

03

SUNDAY • APRIL

M	T	W	T	F	S
1	2	3	4	5	6
7	8	9	10	11	12
14	15	16	17	18	19
21	22	23	24	25	26
28	29	30			

Statistics Assignment

9

Ques1:- Plot a histogram10, 13, 18, 22, 27, 32, 38, 40, 45, 51, 56, 57
88, 90, 92, 94, 99

12

Solution :- bins = 5

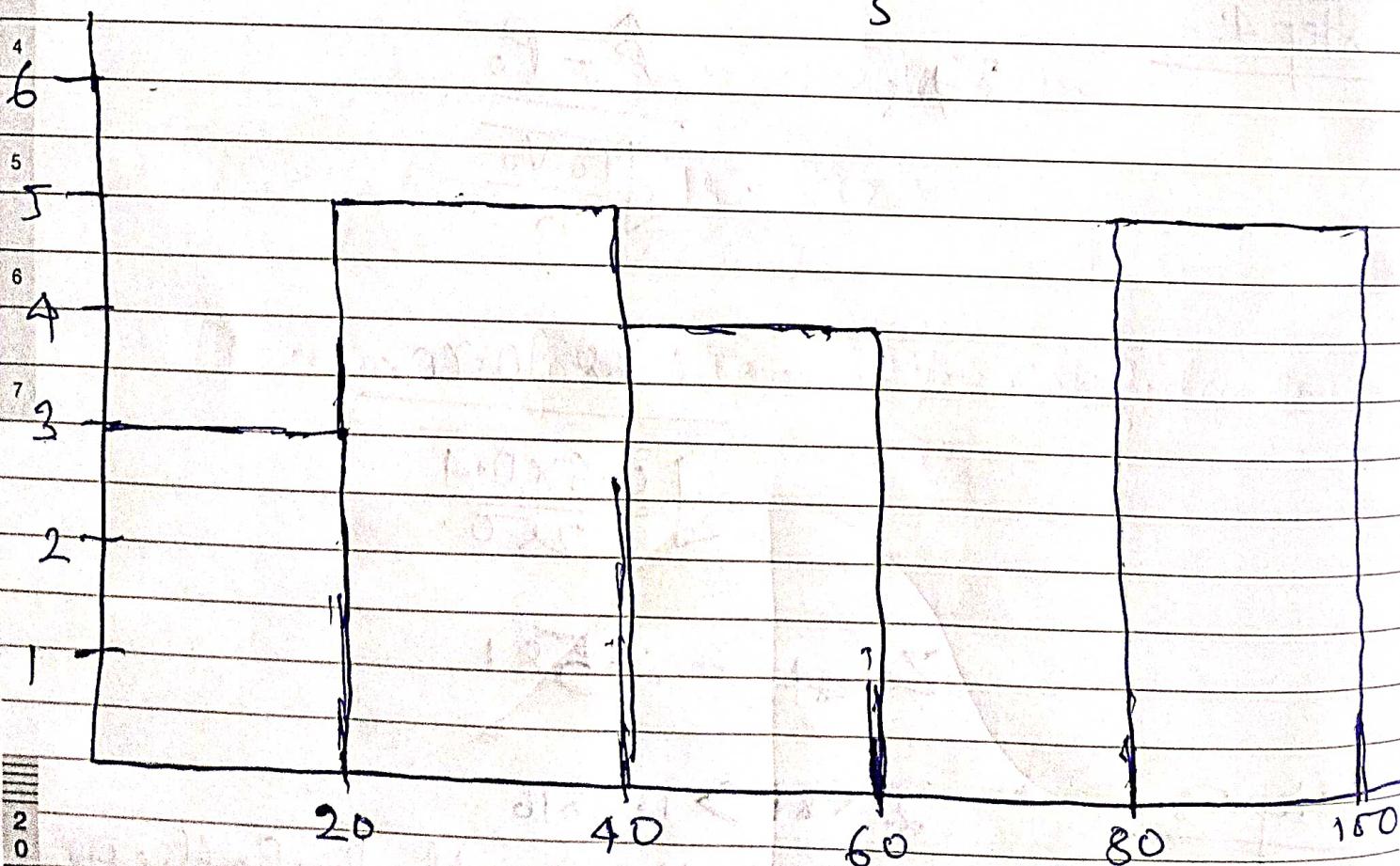
2

bin size range = 0 - 100.

