Q.3]. A car company believes that the percentage of citizens in city ABC that owns a vehicle is 60% or less. A sales manager disagree with this. He conducted a hypothesis testing surveying 250 residents & found that 170 residents responded yes to owning a vehicle.

(a). State the null & alternate hypothesis

(b) At a 10% significance level, is there enough evidence to support the idea that the vehicle owner in ABC city is 60% or less.

$\Rightarrow$

$H_0 : P_0 \leq 60$ Null Hypothesis

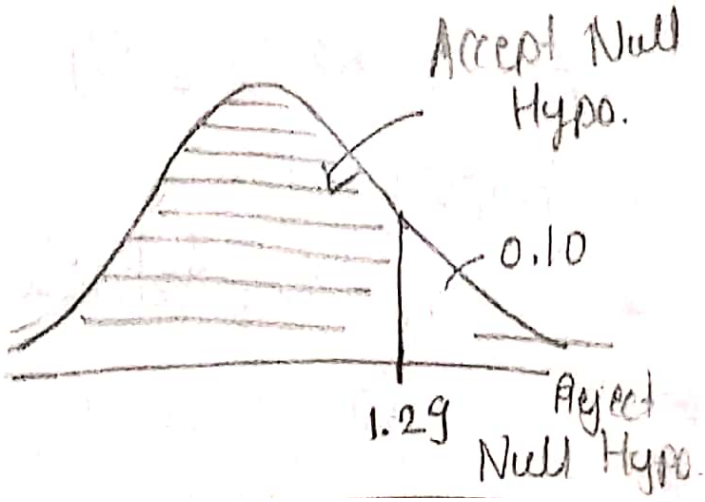
$H_1 : P_0 > 60$ Alternate hypothesis

$\alpha = 0.10$

$1 - 0.10$

$= 0.9$

$= 1.29$



$P_0 = 0.60$, $n = 250$, $\hat{p} = \frac{170}{250} = 0.68$

$$Z_{test} = \frac{\hat{p} - P_0}{\sqrt{\frac{P_0 q_0}{n}}} \qquad (q_0 = 1 - P_0)$$

$$= \frac{0.68 - 0.60}{\sqrt{\frac{0.60\,(1-0.60)}{250}}}$$

$$= \frac{0.08}{\sqrt{\frac{0.24}{250}}} = \frac{0.08}{\sqrt{0.00096}}$$

$$= \frac{0.08}{0.03098}$$

$$= 2.58$$

As $2.58 > 1.29$ we reject the Null Hypothesis.

∴ The the vehicle owner in ABC city is $> 60\%$.