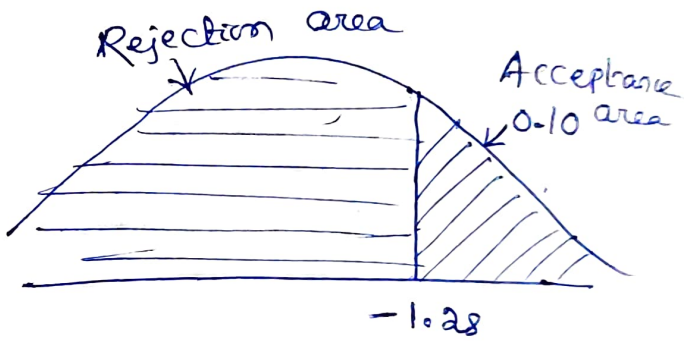
Q) A car company believes that the percentage of residents in city ABC that owns a vehicle is 60% or less. A Sales manager disagrees with this. He conducts a hypothesis testing Surveying 250 residents and found that 170 responded yes to owning a vehicle.

(a) State the Null & Alternative hypothesis

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

→ Here $H_0 : p_0 \leq 60\%$ $\alpha = 0.10$

So 1-tail test



$n = 250$, $x = 170$

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

$p_0 = 60\% = 0.60$

$q_0 = 1 - 0.60 = 0.40$

$n \geq 30$ so Ztest

$$Z_{test} = \frac{\hat{p} - p_0}{\sqrt{\frac{p_0 q_0}{n}}} = \frac{0.68 - 0.60}{\sqrt{\frac{0.60 \times 0.40}{250}}} = \frac{0.08}{0.0309} \simeq 2.58$$

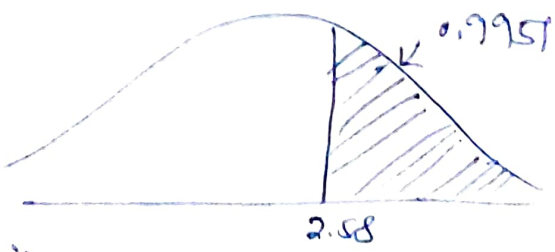
$2.58 > -1.28$ → accept the null hypothesis

Using p-value

p-value $= 1 - 0.9951$

$= 0.0049$

$0.10 > 0.0049$



So accept the null hypothesis

So the vehicle ownership in city ABC is 60%.