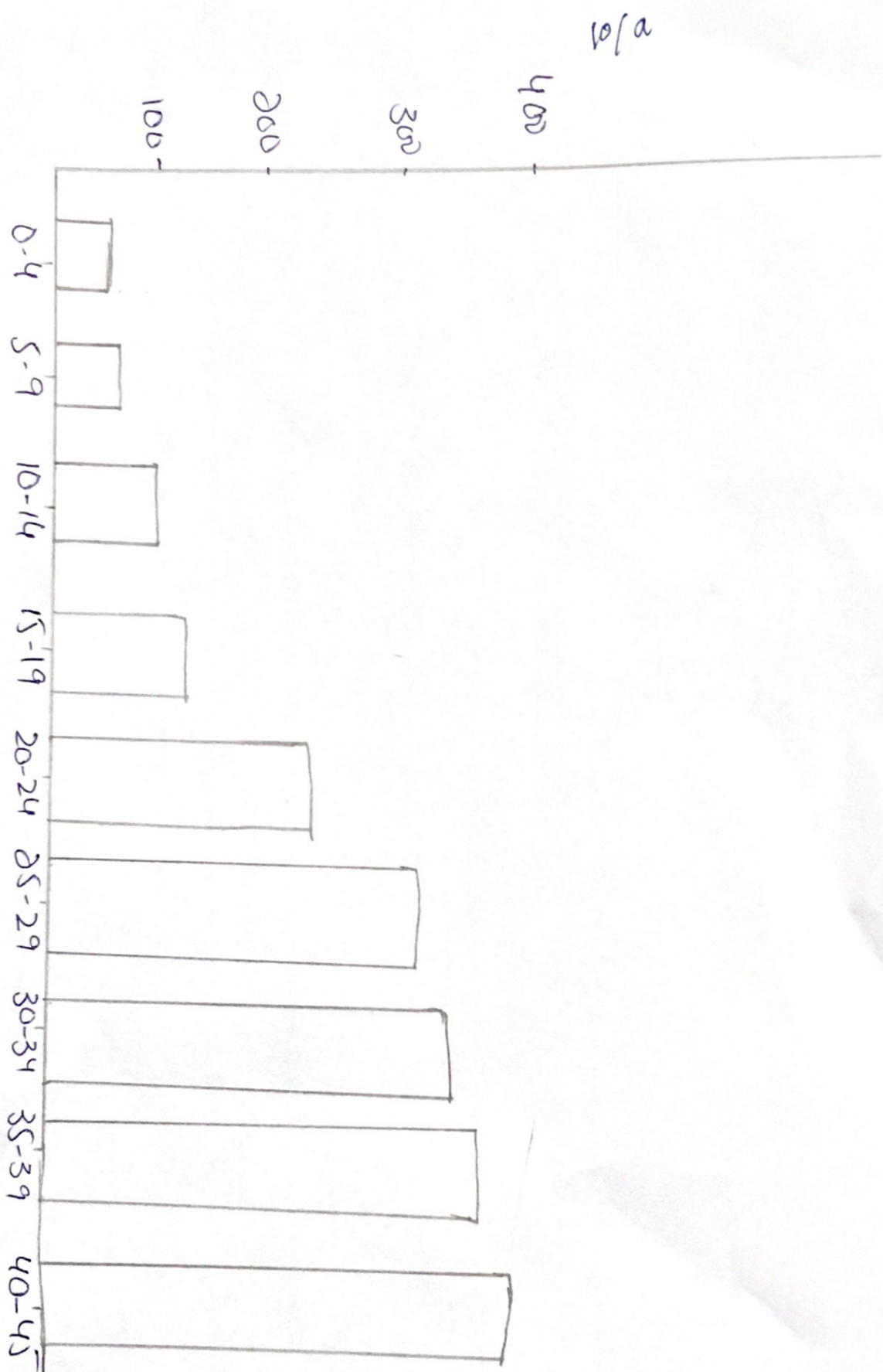


(1) less than = 81 to 143.



b) Take equal class intervals of 0-5, 10-15, etc construct frequency distribution and draw a histogram.

Interval	F
0-4	25
5-9	45
10-14	81
15-19	143
20-24	280
25-29	349
30-34	374
35-39	395
40-44	400



Q7 (a)

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The first Condition is that he does not know how to swim. Second Condition is that there is no one around to save him.

But more important is the fact that a river of average depth 5-feet is not deep uniformly. It can be 2-ft deep at one location and 7-ft at another. It can be 4-ft at one place and 12 or more feet at others. But of course, the average will be 5-ft. So if you are 6-ft tall, you can still drown in a river of average depth 5-ft.

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(b) ~~A~~ A class of 20<sup>12</sup> students averaged 66% on examination. we know sum of percent = percentage  $\times$  number of students.

$$\begin{aligned} \text{Sum of percentage of 20 student} \\ = 66\% \times 20 = 1320 \end{aligned}$$

Another class of 30 students averaged 56%

$$\begin{aligned} \text{Sum of percentage of 30 student} \\ = 56\% \times 30 = 1680 \end{aligned}$$

Sum of percentage of 50 stud.

$$1320 + 1680 = 3000$$

Average per for all 50 student.

$$= \text{Sum of per of 50 student} / 50$$

$$= 3000 / 50$$

$$= 60\%$$

Ans

the average per for all student is 60%

(c)

Yet, the wages paid to domestic workers are often extremely low.... less than half of average wages - and sometimes no more than about 20 percent of average wages.... particularly minimum wage coverage all of which tend to be interlinked. Yet, domestic workers enable their employers - especially women - to go to...



Q8 (a)

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Population and Sample :-

A population is the entire group that you want to draw conclusions about. A sample is the specific group that you will collect data from. The size of the population. In research, a population doesn't always refer to people.

(b) The Range :

The range is the difference b/w the highest and lowest values in a set of numbers. To find it, subtract the lowest number in the distribution from the highest.



(C) The <sup>15</sup> weighted Arithmetic Mean:

The weighted arithmetic mean is similar to an ordinary arithmetic mean except that instead of each of the data points contributing equally to the final average.

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