Name: _____

Lab Problems 9-12

Statistics 0200
Spring 2010
Dr. Nancy Pfenning

9. Is mean age the same for male and female students?

   (a) What variable or variables are involved? For each variable, tell whether it is quantitative or categorical.

   (b) **Before you even look at the data**, formulate null and alternative hypotheses about the difference $\mu_1 - \mu_2$ between population means for the two groups. [The null hypothesis usually states that this difference is zero.]
   H_0 :
   H_a :
   Do you suspect that there will be enough evidence to reject H_0?_____

   (c) Use **MINITAB Basics Example P** to carry out a two-sample t procedure, making sure to opt for the correct alternative ($<$, $\neq$, or $>$); include a display of the data. What is the p-value?_____
   Do you reject H_0?_____

   (d) **State your results**: since you did or did not reject H_0, what do you conclude about the unknown difference between population means? Be sure to express your results specifically in terms of the variable(s) of interest, and mention to what extent the results match your suspicions in (b).

10. In general, is mean income the same for 1st, 2nd, 3rd, 4th, and "other" year students?

    (a) What variable or variables are involved? For each variable, tell whether it is quantitative or categorical.

    (b) **Before you even look at the data**, formulate null and alternative hypotheses about the population means.
    H_0 :
    H_a :
    Do you suspect that there will be enough evidence to reject H_0?_____

    (c) Use **MINITAB Basics Example R** to carry out an ANOVA procedure; include a display of the data. What is the p-value?_____
    Do you reject H_0?_____

    (d) **State your results**: since you did or did not reject H_0, what do you conclude about the various population means? Be sure to express your results specifically in terms of the variable(s) of interest, and mention to what extent the results match your suspicions in (b).

11. Is there a statistically significant relationship between gender and whether or not a student smokes?

    (a) What variable or variables are involved? For each variable, tell whether it is quantitative or categorical. Which, if any, would be the obvious choice for explanatory variable?_____

    (b) **Before you even look at the data**, formulate null and alternative hypotheses about the relationship between those variables.
    H_0 :
    H_a :
    Do you suspect that there will be enough evidence to reject H_0?_____

    (c) Use **MINITAB Basics Example U** to construct a two-way table of counts and row percents, and carry out a chi-square test. What is the p-value?_____
    Do you reject H_0?_____

    (d) **State your results**: since you did or did not reject H_0, do you conclude that those variables are related? Be sure to express your results specifically in terms of the variable(s) of interest, and mention to what extent the results match your suspicions in (b). _____

12. Is there a relationship between age and how much time a student spends on the computer?

    (a) What variable or variables are involved? For each variable, tell whether it is quantitative or categorical.

    Which, if any, would be the obvious choice for explanatory variable?_____

    (b) **Before you even look at the data**, formulate null and alternative hypotheses about the slope β_1 of the population regression line.
    H_0 :
    H_a :
    Do you suspect that there will be enough evidence to reject H_0?_____

    (c) Use **MINITAB Basics Example Q** to check the appearance of the scatterplot. Then carry out a regression procedure to test your hypotheses. What is the p-value?_____
    Do you reject H_0?_____

    (d) **State your results**: since you did or did not reject H_0, do you conclude that the population variables are related? Be sure to express your results specifically in terms of the variable(s) of interest, and mention to what extent the results match your suspicions in (b).