

Prob. ③ A car company believes that the percentage of residence in city ABC that owns a vehicle of 60% or less. A sales manager disagrees with this. He conducts a hypothesis testing surveying 250 residents & found that 170 responded yes to owning a vehicle.

① state the Null & Alternate Hypothesis

② At 10% significance level, is there enough evidence to support the idea that vehicle ownership in city ABC is 60% or less?

$$H_0 = P_0 \leq 60\%$$

$$H_1 = P_0 > 60\%$$

It is on tail test.

$$\therefore n = 250, x = 170, C.P. = 90\%, \alpha = 0.10$$

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

$$\therefore P_0 = 60\% \quad \therefore Q_0 = 1 - P_0 = 1 - 0.60$$

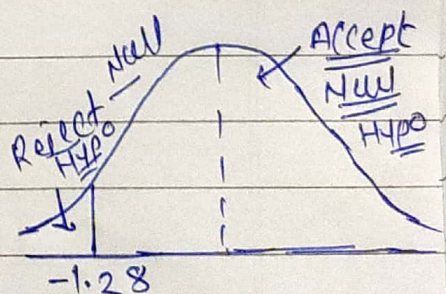
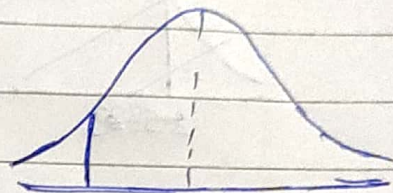
$$Q_0 = 0.40$$

\therefore using Z-test

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

$$\therefore Z_{\text{test}} = \frac{\hat{P} - P_0}{\sqrt{\frac{P_0 Q_0}{n}}}$$

$$= \frac{0.68 - 0.60}{\sqrt{\frac{0.60 \times 0.40}{250}}} = \frac{0.08}{\sqrt{0.00096}}$$



$$Z_{test} = 2.5823$$

Conclusion

$$\underline{2.5823} > -\underline{1.28}$$

∴ We accept the Null Hypothesis

∴ ~~conclude~~ ownership of in city ABC is 60% or less.