Que 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 testing surveying 250 residents & found that 170 residents responded yes to owning a vehicle.

a) State the 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.

Sol. $H_0 : p_0 \geq 60\%$

$H_1 : p_0 \neq 60\%$

$x = 170$

$n = 250$

$q_0 = 1 - 0.6 = 0.4$

$p_0 = 0.6$

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

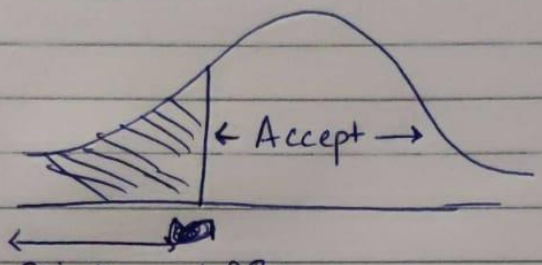
$\hat{p} = 0.68$

$\alpha = 10\%$, $CI = 90\%$

$\alpha = -0.1$

$Z_\alpha = -1.28$

Hence, It is a one-tailed test



So Z propotion test $= \frac{\hat{p} - p_0}{\sqrt{\frac{p_0 \times q_0}{n}}}$

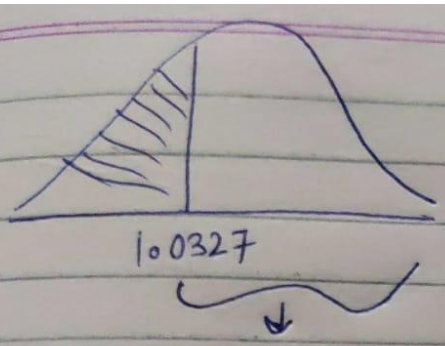
$= \frac{0.68 - 0.60}{\sqrt{\frac{0.6 \times 0.4}{250}}}$

$= \frac{0.08 \times \sqrt{250}}{\sqrt{0.6 \times 0.4}}$

$= \frac{1.2649}{\sqrt{0.6} \times \sqrt{0.4}}$

$= 1.0327$

$1.0327 > -1.28$ so it accept the null hypothesis which mean at 90% CI vechile owner in ABC city is 60% or less.



So pvalue = 1 − 0.8484

= 0.15

pvalue > significance level so we will accept the null hypothesis