Page No.
Date

Assignment - I

Statistics

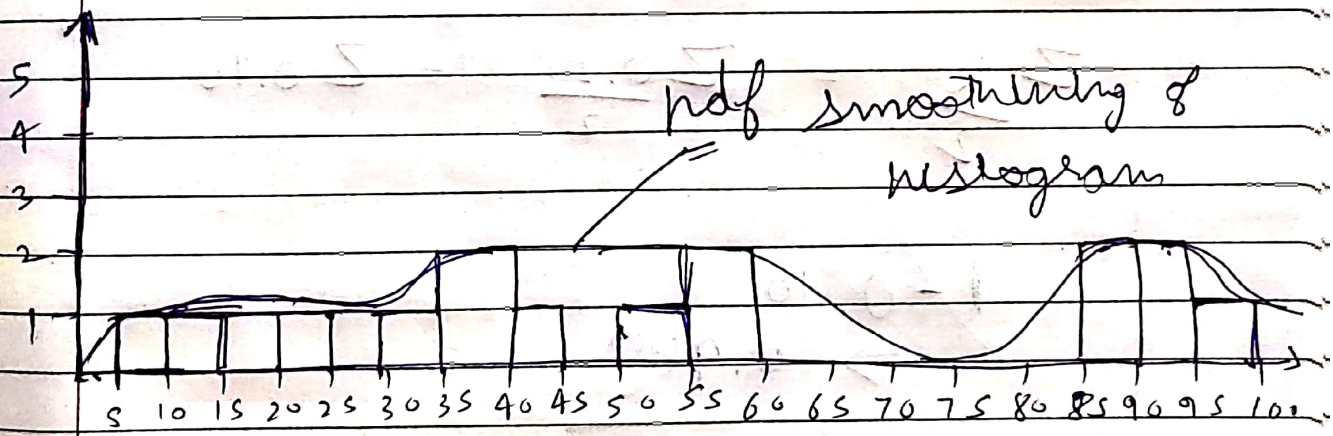
Q1 Plot a histogram

10, 13, 18, 22, 27, 32, 38, 40, 45, 51, 56, 57, 88, 90, 92, 94, 99.

Step ① :- Sort in asc. order

Bins = 5

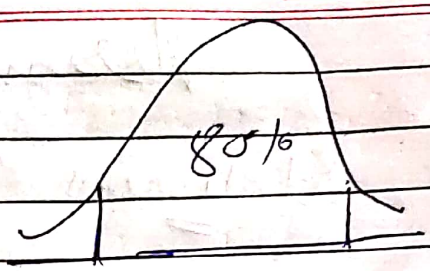
Bin size = $\frac{100}{5} = 20$



Q2 In a quant test of the CAT exam the population std is known to be 100. A sample of 25 tests taken has a mean of 520. Construct 80% C.I about the mean.

Page No.
Date

Ans $\sigma = 100$
$n = 25$
$\bar{x} = 520$



9 C.I = 80%
= 0.80

$1 - 0.80 = 0.20$

α = significance value

C.I
⇒ point estimate ± Margin of error

$Z_{\frac{\alpha}{2}} = Z_{\frac{0.20}{2}} = Z_{0.10}$

$1 - 0.10$
⇒ 0.900

From z table
⇒ 1.29

Lower force $= \bar{x} - Z_{\frac{\alpha}{2}} \frac{\sigma}{\sqrt{n}}$

$\Rightarrow 520 - 1.29 \times \frac{100}{\sqrt{25}}$

BODMAS

Page No.
Date

$= 520 - 1.29 \times 20$

$\Rightarrow 494.2$

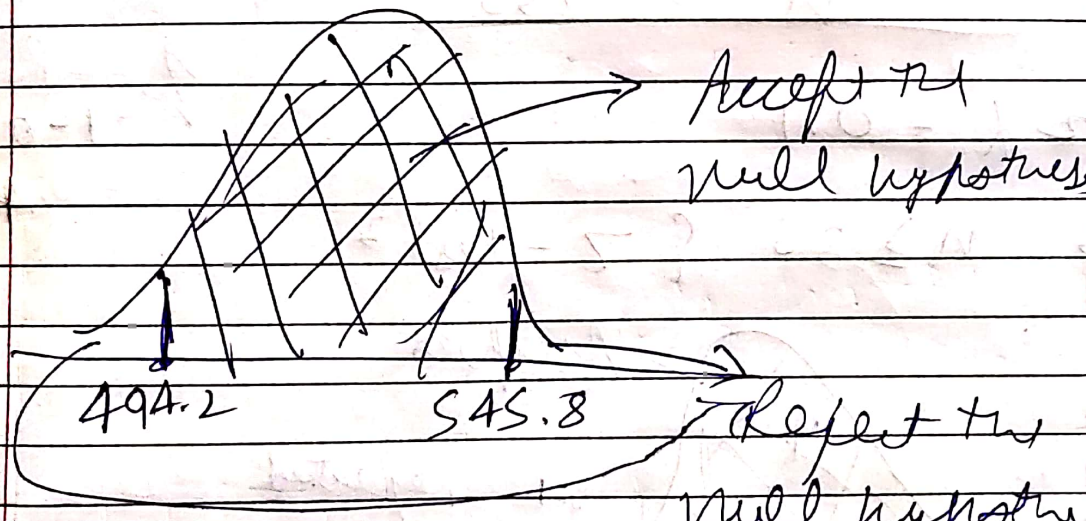
Higher fence $= \bar{x} + \frac{z_{\alpha}}{2} \frac{\sigma}{\sqrt{n}}$

