Problem

Hypothesis Testing Problem:

A company claims that its new product will increase customer satisfaction by at least 10%. A random sample of 100 customers showed an average increase in satisfaction of 10%, with a standard deviation of 15%. Test the company's claim at a significance level of 0.05.

Question:

What is the calculated z-value for the hypothesis test?

Solution

Sample mean ($\bar{x}$) = 10%

Population mean (μ) = 10% (claimed increase by the company)

Sample standard deviation (s) = 15%

Sample size (n) = 100

Significance level (α) = 0.05 (one-tailed test)

Using the formula for the z-test statistic:

$$z = \frac{\bar{x} - \mu}{\frac{s}{\sqrt{n}}}$$

Substituting the given values:

$$z = \frac{10 - 10}{\frac{15}{\sqrt{100}}}$$

$$z = \frac{0}{1.5} = 0$$

The calculated z-value is **0**. It does not fall in the critical region beyond the critical value for α = 0.05. Therefore, we fail to reject the null hypothesis, meaning there is not enough evidence to conclude that the sample mean differs significantly from the claimed increase by the company.

Answer: 0