Assignment - 19-Jun-2022

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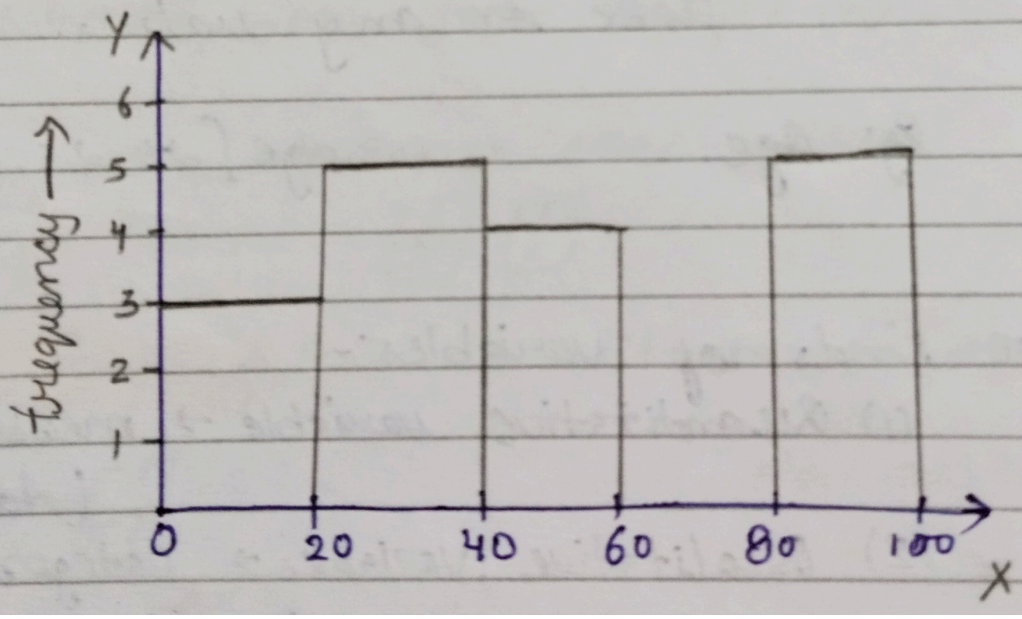
Plot an Histogram of given data

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

bins - 5

bin size = 20



Assignment -(3-July-2022)

In the Quant test of CAT exam, the population standard deviation is known to be 100. A sample of 25 test taker's has a mean of 520. Construct a 80% CI about the mean.

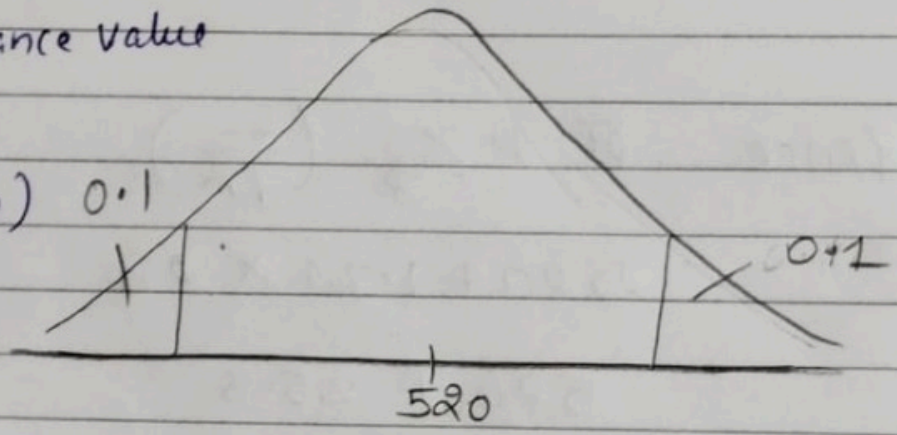
$$\sigma = 100, \quad n = 25, \quad \bar{x} = 520$$

α = Significance value

1 - CI

1 - 80% (0.80)

