Answer on Question #60778 – Math – Statistics and Probability

Question

- Determine the direction of the hypothesis test (one-sided left, one-sided right, bidirectional)

- Determine the test statistic (z* or t*) and the p-value for each of the following situations and

- Determine if they would cause the rejection of the null hypothesis if the confidence level was set

at 95% in each case. (Hint: be wary of the sample size)

Ho: μ = 380 s, Ha: μ ≠ 380 s, sample mean = 357, s = 75, n = 40

Solution

- Since the alternative hypothesis contains "≠" statement, the test is bidirectional.
- Since the sample size is large ($n \geq 30$), one can use z-test and use s as a point estimate of σ.
  The test statistic:
  $$z = \frac{\bar{x} - \mu}{s/\sqrt{n}};$$
  $$z = \frac{357 - 380}{75/\sqrt{40}} = -1.94.$$

  The critical values can be either obtained from the standard normal table or calculated using the technology (NORM.S.INV() function of MS Excel).
  For two-tailed test with α = 0.05, the critical values are z_c = ±1.96.
  The rejection region: $|z| > 1.96$.
- Since the test statistic does not fall within the rejection region, fail to reject the null hypothesis at the given confidence level (95%).