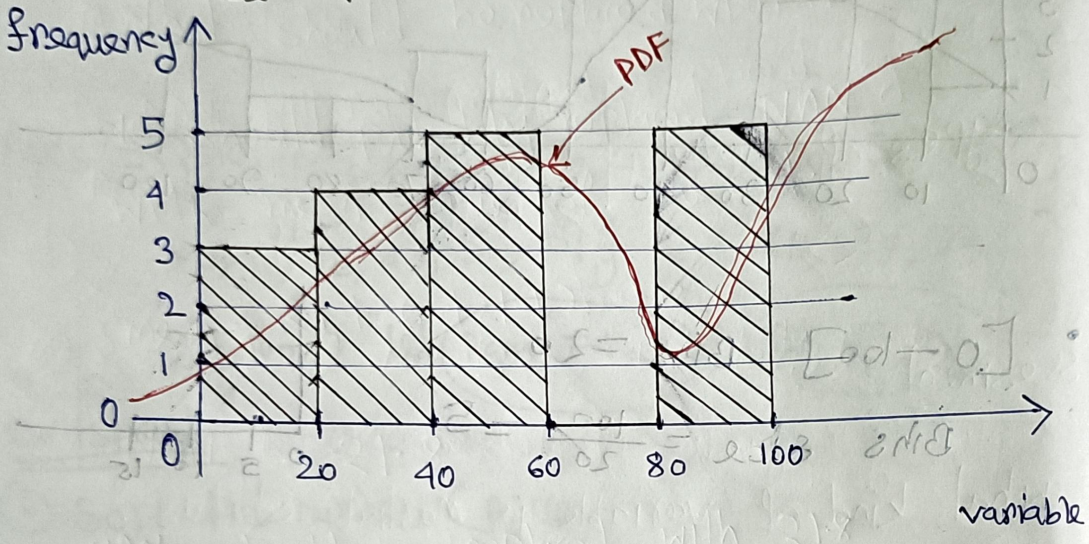
Assignment

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

bins = 5

bin size = 20



range	Data Points	frequency
0 — 19	{10, 13, 18}	3
20 — 39	{22, 27, 32, 38}	4
40 — 59	{40, 45, 51, 56, 57}	5
60 — 79	NA	0
80 — 99	{88, 90, 92, 94, 99}	5

✱ Question

In a quant test of 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.

$\sigma = 100$

$n = 25$

$\bar{x} = 520$

$CI = 80\%$

$\alpha = 1 - 0.8 = 0.2$

$Z_{\frac{\alpha}{2}} = Z_{0.1}$

$Z_{\frac{\alpha}{2}} = \text{Area of } (1 - \frac{\alpha}{2})$

$= \text{Area of } (0.9)$

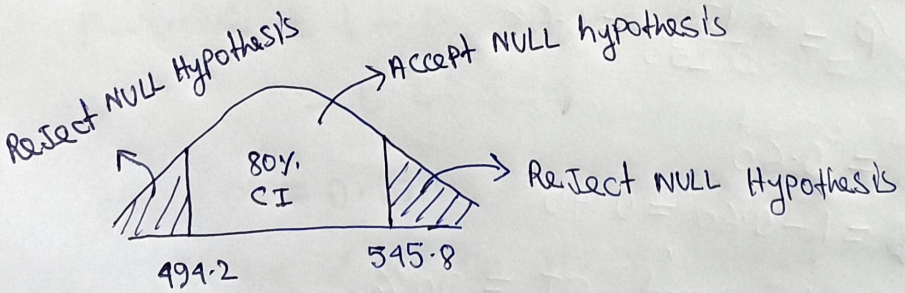
$= 1.2 + 0.09$ [using z-table]

