

Name: \_\_\_\_\_

## Lab Problems 9-12

CHS Statistics 0200  
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 homework time the same for 10th, 11th, and 12th grade 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 having ear(s) pierced and whether or not a student has a tattoo?

(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 weight and how much time a student spends exercising? Because gender might be a confounding variable, first use the second part of Example H in the Minitab Basics document to unstack weights and exercise times by gender. If you are female, analyze for the females; if you're male, analyze for the males.

- (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  $\beta_1$  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).