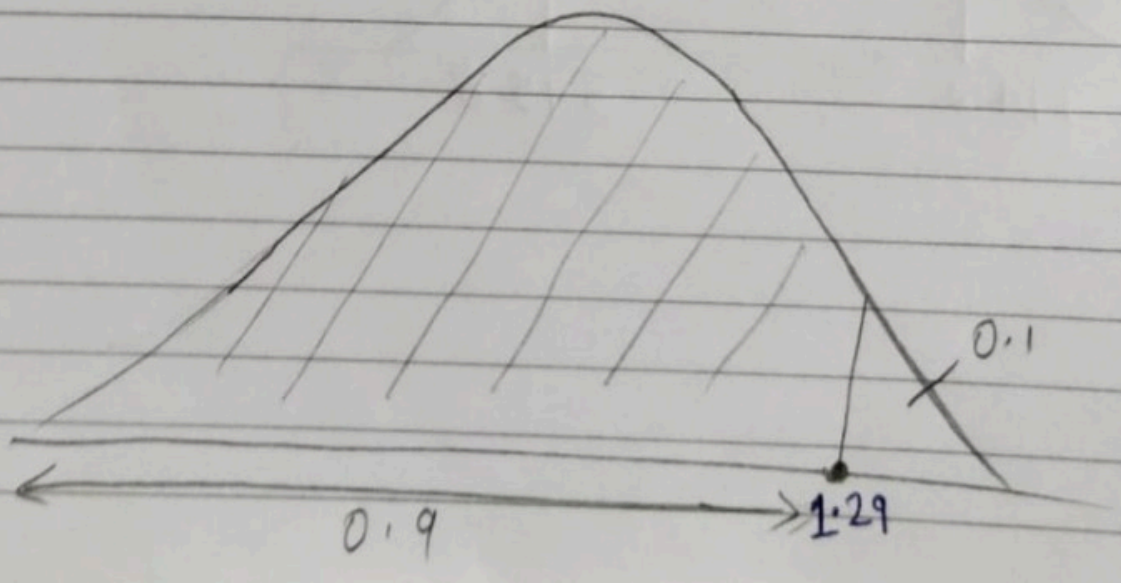
= 0.2



Point estimate ± margin of error

$$\bar{x} \pm z\frac{\alpha}{2}\left(\frac{\sigma}{\sqrt{n}}\right)$$

$$\Rightarrow z_{\frac{\alpha}{2}} = z_{\frac{0.2}{2}} = z_{0.1}$$



Lower fence $\bar{x} - Z_{\frac{\alpha}{2}} \left(\frac{\sigma}{\sqrt{n}}\right)$

