Answer on Question # 41784 – Math - Statistics and Probability

A food company is planning to market a new type of frozen yogurt. However, before marketing this yogurt, the company wants to find what percentage of the people like it. The company's management has decided that it will market this yogurt only if at least 35% of the people like it. The company's research department selected a random sample of 400 persons and asked them to taste this yogurt. Of these 400 persons, 112 said they like it. Test at 2.5% significance level, can you conclude that the company should market this yogurt?

Solution

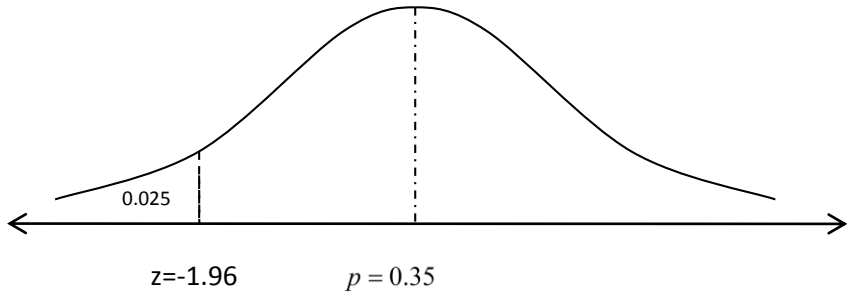
Step 1. State H_o: p≥ 0.35, H_1: p <0.35.

Step 2. Type of test - left-tailed test.

Step 3. Level of significance: $\alpha = 0.025$.

Step 4. Critical value of the statistic: Z=-1.96.

Step 5. Diagram



Step 6. Decision rule: Reject H_o if Z computed from evidence less than -1.96 or p-value < 0.025.

Step 7. Compute the statistic:

Evidence: $n = 400,\ x = 112, \hat{p} = \frac{112}{400} = 0.28.$

$$z = \frac{\hat{p} - p}{\sqrt{\frac{pq}{n}}} = \frac{0.28 - 0.35}{\sqrt{\frac{0.35 \cdot 0.65}{400}}} = -2.94.$$

Compute the p-value:

p-value $= P(z < -2.94) = 0.0016 < 0.025.$

Step 8. Conclusion:

Reject H_o. We have statistical evidence at a 2.5% level of significance to believe that the company should not market the yogurt because the evidence doesn't show that at least 35% of the people like it.