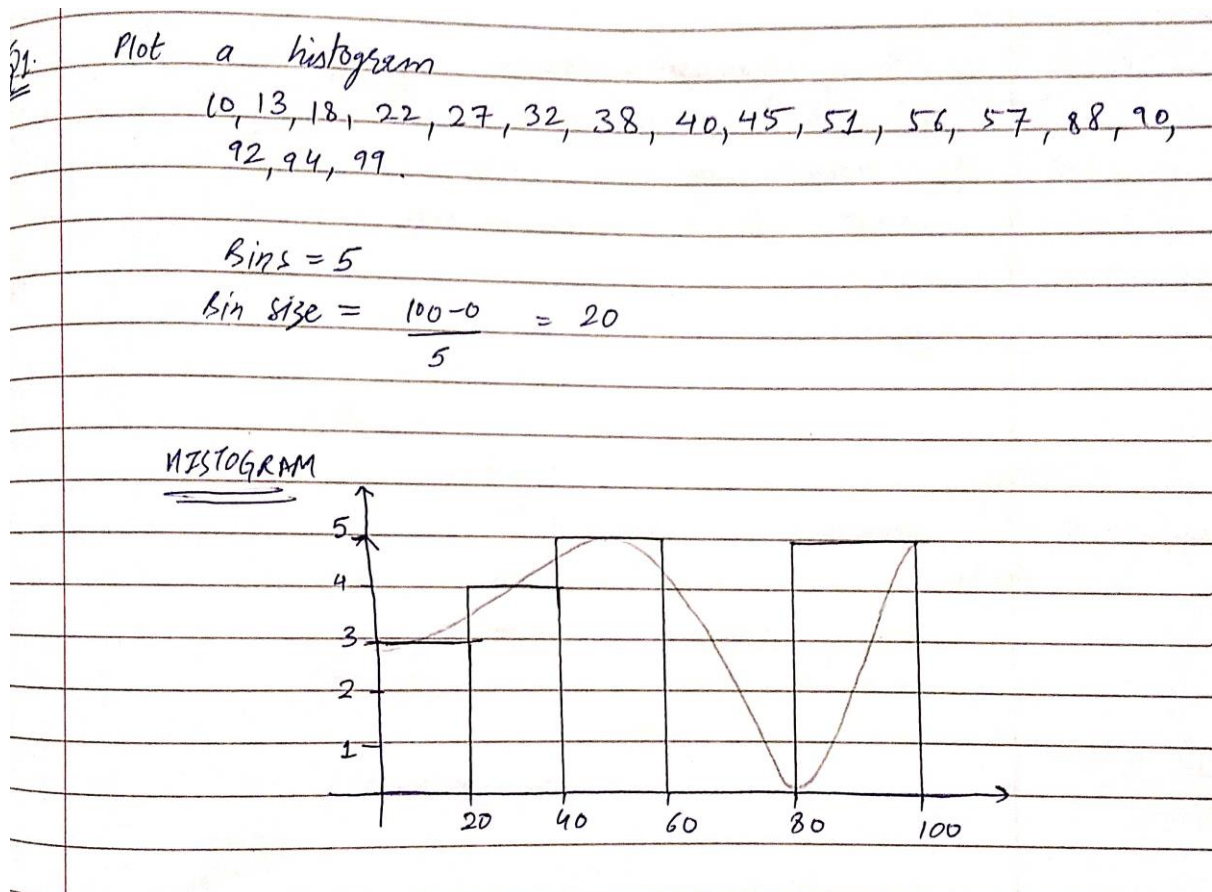


ASSIGNMENT-1

Que 1) Plot a histogram,

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



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

Q2: In a quant test of the CAT exam, the population standard deviation is known to be 100. A sample of 25 tests has a mean of 520. Construct an 80% CI about the mean.

