CLASS TEST/MID TERM SCRIPT

Course Code: MATH - 207
Course Title:
Student Cr Hr Group:
Term/Semester: L-2 T-2

Roll No: 2 0 2 2 1 4 0 9 9

Date: 30. 10. 2023

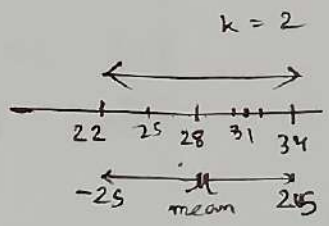
Signature of Invigilator

20 Ans. to the Ques. No : 1

here, $n = 50$

mean, $\bar{x} = 28$

std d, $s = 3$



$$k = \frac{34 - 28}{3} = 2 \quad \text{or} \quad \frac{22 - 28}{3} = -2 \times$$

5 As, we know, chebyshev's inequality theorem states, $S_k = \{ i ; 1 \le i \le n ; |x_i - \bar{x}| < ks ;$ if $N_{(S_k)}$ is the number of elements that lie within k std. d, So,

$$\frac{N_{(S_k)}}{n} \geq 1 - \frac{n-1}{nk^2} > 1 - \frac{1}{k^2}$$

So, $N_{(S_k)} = n \times \left(1 - \frac{1}{k^2}\right)$

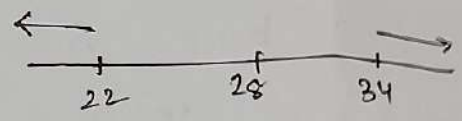
$= 50 \times \left(1 - \frac{1}{2^2}\right)$ here, $k = 2$

$= 37.5$

So, we can say at least 75% or 37.5 no. of observations lie in the interval (22, 34).

The no. of observation that lie outside that interval ($k = 2$),

$$\frac{N_{(sk)}}{n} \leq \frac{1}{k^2}$$



So, $N_{(sk)} = n \times \frac{1}{2^2}$

$= 50 \times \frac{1}{4}$

$= 12.5$

≈ 13

So, at most 25% or 12.5 number of observations lie outside the interval.

(Ans)

Ans to the Ques. No : 2

here, $n = 24$.

smallest value $= 350$, largest value $= 2550$

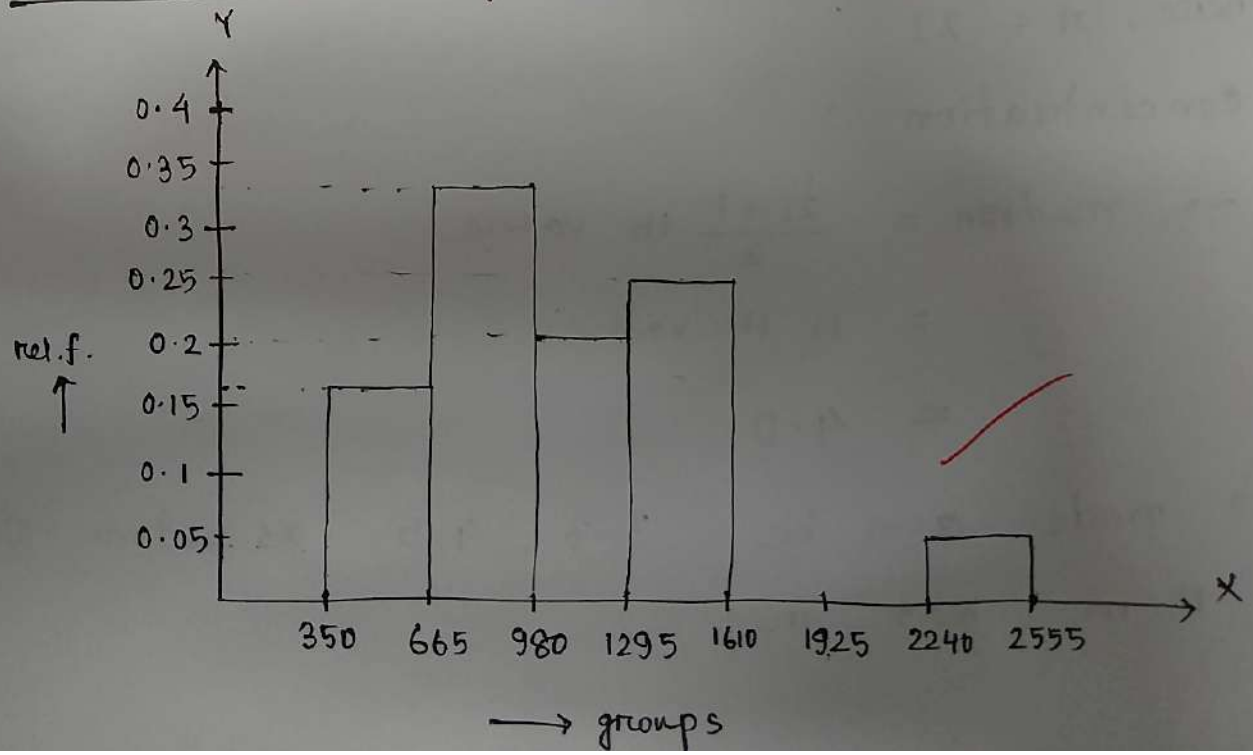
diff of group $= \frac{2550 - 350 + 1}{7} \approx 315$

group	Tally	freq	rel. f
350 - 664	IIII	4	0.167
665 - 979	IIII III	8	0.333
980 - 1294	IIII	5	0.208
1295 - 1609	IIII I	6	0.25
1610 - 1924		0	0
1925 - 2239		0	0
2240 - 2554	I	1	0.042

$n = 24$

10.

Relative freq. histogram :



Ans. to the Ques. No : 3

Stem and leaf plot of given values :

Stem	leaf	(freq)
1	1 , 5	(2)
2	3 , 5 , 7	(3)
3	2 , 3 , 3 , 5 , 8	(5)
4	0 , 2 , 5 , 5 , 7 , 8	(6)
5	5 , 6	(2)
6	5 , 7	(2)
12	3	(1)

5

here, $n = 21$

Concentration :

→ median $= \frac{21+1}{2}$ th value

$= 11$ th value

$= 4.0$

→ mode can be 3.3 , 4.5 as two of them has freq = 2.

→ mean = 4.31 (or, $\frac{90.5}{21}$)

So, we can say in the 4th stem, the data seem to have concentration of values.
