

Homework Solutions

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Exercise 28

1. Let μ_1 be the average number of cavities by children who use the New Brand and let μ_2 be the average number of cavities by children who use the Competitor Brand. The hypotheses are

$$H_0 : \mu_1 = \mu_2$$

$$H_1 : \mu_1 < \mu_2$$

2. $\alpha = 0.01$.

3.
$$t = \frac{(\bar{x}_1 - \bar{x}_2) - 0}{s_p \sqrt{\frac{1}{n_1} + \frac{1}{n_2}}}$$

4. First, compute s_p . Enter the data into two separate lists in the TI-83 and use **1-Var-Stats** for each list. We obtain $\bar{x}_1 = 2.0$, $s_1 = 1.0$, $\bar{x}_2 = 2.636$, and $s_2 = 2.335$. Next, calculate s_p .

$$\begin{aligned} s_p &= \sqrt{\frac{(n_1 - 1)s_1^2 + (n_2 - 1)s_2^2}{n_1 + n_2 - 2}} \\ &= \sqrt{\frac{10 \cdot 1.0^2 + 10 \cdot 2.335^2}{20}} \\ &= 1.796. \end{aligned}$$

$$\begin{aligned} t &= \frac{1.0 - 2.636}{1.796 \sqrt{\frac{1}{11} + \frac{1}{11}}} \\ &= -\frac{1.636}{0.7658} \\ &= -2.136. \end{aligned}$$

5. $p\text{-value} = \text{tcdf}(-E99, -2.136, 20) = 0.0226$.
6. Accept H_0 .
7. There is no difference in the average number of cavities between the two brands.

You could use **2-SampTTest** to compute the values in Steps 4 and 5.