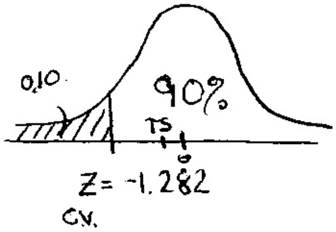
Lab #9 – Cañada Sp13

Question 1: $H_0: p_{NO} \geq p_{WITH}$

$H_A: p_{NO} < p_{WITH}$



$\bar{p} = \frac{74+68}{170+160} = \frac{142}{330} = 0.43\overline{03}$ $\quad \bar{q} = \frac{188}{330}$

T.S.

$$Z = \frac{\left(\frac{68}{160} - \frac{74}{170}\right) - 0}{\sqrt{\frac{\frac{(142)(188)}{330^2}}{160} + \frac{\frac{(142)(188)}{330^2}}{170}}} = \frac{-0.0102941176}{0.0545357983} = -0.1887589 \approx -0.189$$

Fail to reject H_0

At the 90% confidence level there is not enough evidence to support the claim that the proportion of working adults with no college education is lower than the proportion with a college education.

Confidence Interval:

$$\left(\frac{68}{160} - \frac{74}{170}\right) \pm 1.645\overbrace{\sqrt{\frac{68(92)}{160^3} + \frac{74(96)}{170^3}}}^{0.0545280061}$$

$$-0.01029 \pm 0.08970$$

$$(-0.100, 0.079) \text{ or } -0.100 < p_N - p_W < 0.079$$

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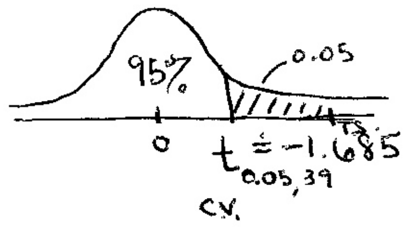
Question 2:

$H_0: \mu_A \leq \mu_B$

$H_A: \mu_A > \mu_B$



T.S.

$$t = \frac{(7.6-6.9)-0}{\sqrt{\frac{1.4^2}{40}+\frac{1.7^2}{40}}} = \frac{0.7}{0.3482097069} \doteq 2.010282844 \approx 2.010$$

Reject H_0 & Accept H_A

At the 5% significance level there is enough evidence to support the claim that the Company A's response times are on average higher than those for Company B.

Confidence Interval: $(7.6-6.9) \pm 2.023\sqrt{\frac{1.4^2}{40}+\frac{1.7^2}{40}}$

0.7 ± 0.70

$(0, 1.4)$ or $0 < \mu_A - \mu_B < 1.4$ minutes

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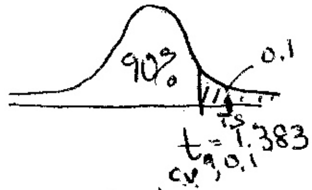
Question 3:

$H_0: \mu_d \leq 1.75$

$H_A: \mu_d > 1.75 \text{gal}$



1st compute differences because this is a paired means test

-1, 5, 13, 5, 0, 2, 9, 12, 5, -2 $\quad \bar{d} = 4.8 \quad s = 5.245106 \quad n = 10$

T.S.

$$t = \frac{4.8 - 1.75}{5.245106/\sqrt{10}} \doteq 1.838846891 \approx 1.839$$

Reject H_0 & Accept H_A

At the 90% confidence level there is enough evidence to support the claim that the families save more than 1.75 gallons per day after watching a conservation video.

Confidence Interval: $4.8 \pm \frac{1.833(5.245106)}{\sqrt{10}}$

4.8 ± 3.040

$(1.76, 7.84)$ gallons or $1.76 < \mu_d < 7.84$ gallons

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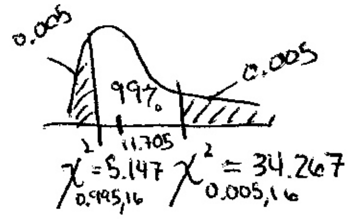
Question 4:

$\bar{x} = 68.8824$
$s = 2.39485$

$H_0 : \sigma = 2.8\text{ in.}$

$H_A : \sigma \neq 2.8\text{ in.}$



T.S.

$$\chi^2 = \frac{16(2.39485)^2}{2.8^2} = 11.704707 \approx 11.705$$

Fail to reject H_0

At the 99% confidence level there is not enough evidence to support the claim that the standard deviation isn't 2.8 inches.

Confidence Interval: $\sqrt{\frac{16(2.39485)^2}{34.267}} < \sigma < \sqrt{\frac{16(2.39485)^2}{5.147}}$

$1.636 < \sigma < 4.222$ inches

Extra Credit: A researcher was interested in comparing the amount of time spent watching television by women and by men. Independent simple random samples of 15 women and 16 men were selected and each person was asked the number of hours he or she had watched TV during the previous week. It is assumed that the population standard deviations of men and women's ★ average TV watching time are the same. If the 15 women's average time watching TV was 12.9 hours with a standard deviation of 4.2 hours and the 16 men's average time watching TV was 16.3 hours with a standard deviation of 4.4 hours test the claim that men time watching TV is greater than women's using a a significance level of 1%.

★ This indicates a pooled test. ∴ $df = n_1 + n_2 - 2$

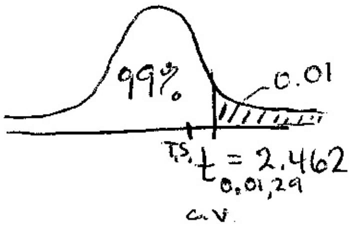
$$S_p^2 = \frac{\overset{240.4}{15(4.4)^2} + \overset{246.96}{14(4.2)^2}}{\underset{29}{14 + 15}} = 18.52965517$$

$= 15 + 16 - 2$

$= 29$

$H_0: \mu_M \leq \mu_W$

$H_A: \mu_M > \mu_W$



T.S. $$t = \frac{(16.3 - 12.9) - 0}{\sqrt{\frac{18.52965517}{16} + \frac{18.52965517}{15}}} = \frac{3.4}{1.547066189} \doteq 2.197708168 \approx 2.198$$

Fail to reject H_0

At the 1% significance level there is not enough evidence to support the claim that mean time spent watching T.V. is greater for men than for women when it is assumed that the standard deviation is the same for both subpopulations.

Confidence Interval: $(16.3 - 12.9) \pm 2.756\sqrt{\frac{18.52965517}{16} + \frac{18.52965517}{15}}$

3.4 ± 4.264

$(-0.864, 7.664)$ min or $-0.864 < \mu_M - \mu_W < 7.664$ min.