$= 1.29$

Margin of error $= 1.29 \times \frac{100}{\sqrt{25}} = 25.8$

Lower fence $= 520 - 25.8 = 494.2$

Higher fence $= 520 + 25.8 = 545.8$

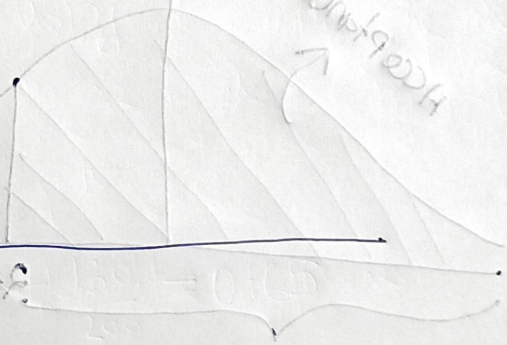


✱ Question

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 owning 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% or less?



(a) H_0 : $P_0 \leq 60\%$

H_1 : $P_0 > 60\%$

(b) $n = 250$

$x = 170$

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

$P_0 = 0.60$

$q_0 = 1 - 0.60 = 0.40$

$\alpha = 0.10$ and $CI = 90\%$

This is one tail test. Most specifically right tail test.

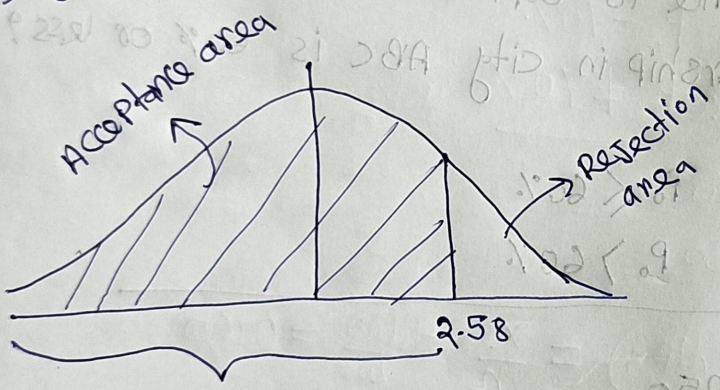
$$z\text{ value} = \frac{\hat{P} - P_0}{\sqrt{\frac{P_0 q_0}{n}}}$$

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

$$= 2.58$$

- Look up 2.58 in the z-table

$\Rightarrow 0.99506$



$$p\text{-value} = 1 - 0.99506$$

$$= 0.00494$$

$\alpha = 0.10$

As p-value $< \alpha$ so we rejected the NULL Hypothesis

So, the idea of car ownership 60% or less got rejected.

(*) 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}

$n = 20$

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

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

$= 20.79$

Generally we have to take the average of value of index 20 & index 21

As index 21 does not exist

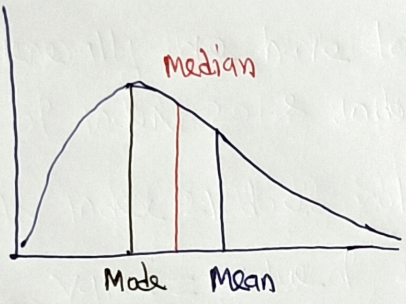
value = value of 20th index

= 12

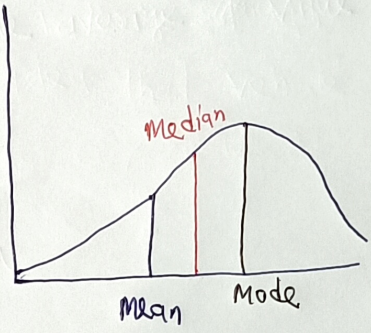
(*) In left & Right Skewed data, what is the relationship between mean, median & mode?
Draw the graph to represent the same

- Skewness is a way to describe the symmetry of a Distribution.
- A distribution is left-skewed if it has a "tail" on the left side of the distribution.
- A distribution is right-skewed if it has a "tail" on the right side of the distribution.

Right-Skewed



Left-Skewed



So, from above graph we conclude that

- In left skewed distribution: Mean < Median < Mode
- In Right skewed distribution: Mode < Median < Mean