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 & 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 $H_0 : p_0 \leq 60\%$

$H_1 : p_0 > 60\%$

$n = 250 \qquad x = 170$

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

$q_0 = 1 - p_0 \Rightarrow 1 - 0.6 \Rightarrow 0.4$

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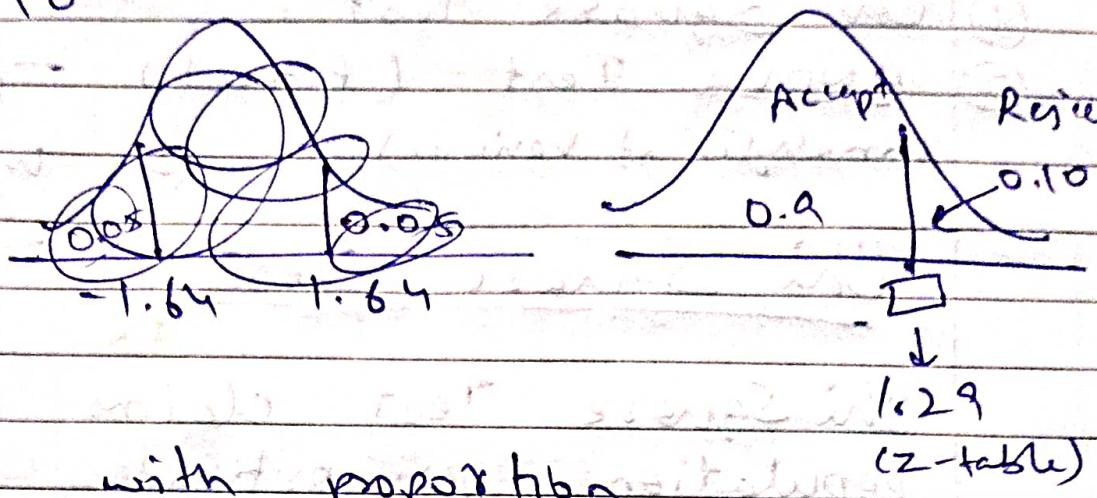
$\alpha = 0.10$



z-test with proportion

$$z = \frac{\hat{p} - p_0}{\sqrt{\frac{p_0 q_0}{n}}}$$

$$= \frac{0.68 - 0.6}{\sqrt{\frac{0.6 \times 0.4}{250}}} \Rightarrow 2.581$$

$2.581 > 1.29$

Reject the Null hypothesis.