

Answer on Question #75032-Math-Statistics and Probability

The manufacturer of the ColorSmart-5000 television set claims 95 percent of its sets last at least five years without needing a single repair. In order to test this claim, a consumer group randomly selects 424 consumers who have owned a ColorSmart-5000 television set for five years. Of these 424 consumers, 326 say their ColorSmart-5000 television sets did not need a repair, whereas 98 say their ColorSmart-5000 television sets did need at least one repair.

Solution

$$H_0: p \geq 0.95$$

$$H_a: p < 0.95$$

$$\hat{p} = \frac{326}{424}.$$

We use 5% significance level.

Critical value:

$$z_{cr} = -1.645.$$

Test statistic is

$$Z = \frac{\hat{p} - p_0}{\sqrt{\frac{p_0(1 - p_0)}{n}}} = \frac{\frac{326}{424} - 0.95}{\sqrt{\frac{0.95(1 - 0.95)}{424}}} = -17.11.$$

Test statistic is less than critical value. Reject the null hypothesis at 5% significance level. There is sufficient evidence to conclude that there is less than 95 percent of the ColorSmart-5000 television sets last at least five years without needing a single repair.

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