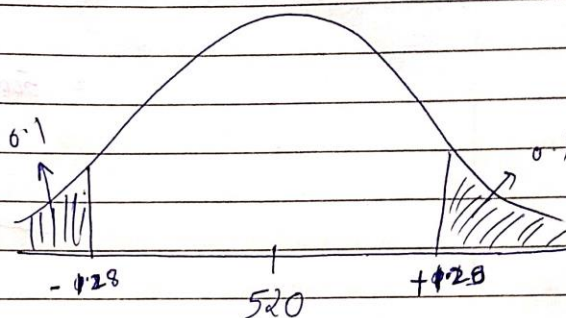
sol

$$\sigma = 100$$

$$n = 25$$

$$\bar{x} = 520$$

$$CI = 80\%$$



CI = point estimate \pm margin of error

$$CI = \bar{x} \pm z_{\alpha/2} \frac{\sigma}{\sqrt{n}}$$

where α is significance value

$$\alpha = 1 - CI$$

$$\alpha = 0.2$$

$$z_{\alpha/2} = z_{0.2/2} = z_{0.1}$$

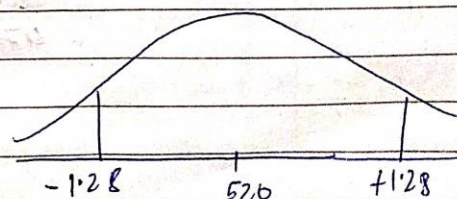
$$1 - 0.1 = 0.9 \quad (\text{Area})$$

Total Area



Now, in Z-table,

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



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

$$= 520 - (1.28) \times \frac{100}{\sqrt{25}}$$

$$= 520 - 1.28 \times \frac{100}{5} = 520 - 1.28 \times 20$$

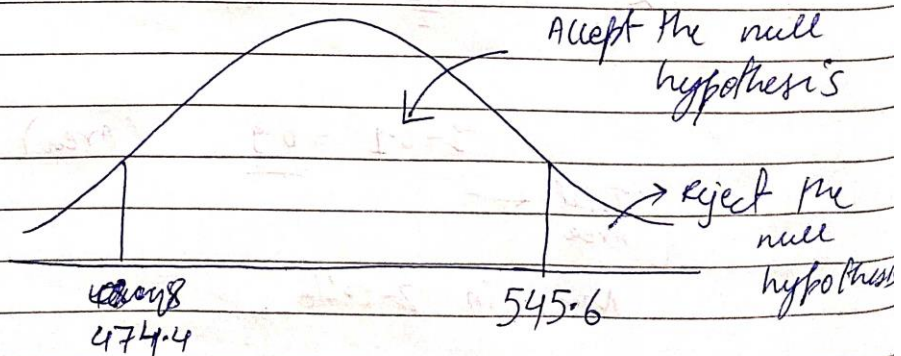
$$= \underline{\underline{474.4}}$$

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

$$= 520 + (1.28) \times \frac{100}{\sqrt{25}}$$

$$= 520 + 1.28 \times 20 = 520 + 25.6$$

$$= \underline{\underline{545.6}}$$



Que 3) 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 conducted a hypothesis testing surveying 250 residents & found that 170 residents responded yes to owning a vehicle.

- State the null & alternate hypothesis.
- At a 10% significance level, is there enough evidence to support the idea that vehicle owner in ABC city is 60% or less.

Q3:

Company Owner

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 conducted a hypothesis testing surveying 250 residents and found that 170 residents responded yes to owning a vehicle.

- State the null & alternate hypothesis
- At a 10% significant level, is there enough evidence to support the idea that vehicle owner in ABC city is 60% or less.

Z-test with proportion

(a) • NULL HYPOTHESIS

H_0 : owns a vehicle ($p_0 \geq 60\%$)

• ALTERNATE HYPOTHESIS

H_1 : owns a vehicle ($p_0 \leq 60\%$)

