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3/19

MA 331 HW #5

"I pledge my honor that I have abided by the Stevens Honor System" - Himanshu Rana

1) a) $CI_{1-\alpha}(d, \hat{d}) = [\hat{d} \pm z_{1-\frac{\alpha}{2}} se(\hat{d})]$

$$n_1 = 292$$

$$\hat{p}_1 = \frac{47}{292} = .161$$

$$n_2 = 233$$

$$\hat{p}_2 = \frac{21}{233} = .0901$$

$$(.161 \pm 1.645 \left(\sqrt{\frac{(.161)(.839)}{292}} \right)) = [.1256, .1963]$$

$$(.0901 \pm 1.645 \left(\sqrt{\frac{(.0901)(.9099)}{233}} \right)) = [.0513, .1210]$$

The CIs do not overlap and are disjoint we can conclude that the Facebook use of women is greater than that of men.

b) $\hat{d} = .1610 - .0901 = .0709$

$$\begin{aligned} & .0709 \pm 1.645 \left(\sqrt{\frac{(.161)(.839)}{292} + \frac{(.0901)(.9099)}{233}} \right) \\ & = .0709 \pm 1.645(.0285) = [.02396, .1177] \end{aligned}$$

$$2) a) H_0: \mu_1 = \mu_2 \quad \alpha = .01 \quad t = \frac{\bar{x}_1 - \bar{x}_2}{\sigma_p \sqrt{\frac{1}{n_1} + \frac{1}{n_2}}}$$

$$H_1: \mu_1 \neq \mu_2$$

$$\text{control: } \begin{cases} \mu_1 = 14.59 \\ \sigma_1 = .8346 \\ n_1 = 10 \end{cases}$$

$$\text{test: } \begin{cases} \mu_2 = 12.06 \\ \sigma_2 = 1.2276 \\ n_2 = 10 \end{cases}$$

$$t = 5.389$$

$$\alpha = .01 \quad \text{critical value} = 2.878$$

5.389 > 2.878, which means that the means are significantly different

The means of both groups are sig. diff. at $\alpha < .01$

$$b) H_0: \mu_1 = \mu_2 \quad \alpha = .05$$

$$H_1: \mu_1 \neq \mu_2$$

μ , σ , and n for both groups are the same as in part a)

$$t = 5.389$$

$$\alpha = .05 \quad \text{critical value} = 2.101$$

5.389 > 2.101, which means that the means are significantly different

The means of both groups are significantly diff. at $\alpha < .05$