4. A car company believes that the percentage of recident in city ABC that own a vehicle 60% or less. A sales manager disagree with this. He conduct a hypothesis testing surveying 250 resident and found that 170 responded yes to owning a vehicle.

(a) State the null and 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.

→ Given: $n = 250 \quad x = 170 \quad P_0 = 0.60$

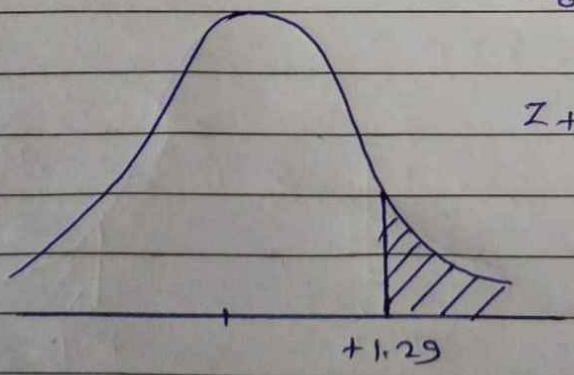
① H_0 : $P_0 = 60\%$

$P_1 > 60\%$

② $\hat{P} = \frac{x}{n} = \frac{170}{250} = 0.68$

$q_0 = 1 - P_0 = 1 - 0.60 = 0.40$

Here $\alpha = 0.1$ [$1 - 0.1 = 0.9$ from Z table $Z_{0.1} = 1.29$]



It is one tail test.

Z test with Proportion

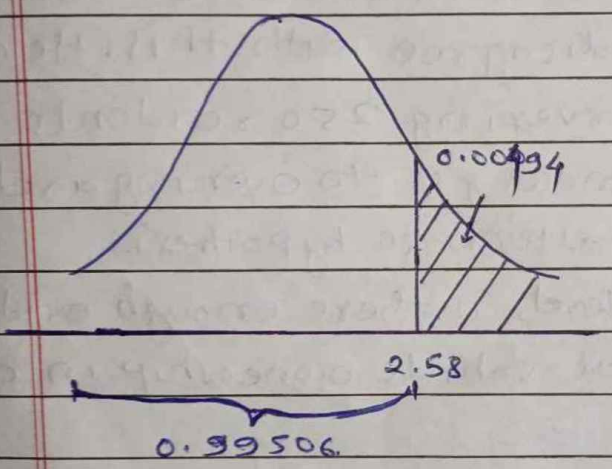
$$= \frac{\hat{P} - P_0}{\sqrt{\frac{P_0 q_0}{n}}}$$

$$= \frac{0.68 - 0.60}{\sqrt{\frac{0.60 \times 0.40}{250}}}$$

$$= 2.58$$

$1.29 < 2.58$ so the null hypothesis rejected.

P value.



P value = 1 - 0.99506

= 0.00494

P value < significance value

0.00494 < 0.1

so Null hypothesis will be rejected.