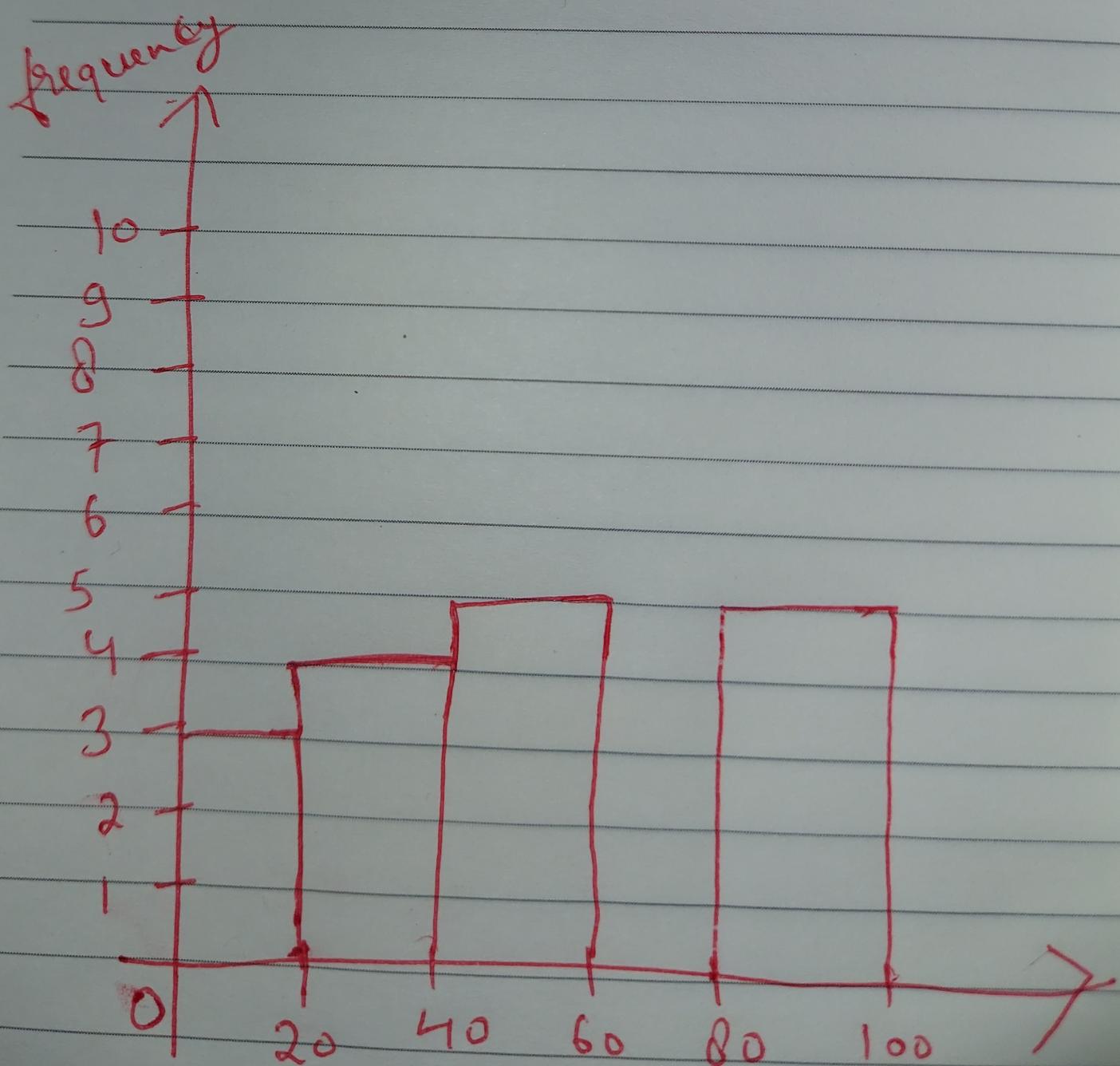


Assignment:-

Eg:- [10, 13, 18, 22, 27, 32, 38, 40, 45, 51,
56, 57, 88, 90, 92, 99, 99]

$$\text{Bin} = 5$$

$$\text{Binsize} = 20$$



Assignment

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Ques- In the quant test of CAT Exam, the population standard deviation is known to be 100. A sample of 25 test takers has a mean score of 520. Construct a 80% of C.I about mean

