Q) A Car Company beleives 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? $n = 250$; $x = 170$

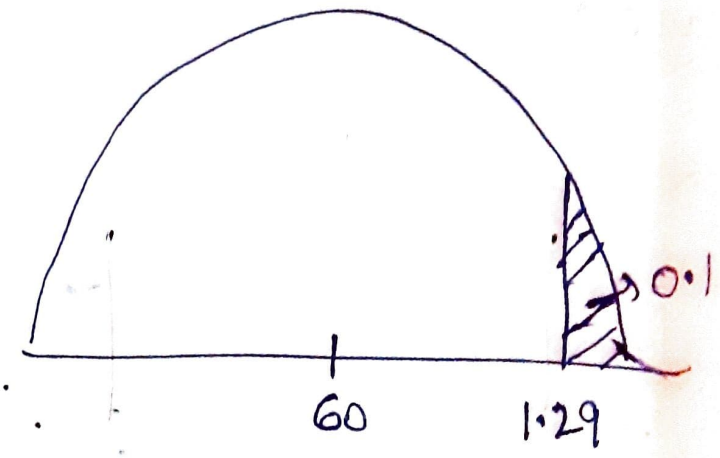
Sol:-

$H_0 : P_0 \leq 60\%$

$H_1 : P_0 > 60\%$

$\Rightarrow p_0 = 0.4$

$\alpha = 0.1$



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

$$\text{Z-test} = \frac{\hat{P} - P_0}{\sqrt{\frac{P_0 q_0}{n}}} = \frac{0.68 - 0.6}{\sqrt{\frac{0.68 \times 0.6}{250}}} = \frac{0.08}{\sqrt{\frac{0.408}{250}}}$$

$$= \frac{0.08}{0.40} =$$

$2 > 1.29$ $\Rightarrow$ Reject the Null Hypothesis.