$520 - 1.29 \left(\frac{100}{\sqrt{25}}\right)$

$520 - 1.29 \times 20$

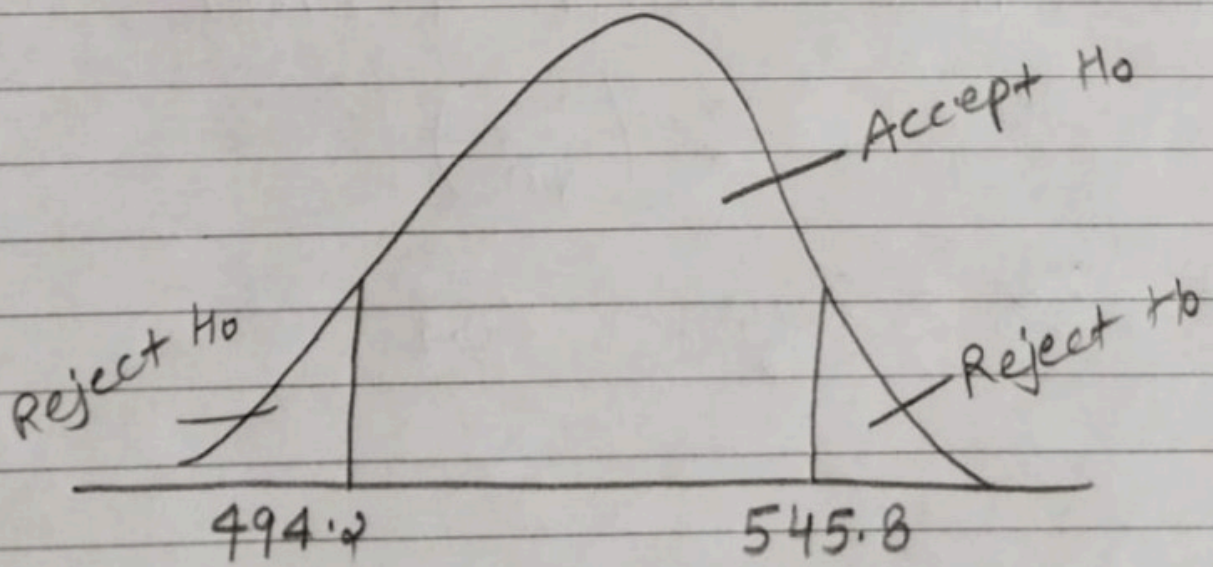
Lower fence = 494.2

Higher fence $\bar{x} + Z_{\frac{\alpha}{2}} \left(\frac{\sigma}{\sqrt{n}}\right)$

$520 + 1.29 \times 20$

$520 + 25.8$

$= 545.8$



Que-3 A car company believes that the percentage of residents 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 and found that 170 responded yes to owing a vehicle

(a) State the Null & Alternate Hypothesis
(b) At 10% significance level is there enough evidence to support the idea that vehicle ownership in city ABC is 60%.

$$H_0 = P_0 \leq 60$$
$$H_1 = P_0 > 60$$

$$n = 250, \quad \bar{x} = 170$$

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

$$q_0 = 1 - P_0 = 1 - 0.6 = 0.4$$

$$\Rightarrow \boxed{q_0 = 0.4}$$

$$\boxed{\alpha = 0.10}$$ (10% significance level)

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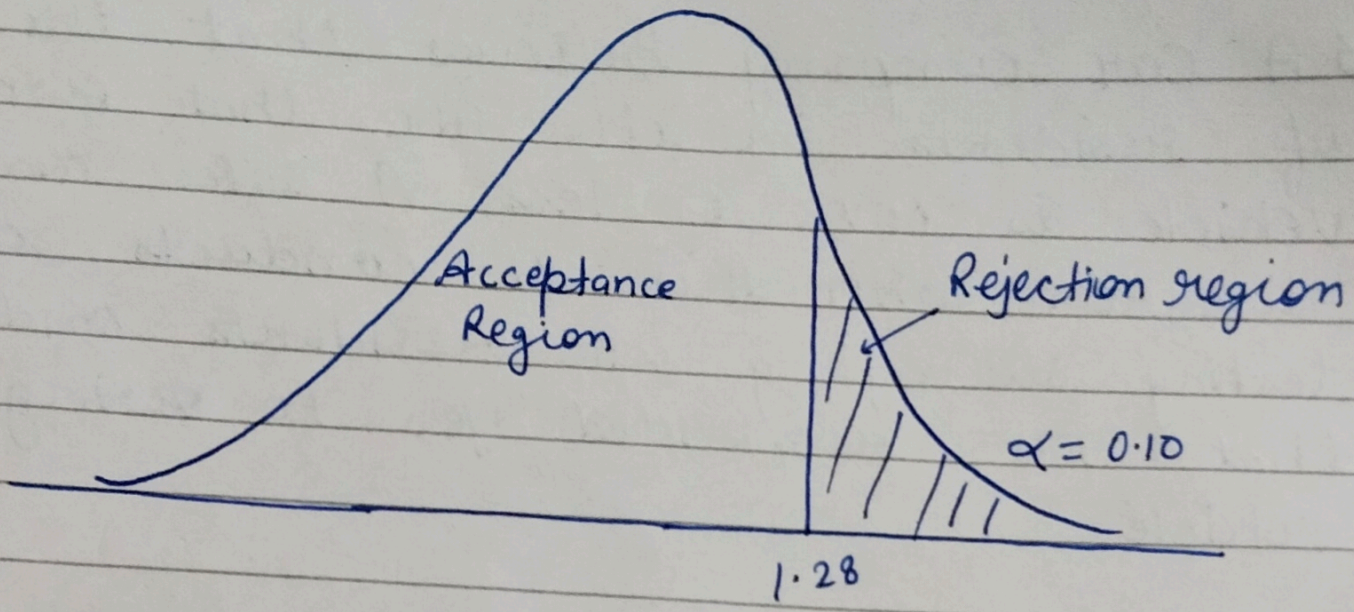
Right tail test



$$Z \text{ test} = \frac{\hat{P} - P_0}{\sqrt{\frac{P_0 q_0}{n}}} = \frac{0.68 - 0.6}{\sqrt{\frac{0.6 \times 0.4}{250}}}$$

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

$$= \frac{0.08}{0.0309}$$

$$\boxed{Z = 2.588}$$

Reject the null hypotheses.

