Quiz 8 STAT 381, APPLIED STATISTICAL METHODS I, SPRING 2015

NAME: Key

Problem 1. (5 points) You want to estimate the average length of time shoppers spend on a website. A random sampling of 434 users gives a sample average of 5.6 minutes with a sample standard deviation of 3 minutes. Find a 99% confidence interval for the population mean time.

Ok to use z-interval or t-interval

$\bar{x}=5.6$ $\quad z_{.005}\approx 2.576 \rightarrow$ z-interval: $(5.2291, 5.9709)$

$s=3$

$n=434$ $\quad t_{.005}\approx 2.587 \rightarrow$ t-interval: $(5.2274, 5.9726)$

Problem 2. (3 points) (a) You want to estimate the proportion of the population who owns a WII with 95% confidence. What minimum sample size do you need in order to guarantee a margin of error no greater than 2%?

$$n \geq \frac{1.96^2}{4(.02)^2} = 2401$$

(2 Points)

(b) You find that 14 out of the first 100 people surveyed own a WII. What is your revised estimate for the sample size you need to keep the margin of error below 2%?

$\hat{p}=.14$

$$n \geq \frac{1.96^2(.14)(.86)}{(.02)^2} = 1157$$

Bonus (3 points) Find a 99% confidence interval for the population standard deviation for problem 1. Use $n=15$

$\chi^2_{.995}=4.075$

$\chi^2_{.005}=31.319$

99% CI for σ^2 is

$$\left(\frac{(n-1)s^2}{\chi^2_{.005}}, \frac{(n-1)s^2}{\chi^2_{.995}}\right) = \left(\frac{14\cdot 3^2}{31.319}, \frac{14\cdot 3^2}{4.075}\right) = (4.023, 30.92)$$

So a 99% CI for σ is $(2.006, 5.56)$