Answer on Question #45017 – Math - Statistics and Probability

Consider the trash bag case. The mean and the standard deviation of the sample of $n = 40$ trash bag breaking strengths are $\bar{x} = 50.575$ and s = 1.6438. Test $H_0 : \mu = 50 \; versus \; H_a : \mu > 50$ by setting α equal to 0.05 and using a critical value rule. Also, interpret the (computer calculated) p-value of 0.0135 for the test.

Solution

Reject $H_0 : \mu = 50$ in favor of $H_a : \mu > 50$ if and only if the test statistics z is greater than z_α.

$$z = \frac{\bar{x} - 50}{\frac{s}{\sqrt{n}}} = \frac{50.575 - 50}{\frac{1.6438}{\sqrt{40}}} = 2.2123.$$

Since 2.2123 is greater than $z_{0.05} = 1.645$, we can reject $H_0 : \mu = 50$ in favor of $H_a : \mu > 50$. Therefore, we conclude that the mean breaking strength of the trash bags exceeds 50 pounds.

p-value of 0.0135 says that, if $H_0 : \mu = 50$ is true, then only 135 in 10000 of all possible test statistic values are at least as, or extreme, as the value $z = 2.2123$. We can reject H_0 in favor of H_a at level

$\alpha = 0.05$ because $p - value = 0.0135 < \alpha = 0.05$.