Name: KEY

Standard Twenty Eight: Quiz Nine – Significance Tests – for Means

Condom failure during sexual intercourse is a serious issue. The article "Fatigue testing in condoms" examined the breaking strength of a random sample of n=20 brand ``G" condoms. The condoms were mechanically tested on an apparatus and breaking strength was determined by measuring the number of cycles until breakage. The mean of the sample of twenty is 1,481 cycles until breakage.

2226, 2283, 875, 733, 1390, 1744, 1174, 1468, 1229, 1386, 1843, 914, 1518, 1288, 1507, 1321, 819, 1370, 1543, 2986

The manufacturer of brand ``G" condoms is curious if their product is better than brand ``T" which is known to have a population mean number of cycles until breakage of 1250. Test the hypothesis that the population mean number of cycles until breakage for brand ``G" is greater than that of brand ``T." Assume a population standard deviation of 550 and use 95% confidence for this test.

1. $H_0: \mu = 1250$
   $H_a: \mu > 1250$

2. ✗ $n \geq 30$ or population is bell shaped
   ✓ Ran
   } Proceed w/ caution

3. $z^* = \dfrac{\bar{x} - \mu_0}{\sigma_x/\sqrt{n}} = \dfrac{1481 - 1250}{550/\sqrt{20}} = 1.8783$

4. $\text{pvalue} = 1 - P(Z < z^*) = 1 - P(Z < 1.88)$
   $= 1 - .9699$
   $= .0301$

5. $\dfrac{\text{pvalue}}{.0301} < \dfrac{\alpha}{.05}$ → Reject H_0. We have sufficient evidence to suggest the population mean number of cycles until breakage for brand "G" is larger than that of brand "T," 1250.