Ques: (3)

A car believes that the percentage of citizens in city ABC that owns a vehicle is 60% or less. A sales manager disagrees with this. He conducted a hypothesis's testing surveying 250 residents & found that 170 residents responded yes to owning a vehicle.

(a). State Null & Alternate Hypothesis
(b). At a 10% significance level, is there enough evidence to support the idea that vehicle owner in ABC city is 60% or less ?

⇒

(1). $H_0 : p_0 \leq 60\%$
$H_1 : p_0 > 60\%$

$n = 250$
$x = 170$

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

$\Rightarrow p_0 = 60\% = \underline{0.6}$

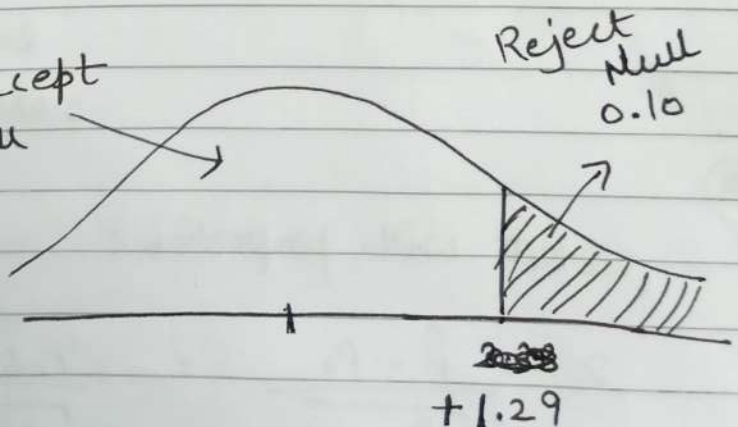
$q_0 = 1 - p_0 = 1 - 0.6 = \underline{0.4}$

Note: $n = 250$ is greater than 30; so Z-test is used.

(2).

$\alpha = 0.10$
(one tail)

$\Rightarrow 1 - 0.10$
$= \underline{0.9}$



③. $$z = \frac{\hat{p} - p_0}{\sqrt{\frac{p_0 q_0}{n}}} = \frac{0.68 - 0.60}{\sqrt{\frac{0.6 \times 0.4}{250}}} = \frac{0.08}{\sqrt{\frac{0.24}{250}}}$$

$$z = \frac{0.08}{\sqrt{0.00096}} = \frac{0.08}{0.03098} = 2.5823$$

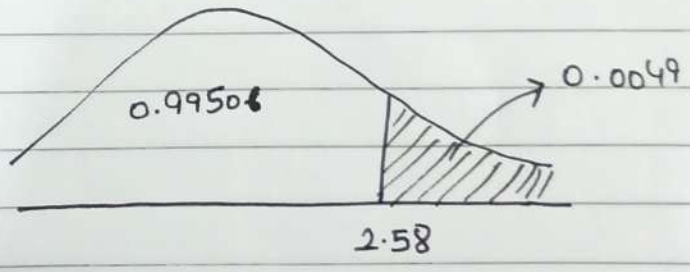
$$\Rightarrow \boxed{2.58}$$

Conclusion:

$$\boxed{1.29 < 2.58}$$

1). Reject Null Hypothesis.
2). There is not enough evidence to support this idea that vehicle owner in ABC city is 60% or less.

P-value:



$= 1 - 0.99506$
$= 0.0049$

Here, $\boxed{P < \alpha} \Rightarrow 0.0049 < 0.10$
So, Reject Null Hypothesis.