Assignment 4.7

Problem Statement 1:

Blood glucose levels for obese patients have a mean of 100 with a standard deviation of 15. A researcher thinks that a diet high in raw cornstarch will have a positive effect on blood glucose levels. A sample of 36 patients who have tried the raw cornstarch diet have a mean glucose level of 108. Test the hypothesis that the raw cornstarch had an effect or not.

Solution

Step 1: Define the Null and Alternate Hypotheses.

Null Hypothesis H0: $\mu = 100$

Alternate Hypothesis H1: $\mu > 100$

Step 2: State the significance level (alpha).

let's assume significance level as 5% (0.05).

Step 3: State decision rule.

For alpha = 0.05, refer the standard Z-table

As this one is two tailed test, so we will refer alpha = 0.05/2 = 0.025 on both side

It Z value is less than -1.96 or greater than 1.96, reject the null hypothesis.

Step 4: Calculate test statistics

$z = (x - \mu) / (\sigma / \sqrt{n})$

where, $x = 108$

$\mu = 100$

$\sigma = 15$

$n = 36$

$z = (108 - 100) / (15 / \sqrt{36}) = 3.2$

Step 5: State result

$z = 3.2$

Result: Reject H0

Step 6: State conclusion

Raw cornstarch had a significant effect, $z = 3.2$, $p < 0.05$