**Name:Shiva Kumar Peddapuram**

**UnivID: 811235874 (speddapu@kent.edu)  
EXAM 1 – Math 40015/50015  
Fall 2022**

SHOW ALL YOUR WORK and write complete and coherent answers. No partial credit will be given if no work is shown. Please write as clearly and neatly as possible. If I cannot read your answers, I cannot give you any credit. Feel free to ask for more  
paper if you need more space. GOOD LUCK!!!

***Questions-***

Based on the data set “water” in package alr4, you are asked to predict stream runoff volume labelled BSAAM using precipitation measurements labelled by OPSLAKE.  
  
**1. Identify the response variable and predictor variable.**

**Response: -** BSAAM

**Predictor: -** OPSLAKE

**2. Draw the scatterplot of the response versus the predictor variable. Summarize the information in the graph.**

**Code: -** I have initially installed all necessary libraries and then done with plotting and then done summary function.

A picture containing table

Description automatically generated

Chart, scatter chart

Description automatically generated

**Conclusion: -** I have concluded above is the graph and code

3. Obtain the estimated intercept, slope, and variance of the simple linear regression.

**Estimated intercepts: -**

Text

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**Slope: -**

Graphical user interface, text, application, email

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**Variance: -**

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4. Obtain the standard errors of the estimated intercept and slope, respectively.

**Answer**: after plotting the graph I have got that standard errors of the estimated Intercept is 3218.9 and slope is 215.7

5. Add the fitted regression line to the scatterplot.

**Code: -**

Text

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**Plot: -**

Chart, scatter chart

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**Conclusion: -** from the above graph by using abline function we can fit the regression line to the scatterplot.

**6. Test the hypothesis that the slope is 0 versus the alternative that it is positive using the significance level α = 0.01. You need to report the computed test statistic, p-value and summarize your decision and conclusion carefully.**

**7. Construct a 99% confidence interval for the slope. Report your interval with both lower and upper bounds and conclude what you find.**

**conclusion: -** in the below graph I have constructed a 99% confidence interval for the slope and I have also found the lower upper bounds I conclude that the lower and upper bounds are varying.

Table

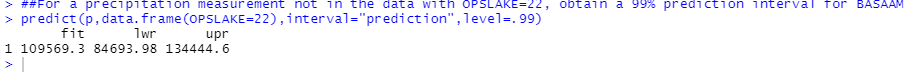
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By using interval=prediction

Table

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**8. For a precipitation measurement not in the data with OPSLAKE=22, obtain a 99% prediction interval for BASAAM.**



Conclusion: - ii have found the precipitation measurement that is not in the data of OPSLAKE=22, and I have also obtained 99% prediction interval for Bassam.