3

$$\text{bin size} = \frac{100}{5} = 20$$

4



20

22

Q.2 In a quant test of the CAT exam, the population standard deviation is known to be 100. A sample of 25 tcsps taken has a mean of 520. Construct an 80% CI about the mean.

$$\sigma = 100$$

$$n = 25$$

$$\bar{x} = 520$$

$$C.I = 0.8$$

$$\begin{aligned}\alpha &= 1 - 0.8 \\ &= 0.2\end{aligned}$$

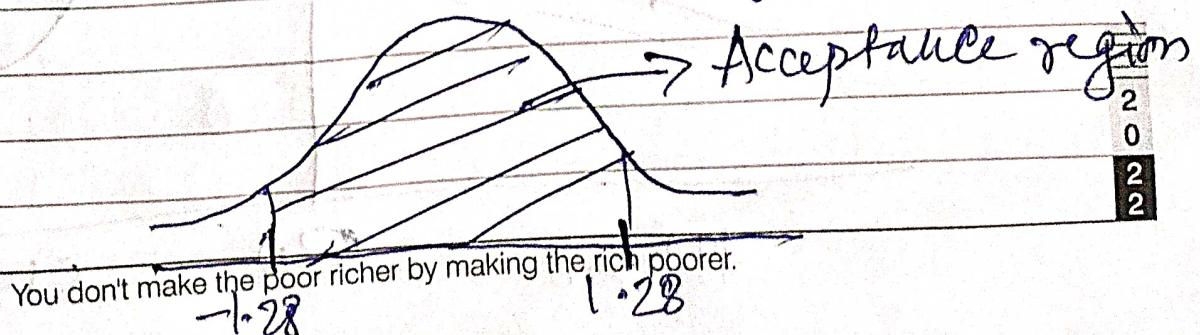
Margin of Error :- $Z_{\alpha/2} = Z_{0.2} = \frac{Z_{0.1}}{2}$

considering the 2 tails.

The limit of RHS = $1 - 0.1 = 0.9$.

limit of LHS = 0.1

The decision boundary.



