

Homework Assignment #5

MA 1510 Online

Chapters 11 and 13: 90 points total - Submit your work in an Excel file including your Megastat output (labeling your answers with the question number/part). Be sure to show your work so you can earn partial credit if you were on the right track, but may have ended up with an incorrect final answer.

Chapter 11:

1. PennDOT calculates the number of lane miles (defined as the aggregate of miles times number of lanes) of roadway per county. Using a sample of five counties in the Philadelphia region the mean number of lane miles of roadway is 6,455 with a standard deviation of 1,578. For a sample of ten Central Pennsylvania counties, the mean number of lane miles of roadway is 4,563 with a standard deviation of 2,177. Do the counties of the Philadelphia region have a higher mean number of lane miles than the Central Pennsylvania counties? Use the $\alpha = 0.10$ level of significance.
 - a. Is this a one-tailed or two-tailed test?
 - b. State the null hypothesis and the alternate hypothesis.
 - c. What is the decision rule?
 - d. What is the value of the test statistic?
 - e. What is the p -value?
 - f. What is your decision regarding the null hypothesis?
 - g. Interpret the result by writing the conclusion in terms of the problem in a clear sentence that someone not taking this course would understand.
2. Using information gathered from 8 sessions of MA 1510, a facilitator wonders if there is a difference in preferring Coke over Pepsi based on if students were born in PA. Of 68 students born in Pennsylvania, 33 prefer Coke. Among the 30 students who were not born in PA, 12 prefer Coke. Is there a difference in preferring Coke based on where students were born? Use the $\alpha = 0.05$ level of significance.
 - a. Is this a one-tailed or two-tailed test?
 - b. State the null hypothesis and the alternate hypothesis.
 - c. What is the decision rule?
 - d. What is the value of the test statistic?
 - e. What is the p -value?
 - f. What is your decision regarding the null hypothesis?
 - g. Interpret the result by writing the conclusion in terms of the problem in a clear sentence that someone not taking this course would understand.
3. An instructor asks students taking Introductory Statistics at two different institutions how many credits they've completed before taking the course. Using the data in the **2 sample credits** data set, determine if Etown students have completed more credits prior to taking MA 1510 than students taking a similar course at HACC. Use the $\alpha = 0.05$ level of significance.
 - a. Is this a one-tailed or two-tailed test?
 - b. State the null hypothesis and the alternate hypothesis.
 - c. What is the decision rule?
 - d. What is the value of the test statistic?
 - e. What is the p -value?
 - f. What is your decision regarding the null hypothesis?
 - g. Interpret the result by writing the conclusion in terms of the problem in a clear sentence that someone not taking this course would understand.

4. A consumer found the prices listed in the **online price** data set for 10 items available online from both Amazon and Walmart. At the $\alpha = 0.10$ level, determine if the Amazon prices were higher than Walmart.
- Is this a one-tailed or two-tailed test?
 - State the null hypothesis and the alternate hypothesis.
 - What is the decision rule?
 - What is the value of the test statistic?
 - What is the p -value?
 - What is your decision regarding the null hypothesis?
 - Interpret the result by writing the conclusion in terms of the problem in a clear sentence that someone not taking this course would understand.
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Chapter 13:

5. The provided **pet cost** data set shows the annual cost for Food and Routine Vet Visits for 7 different pets. Use cost for food as the independent variable.
- Create a scatter diagram.
 - Based on the scatter diagram, does there appear to be any relationship between the Food cost and the cost of Routine Vet Visits? Explain.
 - Calculate the correlation coefficient. Write a sentence interpreting this value in relation to the data.
 - Determine the regression equation.
 - Interpret the slope of the equation by writing a sentence explaining this value in terms of the problem.
 - Using the regression equation, how much would you expect to spend on Routine Vet Visits for a pet that has an annual Food cost of \$125? Show your work and the equation used.
 - What is the coefficient of determination for the data? Write a sentence interpreting this value in relation to the data.
6. The **spending** data set contains the amounts a family spent on Groceries and Eating Out for six months. They want to analyze the relationship between how much they spend on Groceries and Eating Out. Use the spending on groceries as the independent variable. (Groceries is the X)
- What do you expect the direction of the relationship between these variables to be? Why?
 - Create a scatter diagram.
 - Based on the scatter diagram, does there appear to be any relationship between the Grocery and Eating Out spending? Explain.
 - Calculate the correlation coefficient. Write a sentence interpreting this value in relation to the data.
 - Determine the regression equation.
 - Interpret the slope of the equation by writing a sentence explaining this value in terms of the problem.
 - Using the regression equation, if this family spends \$500 for Groceries in a particular month, what would you predict their Eating Out spending to be? Show your work and the equation used.
 - What is the coefficient of determination for the data? Write a sentence interpreting this value in relation to the data.