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 247 packages filled by the machine are collected. The sample mean $\bar{y}$ is equal to 521.3 and the sample variance s_{n-1}^2 is equal to 527.08.

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

   (a) 1.275

   (b) -13.070

   (c) -53.309

   (d) 9.888

   (e) 14.581

   Solution
   The t test statistic is calculated by:

   $$ t \quad = \quad \frac{\bar{y} - \mu_0}{\sqrt{\frac{s_{n-1}^2}{n}}} = \frac{521.3 - 500}{\sqrt{\frac{527.08}{247}}} = 14.581. $$

   The t test statistic is thus equal to 14.581.

   (a) False

   (b) False

   (c) False

   (d) False

   (e) True