AP Statistics

Linear Regression Test and Confidence Interval

Ch. 12

*Do customers who stay longer at restaurants tend to give bigger tips? A server thought this was the case and wanted to test this claim. Since her FAVORITE class was Statistics she did a random sample of receipts at a restaurant which included the length of time spent at the table and the tip that was left for the server. The data follows.*

|  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| *Time* | 23 | *39* | *44* | *55* | *61* | *65* | *67* | *70* | *74* | *85* | *90* | *99* |
| *Tip $* | *5.00* | *2.75* | *7.75* | *5.00* | *7.00* | *8.88* | *9.01* | *5.00* | *7.29* | *7.50* | *6.00* | *6.50* |

Keep in mind my regression line will be 

1) The Ho is usually there is no linear relationship. That means the slope would be \_\_\_\_\_\_\_\_\_\_

Ho:

Ha:

2) The conditions for inference are:

 **L**

 **I**

 **N**

 **E**

 **R**

3) Pick an appropriate alpha level. \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

4) The critical value comes from the t distribution with n-2 degrees of freedom. So our critical value is \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

5) Our t statistic is  (with  ) s=standard deviation of the residuals;  = standard deviation of the explanatory variable;  = standard error of the slope. (before you panic, you should almost never have to calculate this by hand….just know how to interpret. You will have to be able to read a computer printout….more on this tomorrow)

6) Our t-statistic = \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

7) Based on the t-statistic and critical value do we reject or fail to reject the Ho?

8) What is our p-value? \_\_\_\_\_\_\_\_\_\_\_\_\_ Based on the p-value and the alpha level should we reject or fail to reject the Ho?

**How about a confidence interval for the true slope?**

9) Before we even start should we expect to see the Ho in our interval? (did we reject or fail to reject?)

10) A confidence interval for the true slope of the regression line is  where b is the point estimate for slope. (yes, there is a magic button) Create a 95% confidence interval and interpret. Did we reject Ho or fail to reject Ho?