Section 8-7 Hypothesis Testing and Confidence Intervals

When the confidence interval contains the hypothesized mean, do not reject the null hypothesis.

When the confidence interval does not contain the hypothesized mean, reject the null hypothesis.

NOTE: We will only use this method for two-tailed tests.

\[ H_0: \mu = k \quad H_1: \mu \neq k \]

Use a confidence interval to complete the hypothesis test.

The mean time before a certain headache remedy starts to work is 12 minutes, with a standard deviation of 3 minutes. A new coating is used to help user swallow the pill. A sample of 18 people using the pills with the new coating showed the mean time before it started to work was 13 minutes. Is there a difference with the new coating? Test at \( \alpha = 0.01 \) corresponds to a 99% confidence interval.

1) State the hypotheses and claim:

\[ H_0: \mu = 12 \quad H_1: \mu \neq 12 \]

2 and 3) Find the confidence interval using z or t scores as appropriate.

Since given \( \sigma = 3 \), use

\[ E = \frac{\sigma}{\sqrt{n}} = 2.5 \times \left( \frac{3}{\sqrt{18}} \right) = 2.5 \times 0.65 = 1.875 \approx 2 \]

Use \( \bar{x} - E < \mu < \bar{x} + E \Rightarrow 13 - 2 < \mu < 13 + 2 \Rightarrow 11 < \mu < 15 \)

This interval contains the hypothesized mean of 12, so

4) Reject or DNR \( H_0 \)

\[ \Rightarrow \text{DNR } H_0 \]

5) Summary:

There is not enough evidence to support the claim that \( \mu \neq 12 \).

There is not enough evidence to support that there is a difference with the new coating.