Worksheet: Confidence Intervals + Tests about Pop Mean + Prop.

① .99% confidence interval for 1-sample means

$n = 34 \quad \bar{x} = 0.4224 \quad s_e = \frac{.1998}{\sqrt{34}} = .03426 = .0343$

* this is Standard Error of the mean
SE Mean on output

$t^*_{.99} = 2.75 \quad df = 30$

$\bar{x} \pm t^* \frac{s}{\sqrt{n}} = .4224 \pm 2.75(.0343)$

$.4224 \pm .0943$

$(.3281, .5167)$

We are 99% confident that the true mean value for r lies between .3281 and .5167.

If use calculator: $(.32814, .51606)$

② • μ = the true mean level of tar per cigarette

• 1-sample t-test for means

• Conditions:

SRS - stated in problem Normality - stated in problem

Independence - all cigarettes $\geq 10(15)$ Condition met

• H_0: the true mean level of tar per cigarette is 5 mg

H_a: the true mean level of tar per cigarette is more than 5 mg

H_0: $\mu = 5$ mg

H_a: $\mu > 5$ mg

• $n = 15 \quad df = 14 \quad \bar{x} = 5.63 \quad s = 1.61 \quad s_e = \frac{1.61}{\sqrt{15}} = .4157 \quad \alpha = .05$

$P\left(t > \frac{5.63 - 5}{.4157}\right) = P(t > 1.516) = .076$ Since our p-value of .076 is greater than our significance level of .05, we have evidence to fail to reject the null. We can conclude the true mean tar in cigarettes is not greater than 5mg

(3) • μ = the true mean selling price of homes in this city

• 1-sample t-test for means

• Conditions:
SRS - stated in problem Normality - stated in problem
Independence - all homes in this city $\geq 10(40)$ Condition met

• H_0: the true mean selling price of homes in this city is $90,000

H_a: the true mean selling price of homes in this city is not $90,000

H_0: $\mu = \$90,000$

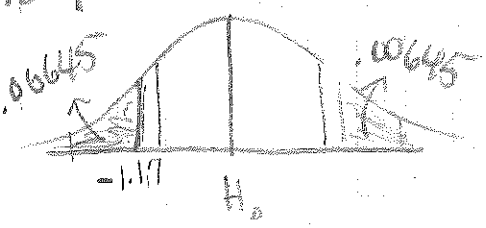
H_a: $\mu \neq \$90,000$

• $n = 40$ $\bar{x} = \$84,500$ $s = 13341.66$ $SE = \frac{13341.66}{\sqrt{40}} = 2109.50$

$df = 39$

$\alpha = .05$

$$P\left(t < \frac{84500 - 90,000}{2109.50}\right) = 2P(t < -2.61) = .0129$$



Since our p-value of .0129 is [illegible] than our significance level of .05, we have evidence to reject the null. We can conclude the mean selling price of homes in this city does differ from $90,000 for samples of n = 40 homes. Our data are statistically significant.

(4) 2005 AP Exam #4

- p = the true proportion of cereal boxes having video rental vouchers in them
- 1-sample z-test for proportions
- Conditions:
  SRS - stated in problem
  Normality - $11 \geq 10$ $54 \geq 10$ Condition met
  Independence - all cereal boxes of this brand $\geq 10(65)$ Condition met

- H_0: the true proportion of cereal boxes containing video rental vouchers is 0.2

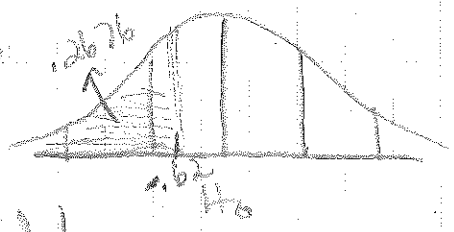
H_a: the true proportion of cereal boxes containing video rental vouchers is less than 0.2

$H_0: p = 0.2$

$H_a: p < 0.2$

- $n = 65$ $\hat{p} = \frac{11}{65} = .1692$ $SE = \sqrt{\frac{(.2)(.8)}{65}} = .0496$ $\alpha = .05$

$$P\left(z < \frac{.1692 - 0.2}{.0496}\right) = P(z < -.621) = .2676$$



Since our p-value of .2676 is greater than our significance level of .05, we have evidence to fail to reject the null. We can conclude that the true proportion of cereal boxes containing video rental vouchers is not less than 0.2.