Name:

Stat 217, Fall 2015

Quiz #7 October 30, 2015. 20 points.

Read all directions and show work. Little to no work will receive little to no credit.

You are working with data collected on the Lemon Glacier in Alaska between 1953 and 2005. The mass balance (MB) of a glacier is measure of the change from one year to the next in the glacier, with the units of measurement of the MB in meters of water equivalent (or m we) that is gained or lost over the year. It is of interest as way to assess the difference between precipitation and the melting that occurs in a glacier, with the long term trend providing information about the future of the glacier. A simple liner regression model was fit, and the output is shown below.

> RegModel.1 <- lm(mb~Year, data=LemonG)

> summary(RegModel.1)

Coefficients:

Estimate Std. Error t value Pr(>|t|)

(Intercept) 25.792681 10.826671 2.382 0.0210

Year -0.013270 0.005471 -2.426 0.0189

Residual standard error: 0.6092 on 51 degrees of freedom

Multiple R-squared: 0.1034, Adjusted R-squared: 0.08585

F-statistic: 5.884 on 1 and 51 DF, p-value: 0.01886

1. Construct a 95% confidence interval for the true y-intercept using .
2. Which of the following is the best interpretation of a 95% confidence interval for the effect of year?
3. For each additional year, we are 95% confident that the mean decrease in mass balance is between 0.0242 meters and 0.0023 meters in this sample.
4. For each additional year, we are 95% confident that the true mean decrease in mass balance is between 0.0242 meters and 0.0023 meters.
5. For year 0, we are 95% confident that the mean mass balance for a glacier lies between 0.0242 meters and 0.0023 meters in this sample.
6. For year 0, we are 95% confident that the true mean mass balance for a glacier lies between 0.0242 meters and 0.0023 meters.
7. Conduct a test for a linear relationship between year and mass balance.
8. Which of the following are the null and alternative hypotheses for this test for a linear relationship between year and mass balance?



13. What is the test statistic?
14. 25.793
15. -0.013
16. 2.382
17. -2.426
18. 5.884
19. What distribution does the test statistic follow under ?
20. Normal Distribution
21. T-Distribution with 1 df
22. T-Distribution with 51 df
23. F-Distribution with 1 and 51 df
24. Chi-Squared Distribution with 1 and 51 df
25. What is the p-value?
26. 0.0210
27. 0.0189
28. 0.6092
29. 0.01886
30. Which of the following is the correct conclusion to the test at the 5% significance level?
31. Reject . There is enough evidence to suggest there is a linear relationship between year and mass balance in the population.
32. Reject There is not enough evidence to suggest there is a linear relationship between year and mass balance in the population.
33. Reject There is enough evidence to suggest there is not a linear relationship between year and mass balance in the population.
34. Fail to reject . There is enough evidence to suggest there is a linear relationship between year and mass balance in the population.
35. Fail to reject There is not enough evidence to suggest there is a linear relationship between year and mass balance in the population.
36. Fail to reject There is enough evidence to suggest there is not a linear relationship between year and mass balance in the population.
37. Use the output above to interpret the 95% confidence interval for the slope.
38. For a one meter increase in mass balance, we are 95% confident that the true mean change in year of a glacier lies between 4.139 years and 47.446 years.
39. For a one meter increase in mass balance, we are 95% confident that the true mean change in year of a glacier lies between -0.0242 years and -0.0023 years.
40. For a one year increase in year, we are 95% confident that the true mean change in mass balance of a glacier lies between 4.139 meters and 47.446 meters.
41. For a one year increase in year, we are 95% confident that the true mean change in mass balance of a glacier lies between -0.0242 meters and -0.0023 meters.



Which of the above plots is used to assess the following assumptions:

1. Linearity of the relationship:
2. Equal/Constant variance:
3. Normality of the residuals:
4. No influential points: