Q. A Car Company believes that the % 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 & 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?

Sol Null Hypothesis $H_0 \leq 60\%$

Alternate Hypothesis $H_1 > 60\%$ (Right tail test)

$n = 250$, $x = 170$, $\hat{p} = \frac{x}{n} = \frac{170}{250} = .68$, $p_0 = .60$

$q_0 = 1 - .60 = .40$

$\alpha = .10$

Z-test with Proportion

$$Z\text{-test} = \frac{\hat{p} - p_0}{\sqrt{\frac{p_0 q_0}{n}}} = \frac{.68 - .60}{\sqrt{\frac{(.60)(.40)}{250}}} = 2.582$$

$2.582 > +1.28$

Reject the Null Hypothesis

Not enough evidence to Prove (ownership $\leq 60\%$)