

Assignment Question

Date _____

Page _____

Q 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 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?

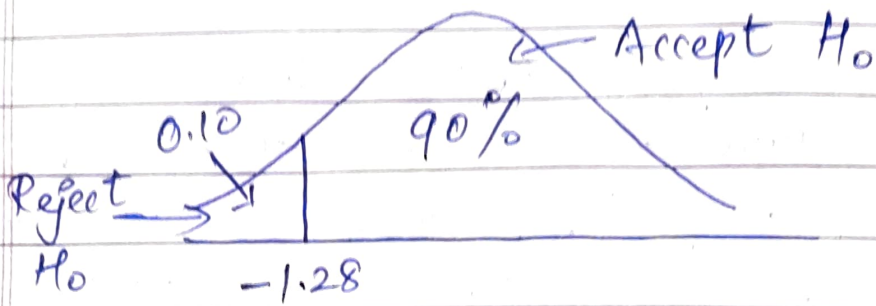
Soln Let Null hypothesis (H_0) : $P_0 = 60\%$
Alternate hypothesis (H_1) : $P_0 \neq 60\%$

Given, $n = 250$, $x = 170$

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

$$\because P_0 = 0.60 \Rightarrow q_0 = 1 - 0.60 = 0.40$$

$$\alpha = 0.10$$



Using -ve z-table (see 0.10)

$$\begin{array}{c} 0.08 \\ \downarrow \\ -1.2 \rightarrow 0.10027 \end{array}$$

$$\Rightarrow -1.28$$

$$\therefore Z\text{-score} = \frac{\hat{p} - p_0}{\sqrt{\frac{p_0 q_0}{n}}} = \frac{0.68 - 0.60}{\sqrt{\frac{0.6 \times 0.4}{250}}}$$

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

$$= \frac{0.08}{0.03098} = 2.5823$$

$$\therefore 2.5823 > -1.28$$

\Rightarrow Accept the Null hypothesis.