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

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

$= \frac{99}{100} \times 21 = 20.79$

So, 12 is the [illegible] value of the 99 percentile

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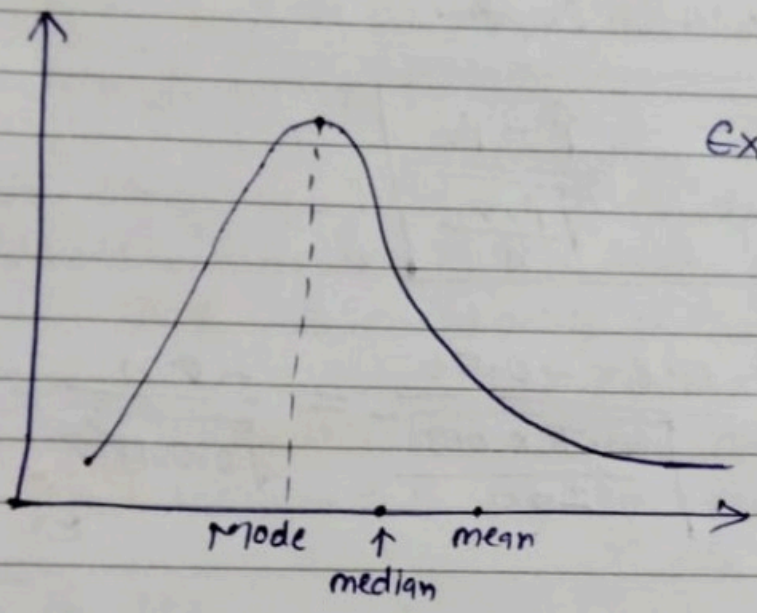
Assignment

What is the relationship between mean, median and mode with respect to right skewed and left skewed distribution.

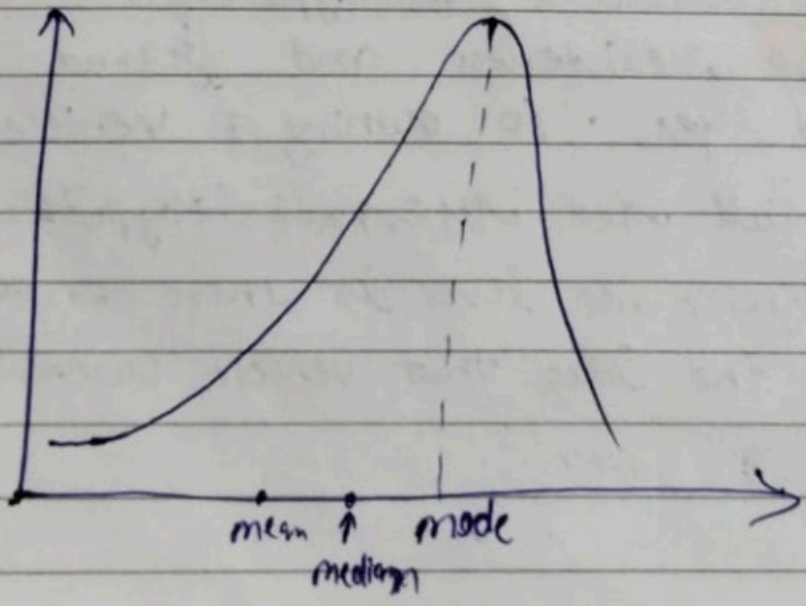
Positively skewed



Example - Wealth Distribution

mean > median > mode.

Negatively Skewed.



mode > median > mean

Example: Life span of Human Beings