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Q:1 Take 100<sup>①</sup> observations randomly and Construct the followings.

• Discrete group frequency Distribution table.

• Contentious Class Boundaries Table.

10, 8, 8, 5, 6, 3, 3, 3, 10, 1,  
20, 19, 19, 13, 12, 12, 12, 11, 17, 19  
30, 22, 22, 23, 27, 29, 30, 25, 25, 24  
33, 32, 34, 35, 35, 37, 39, 40, 39, 38  
50, 50, 50, 47, 47, 47, 43, 42, 41, 47  
59, 58, 57, 57, 57, 52, 53, 52, 52, 60  
70, 69, 68, 65, 65, 65, 62, 62, 62, 70  
80, 80, 80, 75, 75, 74, 73, 72, 71, 80.  
89, 87, 86, 88, 85, 84, 84, 82, 82, 90  
96, 95, 96, 95, 96, 100, 96, 98, 99, 98

$$\begin{aligned} \textcircled{1} \text{ Range} &= \text{Highest} - \text{Lowest} \\ &= 100 - 1 \\ &= 99 \end{aligned}$$

② Class interval keeping at 9.  
Frequency Distribution Table.

No. of observation (classes)	Frequency
10 - 10	10
11 - 20	10
21 - 30	10
31 - 40	10
41 - 50	10
51 - 60	10
61 - 70	10
71 - 80	10
81 - 90	10
90 - 100	10

Q2.

(3)

Find Averages of the above mentioned frequency distribution Table.

• Arithmetic Mean.

$$\text{Arithmetic Mean} = \frac{\text{Sum of all observation}}{\text{No. of observations}}$$

$$= \frac{5190}{100}$$

$$\text{Arithmetic Mean} = 51.9$$

Classes	Class Boundaries	Mid values ( $x_i$ )	Freq ( $f_i$ )	$\log(x_i)$	$f_i \times \log(x_i)$
0-10	0.5-10.5	5.5	10	0.6989	6.989
11-20	10.5-20.5	15.5	10	1.1761	11.761
21-30	20.5-30.5	25.5	10	1.3979	13.979
31-40	30.5-40.5	35.5	10	1.544	15.44
41-50	40.5-50.5	45.5	10	1.653	16.53
51-60	50.5-60.5	55.5	10	1.74	17.4
61-70	60.5-70.5	65.5	10	1.813	18.13
71-80	70.5-80.5	75.5	10	1.875	18.75
81-90	80.5-90.5	85.5	10	1.929	19.29
91-100	90.5-100.5	95.5	10	1.9777	19.777
			$\Sigma f_i = 100$		$\Sigma f_i \times \log(x_i) = 158.04$

• Contentious <sup>(4)</sup> Class Boundaries Table

Classes	Class Boundaries	Frequency
0 — 10	0.5 — 10.5	10
11 — 20	10.5 — 20.5	10
21 — 30	20.5 — 30.5	10
31 — 40	30.5 — 40.5	10
41 — 50	40.5 — 50.5	10
51 — 60	50.5 — 60.5	10
61 — 70	60.5 — 70.5	10
71 — 80	70.5 — 80.5	10
81 — 90	80.5 — 90.5	10
91 — 100	90.5 — 100.5	10

⑤  
Geometric Mean =  $\frac{1}{N} \sum_{i=1}^n f_i \log(x_i)$

$$= \frac{158.046}{100}$$

$$\text{Geometric Mean} = 1.58046$$

Harmonic Mean :

Node : ⑥  
Node is 96.

Q:3 Find <sup>(7)</sup> Quartiles of the Discrete Frequency Distribution of table.

Classes	Frequency	CF
1-10	10	10
11-20	10	20
21-30	10	30
31-40	10	40
41-50	10	50
51-60	10	60
61-70	10	70
71-80	10	80
81-90	10	90
91-100	10	100

Q: 1 Class :  $\frac{N}{4}^{\text{th}}$   
 $= \frac{100}{4} = 25$   
 Class (21-30)

The lower <sup>(8)</sup> boundary of class  
21-30 is 21

$$L = 21$$

$$Q_1 = L + \frac{\frac{n}{4} + CF}{f} \times C$$

$$Q_1 = 21 + \frac{25 - 30}{10} \times 9$$

$$= 21 + \frac{-5}{10}$$

$$= 21 + (-0.5 \times 9)$$

$$= 21 + (-4.5)$$

$$Q_1 = 16.5$$

Q 8 2

$$\text{Class} = \frac{2^{100}}{4}$$

$$= \frac{2(100)}{4} = 50$$

$$\text{Class} = 41-50$$

Class (9) 41 - 50 lower limit 9  
41

$$Q_2 = L + \frac{\frac{2n}{4} - CF}{f} \times C$$

$$Q_2 = 41 + \frac{50 - 50}{10} \times 9$$

$$Q_2 = 41 + \frac{0}{10} \times 9$$

$$Q_2 = 41$$

Q<sub>3</sub>

$$\begin{aligned} \text{Class} &= \frac{3n}{4} \\ &= \frac{3(100)}{4} \\ &= 75 \end{aligned}$$

Class = 71 - 80

Class 71 - 80 lower limit 71

(10)

$$Q_3 = L + \frac{\frac{31}{4} - CF}{CF} \times C$$

$$Q_3 = 71 + \frac{75 - 80}{10} \times 9$$

$$= 71 + \frac{-5}{1} \times 9$$

$$= 71 + (-0.5 \times 9)$$

$$= 71 + (-4.5)$$

$$= 71 - 4.5$$

$$Q_3 = 66.5$$

①-4 Find the following of the Discrete group frequency distribution table.

• Range

$$\begin{aligned} \text{Range} &= \text{Maximum} - \text{Minimum} \\ &= 100 - 1 \\ &= 99 \end{aligned}$$

• Quartile Range

$Q_3 - Q_1$   
interquartile

$$\begin{aligned} \text{Range} &= Q_3 - Q_1 \\ &= 66.5 - 41 \\ &= 25.5 \end{aligned}$$

Semi-interquartile Range: (15)

$$= Q_3 - Q_1 / 2$$

$$= 66.5 - 41 / 2$$

$$= 25.5 / 2$$

Semi-interquartile Range = 12.75

Variance : - (13)

Classes	Mid Point $\bar{x}_i$	Frequency	$(x - \bar{x}_i)^2$	$(x - \bar{x})^2$
0-10	5	10	-45	2025
11-20	15	10	-35	1225
21-30	25	10	-25	625
31-40	35	10	-15	225
41-50	45	10	-5	25
51-60	55	10	5	25
61-70	65	10	15	225
71-80	75	10	25	625
81-90	85	10	35	1225
91-100	95	10	45	2025

$$\sum \bar{x}_i = 50$$

$$\sum (x - \bar{x}_i)^2 = 8250$$

$$\text{Variance} = \frac{\sum (x - \bar{x}_i)^2}{100}$$

$$= \frac{8250}{100}$$

$$\text{Variance} = 82.5$$

• Standard Deviation: (14)

$$S.D = \sqrt{\text{Variance}}$$

$$S.D = \sqrt{82.5}$$

$$S.D = 9.08$$

• Co-efficient of Variance

$$\begin{aligned} \text{Co-efficient of variance} &= \frac{S.D}{\text{Mean}} \times 100 \\ &= \frac{9.08}{50} \times 100 \\ &= 18.16\% \end{aligned}$$