ASSIGNMENT.

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Q: A Car company believes that the percentage of residents in a City ABC that owns a Vehicle is 60% or less. A Sales manager disagrees with this. He conducts a hypothesis testing survey for 250 residents and found that 170 responded yes to owing a vehicle.

a) state the null hypothesis. or alternate hypothesis

b) At 10% significance level, is there enough evidence to support the idea that vehicle ownership company AB is 60% or less?

Solution

① $H_0 : P_0 \leq 60\%$

$H_1 : P_0 > 60\%$

$\bar{x} = 170$ $n \geqslant 30$ (z test)

$n = 250$

$P_0 = 60\% = 0.6$ $q_0 = 0.4$

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

at $C \cdot I = 90\%$.

② $\alpha = 0.1$

$z \text{ test} = Z_{0.1} = -1.28$.

③ Decision boundary.

rejection area

acceptance area.

-1.28
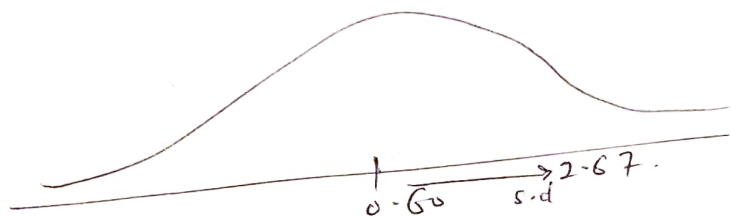
$Z \text{ test statistic} = \dfrac{\hat{P} - P_0}{\sqrt{\dfrac{P_0 q_0}{n}}} = \dfrac{0.68 - 0.6}{\sqrt{\dfrac{0.6 \times 0.4}{250}}} = \dfrac{0.08}{\sqrt{\dfrac{0.24}{250}}}$

Z test statistic $= \dfrac{0.08}{\sqrt{0.00096}} = \dfrac{0.08}{0.03} = 2.67.$

Z score $= 2.67 > -1.28$ Accept null hypothesis.

For P value $= 0.0038$

Since P value, $0.0038 < 0.1$ — reject null hypothesis.
accept H_1.
the percentage of residents
in City ABC that owns a
car is greater than 60%.