1. **Problem**

   A machine fills milk into 500ml packages. It is suspected that the machine is not working correctly and that the amount of milk filled differs from the setpoint $\mu_0 = 500$. A sample of 226 packages filled by the machine are collected. The sample mean $\bar{y}$ is equal to 517.2 and the sample variance s_{n-1}^2 is equal to 262.56.

   Test the hypothesis that the amount filled corresponds on average to the setpoint. What is the value of the t-test statistic?

   (a) -9.853

   (b) 30.505

   (c) -22.761

   (d) -2.894

   (e) 15.958

   Solution

   The t-test statistic is calculated by:

   $$t = \frac{\bar{y} - \mu_0}{\sqrt{\frac{s_{n-1}^2}{n}}} = \frac{517.2 - 500}{\sqrt{\frac{262.56}{226}}} = 15.958.$$

   The t-test statistic is thus equal to 15.958.

   (a) False

   (b) False

   (c) False

   (d) False

   (e) True