**Title page**Title of paper, Name, Class, Date

*Note: Title page is on its own separate page and does not include the heading “Title page.” Instead it includes the Title, name, class, and date, all centered.*

**Abstract**

A brief summary of the research. Normally has a sentence about the purpose, what was done, what was found, what it all means. So 4-6 sentences total. *[Note, the abstract should be on its own separate page.]*

**Introduction**

For this project, it should be a brief one-paragraph (4-5 sentences minimum) explanation of (1) what the purpose of our research and (2) what you hoped to find/learn from doing this project.

**Methods**

**Schools**

What was the exact number of schools? This was all schools, not just the three you picked. How many small, medium, & large schools were selected?

Refer the reader to the Appendix (the Appendix goes at the end of the paper) and have a list of all the schools used for this project (this should be from the Minitab file from the Project 4: Data page).

**Materials**

What materials were used to conduct this study? (Hint, where did we get the data from? What did you need to collect the data?)

What variables did we collect data on? This is where you provide the data dictionary.

**Procedures**

What specifically did you do to collect the data for your three schools?

How was the rest of the data collected?

**Results**

**Correlation -** Compare each of the seven predictor variable to the response variable and determine the best single predictor of your response variable. Make sure to include the following information for each of the seven predictor variables.

1. Write your correlation claim.  Hint: You picked these variables because you thought they were related, so your claim should be the alternative claim.
2. Is it the null or alternative?
3. Use Minitab to calculate the appropriate statistics in Minitab and include this output in your document.
4. What are the important test statistics?
   * Correlation coefficient (r) =
   * P-value
5. Should the calculated regression line be used for estimation? [Yes, No]
6. What type of correlation is this? [Positive, Negative, None]
7. How strong of a correlation is it? [Strong, Medium, Weak]
8. There [IS, IS NOT] enough evidence to [REJECT, SUPPORT] the claim that [insert claim].
9. Can this data be used for a linear regression analysis? [Yes, No]
10. Provide a real world conclusion

**Which predictor variables can be used for a linear regression analysis?** For this section review Part 1 and write down all of the predictor variables that CAN be used for a linear regression. Hint: These are the ones where you answered yes to #9.

**Linear Regression** - Answer the questions below ONLY for the predictor variables you listed in Part 2.

1. Write your claim. Is it the null or alternative?
2. Calculate the appropriate statistics using Minitab and include the Minitab output (including what's needed for F, p, r-sq, and the graphs for the assumptions)
3. Specifically type out the following information: F-value & P-value
4. Check Assumptions:
   * Linearity - [Positive, Negative, None]
   * Equal Error Variance - [Yes, No]
   * Independent Observations - [Yes, No]
   * Normality of Errors - [Yes, No]
5. How good does the model fit our data? R-sq & [Very good, good, fair, poor]
6. There [IS/IS NOT] enough evidence to [Support/Reject] the claim that [insert claim].

**What is the ONE best predictor variable?** After doing the linear regressions in Part 3, look at the data and determine which single predictor variable appears to be the ONE best predictor of your response variable. Explain which single predictor variable appears to be the best and why. Did you expect this or were you surprised by this?

**Multiple Regression:** Start with a model that includes all seven of your predictor variables and then eliminate them one at a time to find the best overall model.

1. Write the claim you are testing and identify if it is the null or alternative.
2. Analyze the data using Minitab and calculate the appropriate statistics (include appropriate output in paper or appendix). Based on your results explain why you are going to remove a variable from your model. Make sure to include the specific results (Minitab output/number) that you are using to make this decision.
3. Using the Stepwise Process repeat the steps above (removing one variable each time) until you have worked down to ONE predictor variable left in the model. Create a table with this information (see below) and also make sure to explain why you removed each predictor variable from the model. **[Remember to include the Minitab output for each model in the paper or the Appendix!]**

|  |  |  |
| --- | --- | --- |
| **Model (Response = ?)** | **Predictor variables & p-value** | **R-sq (adj) or R-sq** |
| Model 1 | seven predictors & p-value | R-sq (adj) = |
| Model 2 | six predictors & p-value | R-sq (adj) = |
| Model 3 | five predictors & p-value | R-sq (adj) = |
| Model 4 | four predictors & p-value | R-sq (adj) = |
| Model 5 | three predictors & p-value | R-sq (adj) = |
| Model 6 | two predictors & p-value | R-sq (adj) = |
| Model 7 | one predictor & p-value | R-sq = |

1. What Model provides the best fit and why is this model the best?
2. Answer the following questions for the Model of Best Fit. Make sure to include the Minitab output!
   * There [IS, IS NOT] enough evidence to [REJECT, SUPPORT] the claim that [Insert claim for Model of Best Fit].
   * A [very good, good, fair, poor] amount,[R-squared adjusted %], of the variability in the [response variable] is explained by the [predictor variables].
   * What relationship does *each* predictor (x) variable have with the response (y) variable when all other predictor variables are held constant?
3. What is the real world meaning of your results?

**Discussion**

Explain the results of the analysis in real-world terms, not just "there is enough evidence to reject the claim that ...", but what practical implications do your results have?

What story did your data tell?

Does this change what you think in regards to what is a good measure for how well a school does? Were you surprised by your results? Why/Why not?

Do you think your results can be generalized to a larger population of schools and if so, what is that population?

Play critical thinker and try to address any potential claims someone might levee against your report based on the method or source used when collecting data.

**References**

Include an APA Style reference for any article or source you used for this paper. There is no requirement to have sources for this project.

*Note: The Reference page has its own heading and is on its own separate page.*

**Appendix**

This is goes at the end of the paper, so it's the very last thing. It's where you add your list of schools, as well as your data dictionary and/or Minitab output if desired.

*Note: The Appendix page has its own heading and is on its own separate page.*