

Name: _____

Lab Problems 5-8 (worth 15 pts.)

Statistics 1000

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5. Students were surveyed as to how many minutes they had exercised the day before. They were also asked whether or not they smoked.
- (a) If one group exercised more, would you expect it to be the
 - (i) smokers or the (ii) non-smokers?
 - (b) Use software to access the student survey data, and report the mean minutes exercised for smokers _____ and for non-smokers _____. Which sample mean is higher? _____
 - (c) Use software to carry out a (one-sided) test of the hypothesis that mean amount of exercise is the same for populations of smoking and non-smoking students. Which of these is relevant? (i) mean of differences (ii) difference between means. Report it. _____ Report the p-value. _____ Should the hypothesis of equality be rejected? _____

6. Is there a difference in mean hours slept for students in various years at college?

(a) Give at least one reason why students in earlier years may get more sleep.

(b) Give at least one reason why students in later years may get more sleep.

(c) Use software to access the student survey data, and report the mean hours of sleep for sampled students in each of the five year levels:

1st _____ 2nd _____ 3rd _____ 4th _____ Other _____

Which sample mean is highest? _____ Which is lowest? _____

(d) Use software to carry out the appropriate test; report the p-value. _____

(e) Two of these express the correct conclusions to draw, given the size of the p-value; which **two** are they?

- i. There is a relationship between students' year at school and how much sleep they get, for populations of students in the various years.
- ii. There is no relationship between students' year at school and how much sleep they get, for populations of students in the various years.
- iii. Mean amount of sleep may be equal for populations of students in the various years.
- iv. Mean amount of sleep is not equal for populations of students in any of the various years.
- v. Mean amount of sleep is not equal for populations of students in at least two of the various years.

7. A large sample of students was surveyed at a particular university; among other things, they were asked to report their weight, and how many minutes of television they had watched the day before.
- (a) Give at least two reasons why we may expect the relationship between weight and TV time to be positive.

 - (b) If weight is taken to be the explanatory variable, what would this be suggesting in particular about weight and TV time?

 - (c) If TV time is taken to be the explanatory variable, what would this be suggesting in particular about weight and TV time?

 - (d) Explain why gender should be taken into account as a possible confounding variable.

 - (e) Use software to separate out the weights and TV times of males from females. Regress weight on TV time for each gender group. For males, test against the **one-sided alternative** $\beta_1 > 0$ and report the value of correlation r _____ and the p-value. _____ For females, test against the **one-sided alternative** $\beta_1 > 0$ and report the value of correlation r _____ and the p-value. _____

 - (f) Do your regression results suggest that in general, students in one or the other or both gender groups who watch more TV tend to weigh more? _____ Explain.

 - (g) Do your regression results suggest that in general, watching more TV *causes* weight gain for males, females, both, or neither? _____ Explain.

8. Is there a statistically significant relationship between gender 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). _____