(b) • $n = 250$

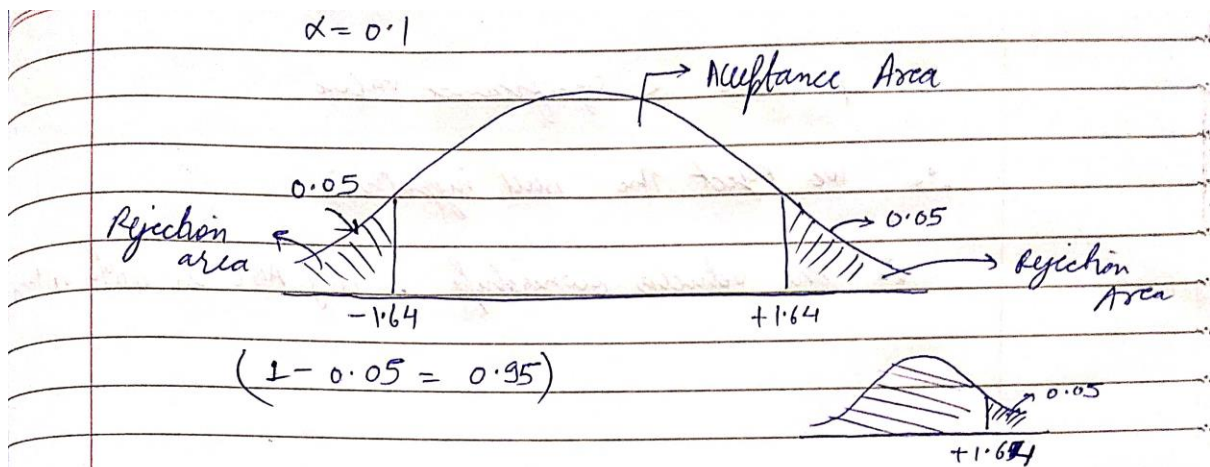
$x = 170$

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

$$q_0 = 1 - p_0$$

$$= 1 - 0.6 = 0.4$$

- Significance level = 10%
 \Rightarrow CI = 90%



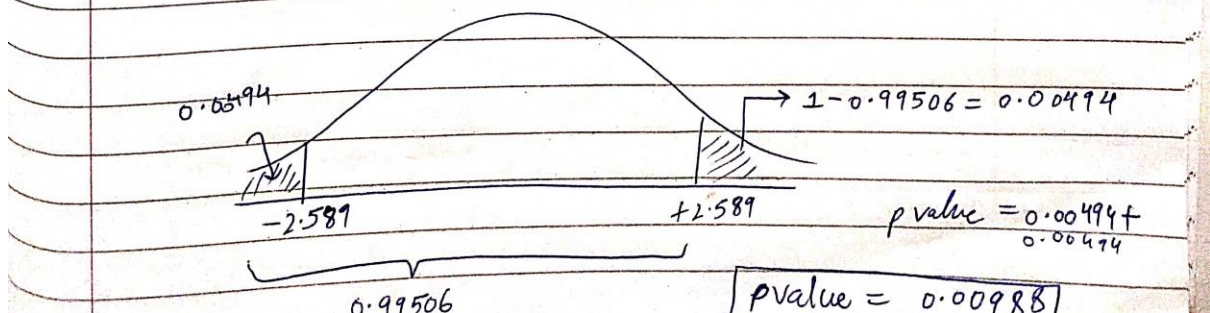
$$z_{\text{test}} = \frac{\hat{p} - p_0}{\sqrt{\frac{p_0 q_0}{n}}}$$

$$= \frac{0.68 - 0.60}{\sqrt{\frac{(0.60)(0.40)}{250}}}$$

$$= \frac{0.08}{\sqrt{\frac{0.24}{250}}}$$

$$= \frac{0.08}{\sqrt{0.00096}} = \frac{0.08}{0.0309} = 2.588997$$

- $2.589 > 1.96$ } Reject the null hypothesis?



$p \text{ value} < \text{significance value}$

\therefore We reject the null hypothesis

\therefore The vehicle ownership in city ABC is 60% or less

Que 4) What is the value of the 99 percentile?

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

Q4) What is the value of 99 percentile?

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

\Rightarrow

$$\text{Value} = \frac{\text{percentile}}{100} \times (n+1) \quad \left\{ n = 20 \right\}$$

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

$$= (20.79)^{\text{th}} \text{ index}$$

Value $\approx 20^{\text{th}}$ index

$$\boxed{\text{Value} = 12}$$

Que 5) In left & right-skewed data, what is the relationship between mean, median & mode?

Draw the graph to represent the same.

