9) A car company believes that % of residents in city ABC that own 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 owing a vehicle.

(a) State null and alternate hypothesis.

(b) At 10% significance level, is there enough evidence to support idea that vehicle ownership in city ABC is 60% or less?

⇒ Null hypothesis $H_0 : P_0 \leq 60\%$

Alternate hypothesis $H_1 : P_1 > 60\%$

$n = 250$

$x = 170$

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

$q_0 = 1 - P_0 = 1 - 0.6 = 0.4$

Significance value $\alpha = 0.9 = 1.645$

Z-test with proportion

$$Z = \frac{\hat{p} - P_0}{\sqrt{\frac{P_0 q_0}{n}}} = \frac{0.68 - 0.6}{\sqrt{\frac{0.6 \times 0.4}{250}}} = 2.58$$

$\because 2.58 > 1.645 \therefore$ Reject the null hypothesis

% of car ownership in city ABC is more than 60%.