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TUESDAY • APRIL

11	12	13	14	15	16	17
18	19	20	21	22	23	24
25	26	27	28	29	30	

$$\text{Lower fence} = \bar{x} - Z_{\alpha/2} \cdot \frac{\sigma}{\sqrt{n}}$$

$$= 520 - 1.2816 \times \frac{10.6}{\sqrt{25}}$$

$$= 520 - 1.2816 \times 20$$

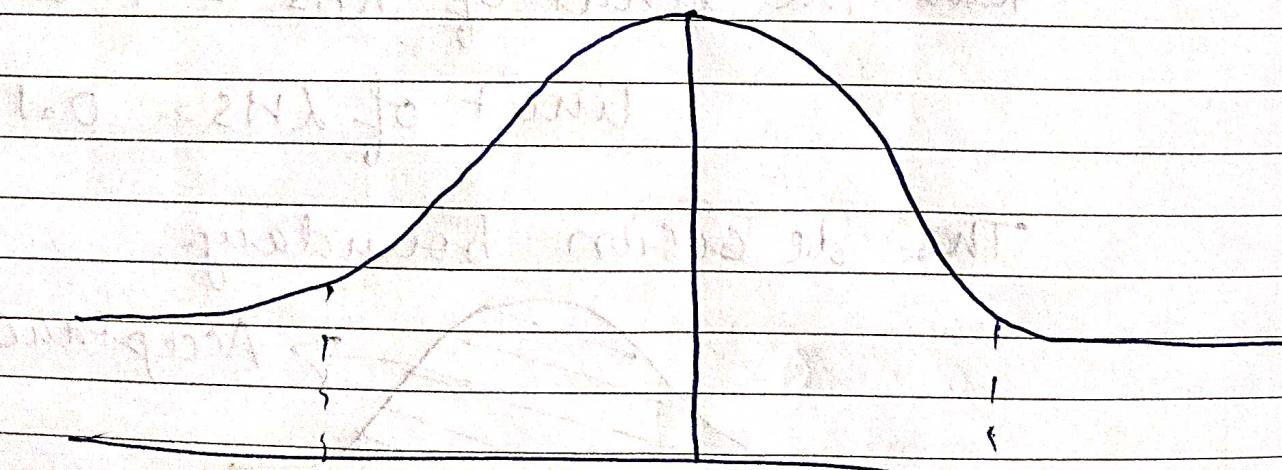
$$= 494.368$$

$$\text{Higher fence} = \bar{x} + Z_{\alpha/2} \cdot \frac{\sigma}{\sqrt{n}}$$

$$= 520 + 1.2816 \times 20$$

$$= 545.632$$

Therefore for the 80% confidence interval



494.368 520 545.632

Foolishness is a weak person's imitation of strength

2022

APRIL • WEDNESDAY

06

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
16	17	18	19	20	21	22	23	24	25	26	27	28	29	

A car company believes that the percentage of citizens in the city ABC that owns a vehicle is 60% or less. A Sales Manager disagrees with this. He conducted a hypothesis testing Surveying 250 residents & found 170 residents responded yes to owning a vehicle.

- i) State null & alternate hypothesis.
- ii) At at 10%. Significance level, is there enough evidence to support the idea that vehicle owner in ABC City is 60% or less.

H₀: a) Null hypothesis H₀: P ≤ 60

Alternate hypothesis H₁: P > 60

It's a one tail test.

iii) Step 1:- $n = 250$

$$x = 170$$

$$\hat{P} = \frac{170}{250} = 0.68$$

$$P_0 = 0.60$$

$$\begin{aligned} Q_0 &= 1 - P_0 \\ &= 1 - 0.60 \\ &= 0.40 \end{aligned}$$

M	T	W	T	F	S
4	5	6	7	8	1
11	12	13	14	15	2
18	19	20	21	22	3
25	26	27	28	29	4

07

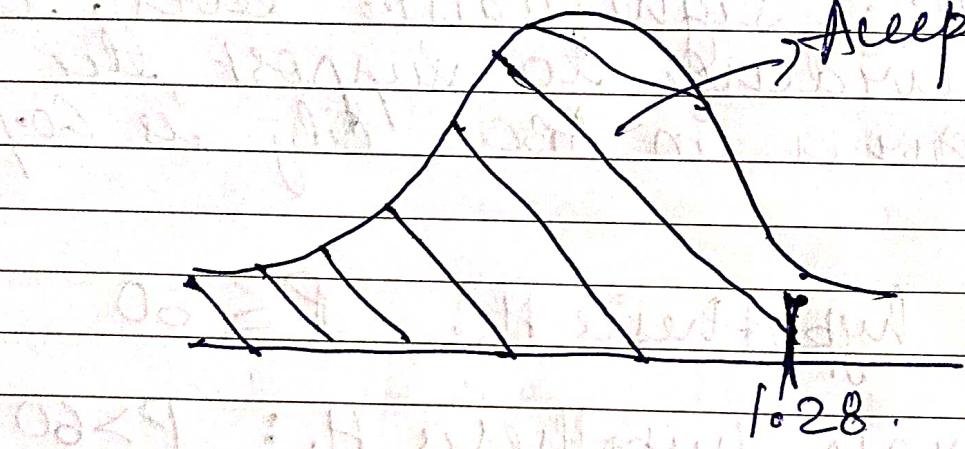
THURSDAY • APRIL

the Step 2:- The CI.

$$\alpha = 0.10$$

$$CI = 1 - 0.10 = 0.90$$

Step 3:- Decision boundary. It's a one tail test ~~to the Right hand side~~ Acceptance region



from Z-table $0.1 \rightarrow 1.28$.

$$Z_{\text{test}} = \frac{\hat{P} - P_0}{\sqrt{\frac{P_0(1-P_0)}{n}}}$$

$$\frac{P_0(1-P_0)}{n}$$

$$\frac{0.68 - 0.60}{\sqrt{\frac{0.68 \times 0.40}{250}}}$$

08

APRIL • FRIDAY

1	2	3	4	5	6	7	8
9	10	11	12	13	14	15	
16	17	18	19	20	21	22	
23	24	25	26	27	28	29	
30	31						

Test = $Z = 2.58$.

