

A cell 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

null hypothesis: $H_0: P_0 = 60$

$H_1: P_0 \neq 60\%$

$n = 250$, $x = 170$

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

$$P_0 = 60\% = 0.6$$

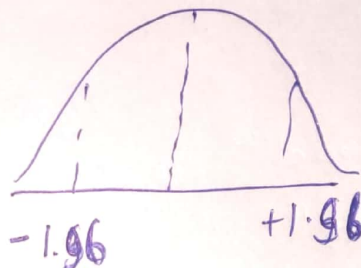
$$q_0 = 1 - P_0 =$$

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

② $\alpha = \underline{0.1}$

③ applying Z-test

$n > 30$



④ Z-test with proportion

$$z\text{-test } \frac{\hat{p} - P_0}{\sqrt{\frac{P_0 q_0}{n}}} \Rightarrow \frac{0.68 - 0.60}{\sqrt{\frac{0.60 \times 0.4}{250}}}$$

$$= \frac{0.08}{\sqrt{\frac{0.24}{250}}}$$

$$= \frac{0.08}{\sqrt{0.00096}}$$

$$= \frac{0.08}{0.03096} = \underline{0.030}$$

$$0.030 > 1.96$$

~~0.030 < 1.96~~

accept ~~reject~~ the null hypothesis