Stat 2470, Quiz #9, Spring 2015 Name KEY

Instructions: Show all work. State any formulas used. If you use the calculator, you should say which function you used, and what you entered into it, as well as any output. I can only give partial correct for incorrect answers if I have something to grade.

1. A vintner tests 20 bottles of wine and finds their mean alcohol content is 9.6% with a standard deviation of 2.2%. The vintner wants to determine a 99% confidence interval for the mean alcohol content of all Ohio wines with a width of not more than 0.2%. What sample size is needed to obtain this results? The equation for the sample size is $n = \left(\frac{2z\sigma}{w}\right)^2$.

$$n = \left(\frac{2 \cdot 2.58 \cdot 2.2}{0.2}\right)^2 = (56.76)^2 = 3221.6976$$

$$\Rightarrow 3222 = n$$

2. What is the confidence interval the vintner originally found for his 20-bottle sample?

TInterval Stats
$\bar{x} = 9.6$
$s = 2.2$
$n = 20$
C-level: .99

(8.1926, 11.007)

3. A national opinion poll asked 1786 Americans their views on biological evolution, and found that 42% claimed to reject scientific explanations for human origins (specifically, they agreed with a statement that said humans were created in their present form with no evolution). Find a 95% confidence interval for that value.

1PropZInt

$x = .42 * 1786 = 750.12 \Rightarrow 750$
$n = 1786$
C-Level: .95

(.39704, .44282)
or (39.7%, 44.3%)

4. Define Type I and Type II errors in the context of a legal proceeding. [Hint: What is the null hypothesis in a criminal trial, and what is the alternative?]

Since H_0: is the accused is innocent.
a Type I error is convicting an innocent man.

Since H_a is the accused is guilty, a Type II error is allowing a guilty man to go free.

5. Which of the following sets of hypotheses fail to conform to our standards for setting up correct tests of hypotheses?

fail a. $H_0: p = 0.50, H_a: p = 0.75$ ← both values (##) are the same, only = or > < ≠ changes

b. $H_0: \mu = 11, H_a: \mu < 11$ ok

fail c. $H_0: p \neq 0.50, H_a: p = 0.50$ ← equality goes in H_0, ≠ in H_a

fail d. $H_0: p > 0.50, H_a: p \leq 0.50$ ← same as above if using ≥ or ≤ it goes in H_0

e. $H_0: \mu \leq 0, H_a: \mu > 0$ ok