Step 5:-

Since here we can see that $2.58 > 1.28$, we can reject the null hypothesis.

Therefore the Proportion of citizens of ABC that owns vehicle is greater than 60%.

alternatively Using P-value.

by Z-table for $Z = 2.58 : - 0.9951$.

$$1 - 0.9951 = 0.0049.$$

Pvalue $\leq \alpha$

reject null hypothesis

09

SATURDAY • APRIL

M	T	W	T	F	S
4	5	6	7	8	9
11	12	13	14	15	16
18	19	20	21	22	23
25	26	27	28	29	30

Q.4.

what is the value of 99 percent?

2, 2, 3, 4, 5, 5, 5, 6, 7, 8, 8, 8, 8, 8, 9, 9, 10, 11, 11,

Sol:-

$$\frac{99}{100} \times 20 = 19.8$$

Total nos = 20

$$\frac{99}{100} \times 20 = 19.8$$

$$19.8 \% \text{ index} = \frac{11+12}{2} = \frac{23}{2} = 11.5$$

But if we follow $n+1$

$$\frac{99}{100} \times (20+1) = 20.79 \text{ th index}$$

Q.5

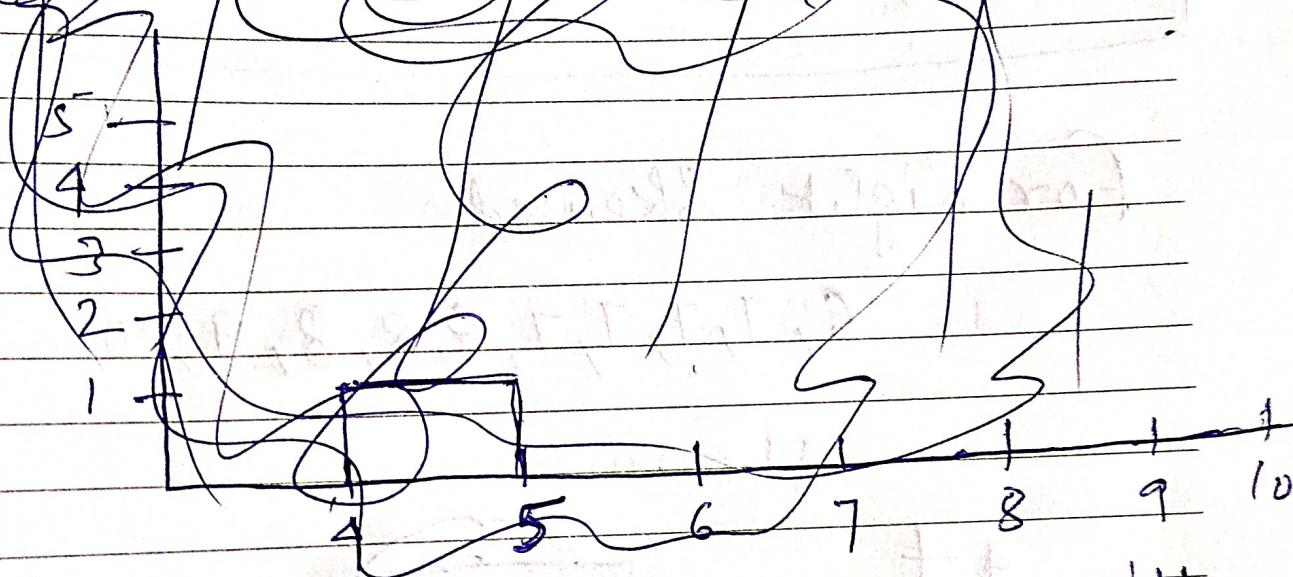
In left skewed data, what is the relationship b/w mean, median & mode.