$= 520 + 1.29 \times \frac{100}{\sqrt{25}}$

$= 520 + 1.29 \times \frac{100}{5}$

$= 520 + 25.8$

$= 545.8$



Q3 A car believes that the percentage of citizens in city ABC that owns a vehicle is 60% or less. A sales manager disagrees with this. He conducts a hypothesis testing surveying 250 residents & found that 170 residents responded yes to owning a vehicle.

(a) State the null & alternate hypotheses

(b) At a 10% significance level, is there enough evidence to support the idea that vehicle owners in ABC city is 60% or less.

$x = 170, \quad n = 250$

Ans $H_0 = p_0 \leq 60\%$ {Null hypothesis}

$H_1 = p_0 > 60\%$ {Alternate hypothesis}

$$\hat{p} = \frac{x}{n} = \frac{170}{250} = 0.68$$

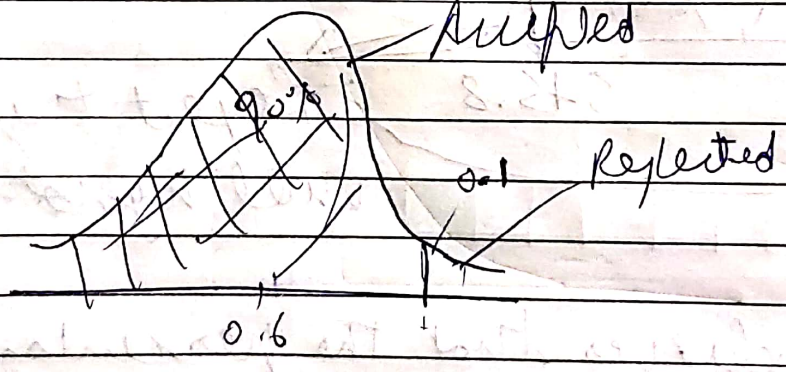
$q_0 = 1 - p_0$

$= 1 - 0.6$

$= 0.4$

Step 2 $\alpha = 0.1$

Step 3 $n \geq 30$ {Z-test}



$1 - 0.1$

$= 0.906$

$= +1.28$

Step 4 Calculate Z-test statistics

$$Z = \frac{\hat{p} - p_0}{\sqrt{p_0 q_0}} = \frac{0.68 - 0.6}{\sqrt{0.6 \times 0.4}}$$

= 2.5

Step 5 :- Conclusion

$z = 2.5 > 1.28$

Reject the null hypothesis

(b) No, At 10% significance level, ads is not enough to support.

Q4 What is the value of the 99 percentile?

2, 2, 3, 4, 5, 5, 5, 6, 7, 8, 8, 8, 8, 9, 9, 10, 11, 11, 12

Value of 99 percentile = $\frac{\text{percentile}}{100} \times (n+1)$

$\Rightarrow \frac{99}{100} \times (20+1)$

$= \frac{99}{100} \times 21$

$= 20.79 \Rightarrow$ Index

$\Downarrow$

Value = 11 12

Value of 99 percentile is 12

Page No.
Date

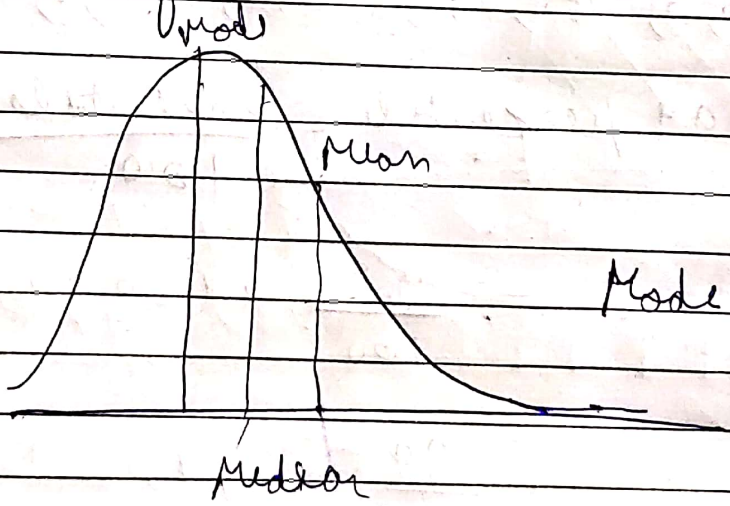
Q5 On left & right skewed data, what is the relationship b/w mean, median & mode?

Draw a graph to represent the same.

Ans

Mean < Median < Mode

Left skewed data



Mode < Median < Mean

Right skewed data