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

$$Z_{\frac{\alpha}{2}} \Rightarrow Z_{0.20} / 2$$

C.I $\rightarrow 80\%$

$$\alpha = 1 - C.I$$

$$\alpha = 1 - 0.80$$

$$\alpha = 0.20$$

$$Z_{0.10} \Rightarrow 1 - 0.10 \Rightarrow 0.90 \\ Z_{0.10} = 1.29$$

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

$$= 520 - 1.29 * \frac{100}{\sqrt{25}}$$

$$= 520 - \frac{1.29 * 100}{5}$$

$$= 494.2$$

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

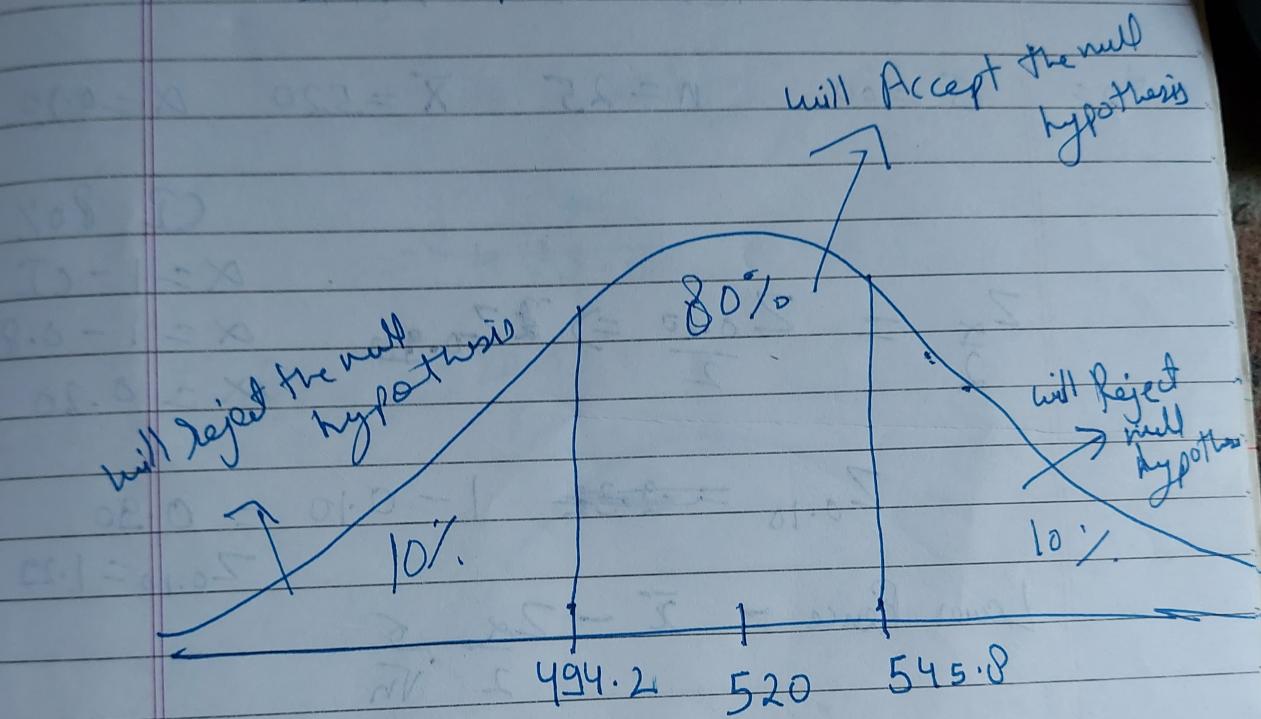
Not

72

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

$$= 520 + \frac{129}{5}$$

$$= 545.8$$



- Note:- If the ~~Chao~~ Confidence Interval is 494.2 to 545.8 (between this we will accept the null hypothesis).
- If the data point is less than the 494.2 we will ~~reject~~ the null hypothesis
 - If the data point is greater than 545.8 then also we will ~~reject~~ the null hypothesis

Ques

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

- (i) State H_0 & H_1 ,
- (ii) At 10% significance level, is there enough evidence to support the idea that vehicle ownership in city ABC is 60% or less?

Solution

$$H_0: P_0 \leq 60\%$$

$$q_0 = 1 - 0.60$$

$$H_1: P_1 > 60\%$$

$$q_0 = 0.40$$

~~$\alpha = 0.10$~~

$$n = 250 \quad x = 170$$

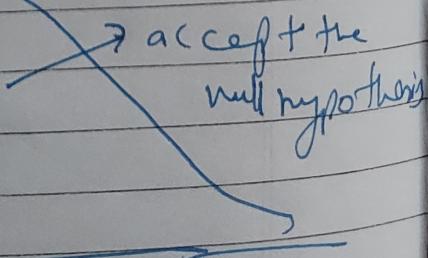
$$\hat{P} = \frac{x}{n} = \frac{170}{250} = 0.68$$