Q.6

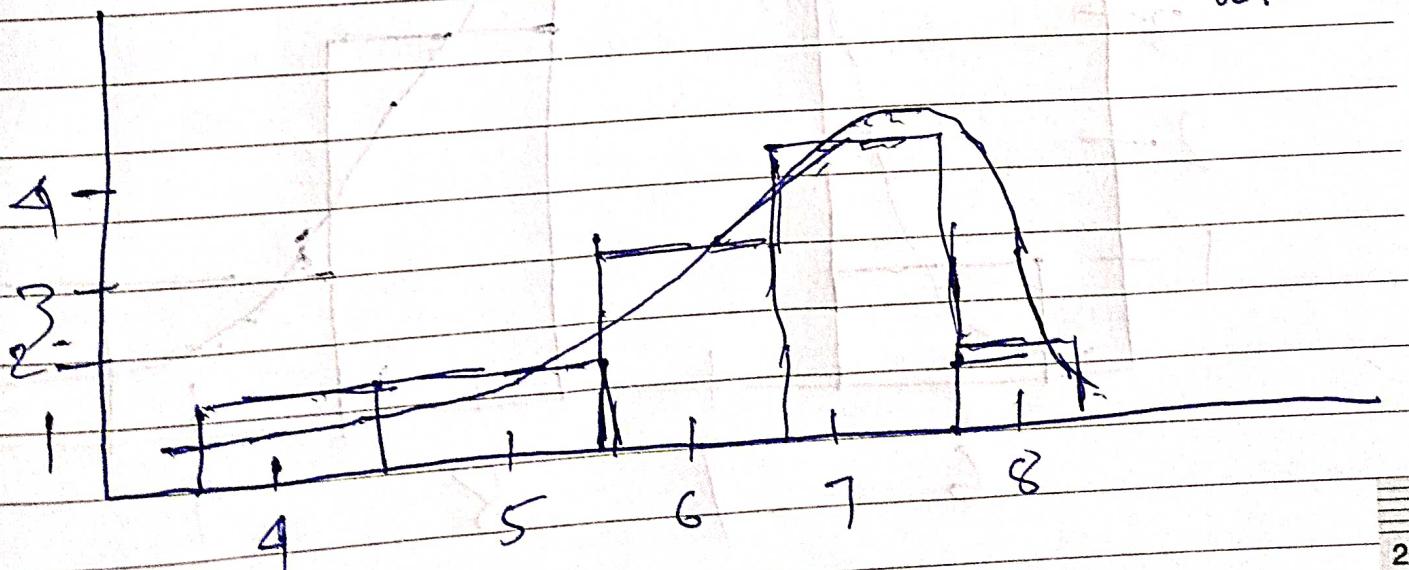
left skewed data:-

$$x = 4, 5, 6, 6, 6, 7, 7, 7, 7, 8, \text{ (scratched)}$$

Histogram with bin width = 1, bin size = 2



Histogram with width = 1



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MONDAY • APRIL

M	T	W	T	F	S
4	5	6	7	8	9
11	12	13	14	15	16
18	19	20	21	22	23
25	26	27	28	29	30

Mean = $\frac{63}{10} = 6.3$

9

Median = $\frac{6+7}{2} = 6.5$

10

Mode = 7.

11

for left skewed :- Mean < Median < Mode

12

For Right skewed .

3

6, 7, 7, 7, 7, 8, 8, 8, 9, 10.

4

5

6

7



M	T	W	T	F	S	S
30	31				1	
2	3	4	5	6	7	8
9	10	11	12	13	14	15
16	17	18	19	20	21	22
23	24	25	26	27	28	29

WK 16 (102-263)

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APRIL • TUESDAY

Mean : - $\frac{77}{10} = 7.7$

Median : - $\frac{7+8}{2} = 7.5$

Mode : . 7 .

For Right Skewed : - Mean > Median > Mode