

Answer on Question #44954 – Math - Statistics and Probability

A trucking firm is suspicious of the claim that the average lifetime of certain tires is at least 28000 miles. To check the claim, the firm puts 40 of these tires on its trucks, and gets a mean lifetime of 27463 miles with a standard deviation of 1348 miles. What can it conclude if the probability of a type I error is to be at least 0.01?

Solution

The trucking firm wants evidence that the claim is wrong, i.e. that $\mu < 28000$. This is designated as H_a . The complementary statement is designated as H_0 . Thus the hypotheses to be tested are

1. $H_0 : \mu \geq 28000$ vs $H_a : \mu < 28000$.
2. $\alpha = 0.01$.
3. $z = \frac{27463 - 28000}{\frac{1348}{\sqrt{40}}} = -2.52$.
4. $z_\alpha = z_{0.01} = -2.326$.
5. Reject H_0 because $z = -2.52 < z_{0.01} = -2.326$. There is sufficient evidence to doubt the trucking firm's claim.