Answer on Question #82908 – Math – Statistics and Probability

Question

A market research agency takes a sample of 1000 people and finds that 200 know of brand X after an advertising campaign a further sample of 1091 people is taken and it is found that 240 know of brand X. It is required to know if there has been an increase in the number of people having an awareness of brand X at the 5% level.

Solution

$\hat{p}_1 = \frac{200}{1000} = 0.2, \ \hat{p}_2 = \frac{240}{1091} = 0.22, \ p = \frac{200+240}{1000+1091} = 0.21.$

Null Hypothesis $H_0: p_1 = p_2$.

Alternative Hypothesis $H_a: p_1 < p_2$.

Test statistic: $z = \frac{\hat{p}_1 - \hat{p}_2}{\sqrt{p(1-p)\left(\frac{1}{n_1}+\frac{1}{n_2}\right)}} = \frac{0.2-0.22}{\sqrt{0.21*(1-0.21)\left(\frac{1}{1000}+\frac{1}{1091}\right)}} = -1.12.$

P-value: $p = 0.1314.$

Since the P-value is greater than 0.05 we fail to reject the Null Hypothesis and should conclude that there has been no increase in the number of people having an awareness of brand X.