Q⇒ FOR our 100K employees how many XL & L size t-shirts we should order for our employees.

⇒ given a sample data of 500 in which [300 XL & 200 L] size t-shirts.

Ans⇒ assuming 95% C.I, $\alpha = 5\%$, 2-tailed test, $\alpha/2 = 0.025$.

$$\boxed{Z_{\alpha/2} = 1.96} = Z_c.$$

finding Proportions

$$P_{XL} = \frac{300}{500} = 0.6. = P_o$$

$$P_L = \frac{200}{500} = 0.4. = q_o$$

assuming, sample is completely random, and is a representation of a population. So, we assume mean for XL size t-shirts as 60%, and 40% for L size t-shirts.

Now we will calculate CI,

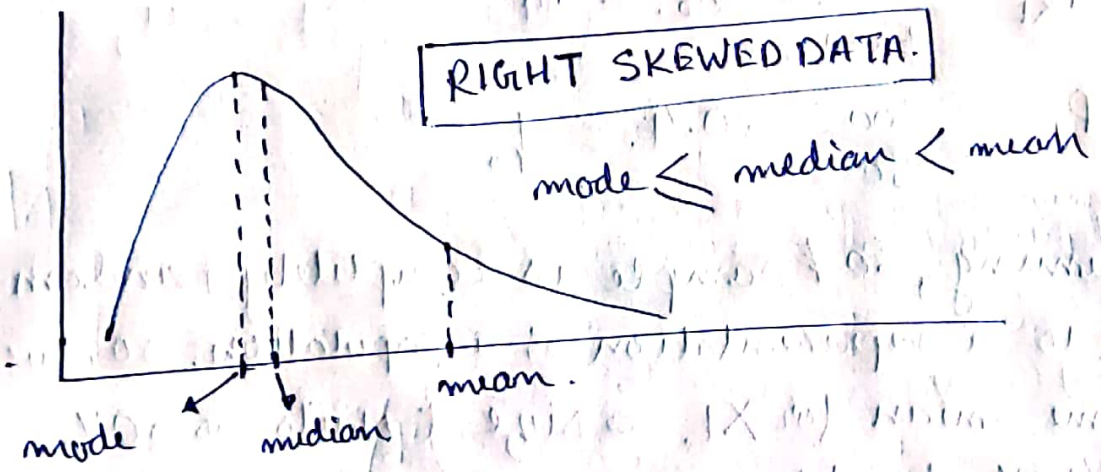
$$CI_{(XL)} = \left[0.6 \pm Z_{\alpha/2} \times \sqrt{\frac{0.6 \times 0.4}{500}}\right].$$

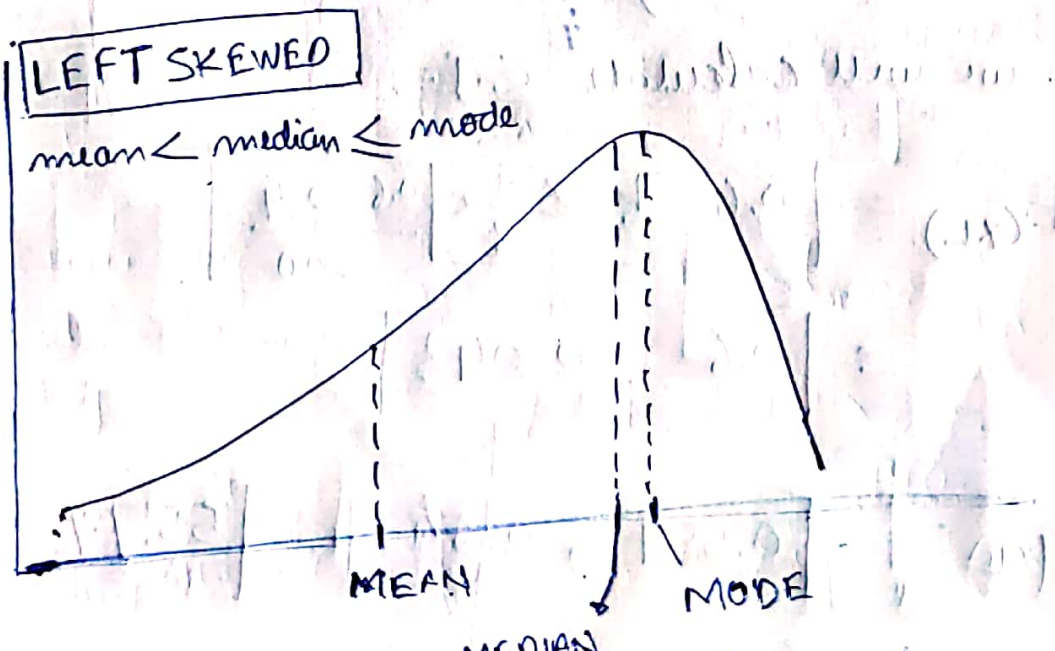
$$= [0.6 \pm 0.043]$$

$$CI_{(XL)} = [0.557, 0.643] = [55.7\%, 64.3\%]$$

so, In a Population of 100,000, order about [55,700 – 64,300] XL size t-shirt. and about [35700 – 44,300] L size t-shirt.

Q:) In left and right skewed data what is the relationship b/w mean, median, and mode.





⇒ A ~~Dalbs~~ ~~manager~~ car company believes that the % of residents in city ABC that owns a vehicle is 60% or less. A Dalbs 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 and 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) $H_0 \Rightarrow P_0 \leq 60\%$

$H_a \Rightarrow P_0 > 60\%$

$q_0 = 40\%$

$\hat{P} = 68\% \Rightarrow \hat{P} = \frac{x}{n}$

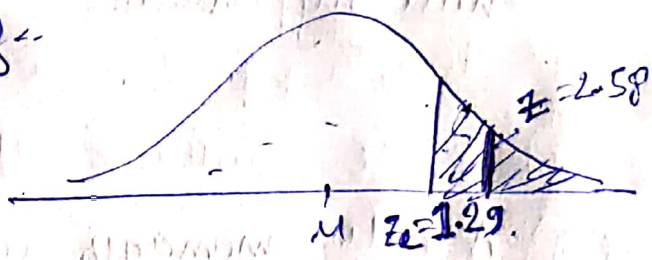
$n = 250$

$x = 130$

(2) $\alpha = 10\% = 0.1$, one-tailed test. (C)

$Z_c = 1.29$.

$$Z = \frac{0.68 - 0.60}{\sqrt{\frac{0.6 \times 0.4}{250}}} = 2.58$$



C.I. $\Rightarrow \left[\bar{x} \pm Z_{\alpha/2} \times \frac{\sigma}{\sqrt{n}}\right]$ for Z-test

$$CI = \left[\bar{x} \pm 1.29 \times \sqrt{\frac{P_0 \times q_0}{n}}\right]$$ → for Z-test with proportions.

$$\left[.68 \pm 1.29 \times \sqrt{\frac{0.6 \times 0.4}{250}}\right]$$

$C.I. = [0.64, 0.72]$

Here, P-value is less than 0.1 so, we can reject our null hypothesis,

so, at 10% significance level, there is not enough evidence to support the idea that vehicle owner in ABC city is 60% or less.