$$\alpha = 0.10 \quad Z_{0.10} = -1.28$$

$$Z_{0.10} = -1.20$$

Reject the null hypothesis

$$-1.28$$



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 Gopal

$$Z\text{-test} = \hat{P} - P_0$$

$$\frac{\sqrt{P_0 q_0}}{\sqrt{n}} = \frac{0.68 - 0.60}{\sqrt{0.60 \times 0.40}} \\ \frac{0.08}{\sqrt{0.24}} = \frac{0.08}{0.48} = \frac{0.08}{0.25} = 0.32$$

$$Z\text{-test} = \frac{0.08}{\sqrt{\frac{0.24}{250}}} = \frac{0.08}{0.00096} = \frac{0.08}{0.00096} = 8.33$$

$$= 0.08 = 2.58$$

$$0.0309$$

~~2.58~~ $2.58 > -1.28$ means we accept the null hypothesis

2

Ques - 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, 12

Ans
Solution =

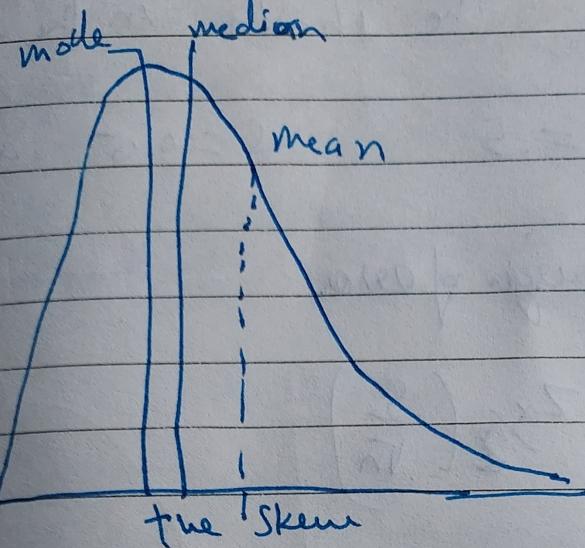
$$\text{Value} = \frac{\text{Percentile}}{100} \times (n+1)$$

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

$$\text{Value} = 20.79 \text{ (Index Position)}$$

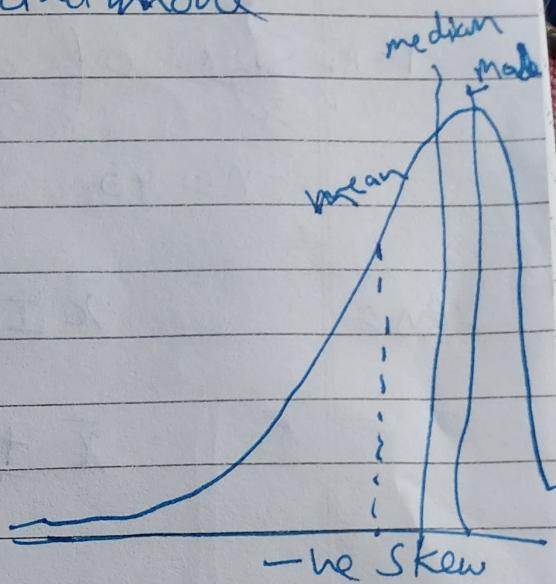
$$\text{Value} = 12$$

Left Skewed and Right Skewed and Relation with mean, median and mode



Right Skewed

Eg:- Wealth distribution
Length of the comment
in any forum

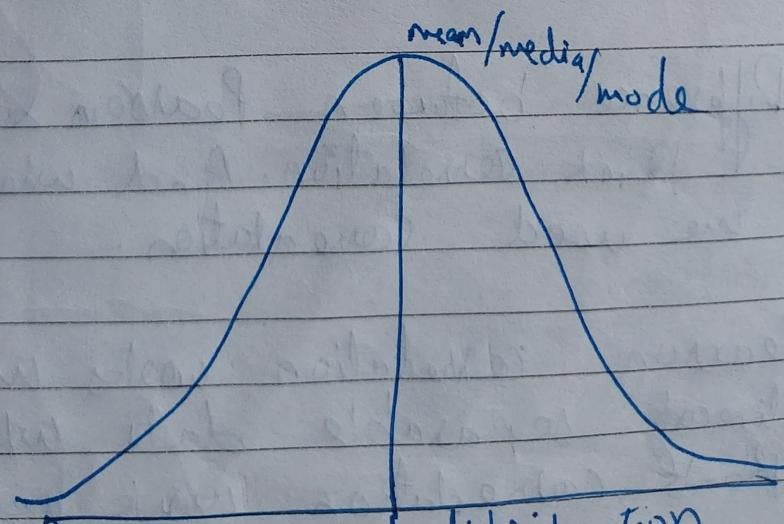


left skewed

Eg:- Life span of
human being

$\text{Mean} > \text{Median} > \text{Mode}$

$\text{Mean} < \text{Median} < \text{Mode}$



Normal distribution
 $\text{Mean} \approx \text{Median} \approx \text{Mode}$