

STEAM Project - Exponential Research

From population growth to Carbon-14 dating, there are many topics from finance, biology, environmental science, etc. that are best modeled as exponential functions. In this project, you are choosing a topic that could be modeled exponentially and analyzing a set of data using an exponential regression. You are then comparing the validity of the exponential regression to a linear regression to decide which model would be better.

In order to analyze the data, you are going to create your own set of questions to answer. This should be one complete word document. Word has formatting options so you shouldn't have to use carets (^) for exponents or strange formats for subscripts. Your name or names and a title should be on the first page and the website for the data should be cited at the end.

This is a math project so all calculations that you would put in a calculator or steps to solve should be shown in your work. This is a data project so your data and how you manipulated the values as inputs or outputs (for instance, changing x-values based on a year) should be clearly included in a table in your document. **Use 3 decimal places for all calculations before rounding to reasonable numbers for your topic.**

Read the ENTIRE RUBRIC. Under each main topic, there is a lot of detailed information about the calculations or discussion that should be included. The project should be organized in the order it is laid out in the rubric. Put topic headers to separate each piece of the analysis covered in the rubric.

The project should be uploaded to google drive for sharing. If the upload messes up the formatting, save your word document as a PDF and upload the PDF instead. The final project should be shared with your teacher's magnet account, Amanda.Morton@wheelermagnet.com or Sarah.DenBesten@wheelermagnet.com, before 8:20 am on Wednesday, March 4th. When sharing with your teacher, you should give editing rights, not view only. If you edit the project after the 8:20am deadline, you will lose points for it being on time. The M&M Task can be completed by hand and turned in at the beginning of class on March 4th.

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Rubric

<p>M&M experiment was completed correctly</p> <p>The packet for the M&M experiment showed data from the completion of the experiment. The experiment was done with AT LEAST 100 M&Ms. All questions in the packet were answered correctly from the data collected.</p>	_____/25
<p>Topic was chosen on the spreadsheet</p> <p>Student chose the topic for their data set on the shared document.</p>	_____/5
<p>Student created a computer generated scatterplot, found the equation for the exponential regression, and graphed the exponential regression through the data plot.</p> <p>Student picked a good set of AT LEAST 10 data points from the data and presented them in a table. Student produced a computer-generated scatterplot with correct scales and labels. Student found the correct equation for the exponential regression and generated a graph of this function through the scatterplot.</p>	_____/20
<p>Student found the correlation coefficient from the regression and discussed its meaning about the strength and direction of the regression.</p>	_____/5
<p>Student interpolated from the exponential regression.</p> <p>Student created a question that analyzed the regression from within the domain of the data. Student evaluated the answer to the question showing all work.</p>	_____/10
<p>Student performed an error analysis on their interpolation. Student described the percent over or underestimation the exponential regression created in comparison to the actual data value showing all work.</p> $Error\ Analysis = \frac{Predicted - Actual}{Actual}$	_____/10
<p>Student extrapolated from the exponential regression.</p> <p>Student created a question that predicted a future or prior value from the exponential regression. Student answered the questions showing all work. Student discussed the validity of this answer in a real-world context.</p>	_____/10
<p>Student calculated the inverse function of the exponential regression.</p> <p>Student found the equation of the inverse for the exponential regression showing all steps for the calculation.</p>	_____/10
<p>Student used inverse to answer an input question.</p> <p>Student created a question about the original range that predicted the input value from the exponential regression. Student used the inverse found in the previous problem to find the answer and showed the work for the answer.</p>	_____/10
<p>Student performed a linear regression for the same data. Student analyzed whether the linear regression would be a better model than the exponential.</p> <p>Student found the equation for the linear regression and its correlation coefficient. Student compared the correlation coefficient of the linear and exponential regressions and discussed which would be a better model for their set of data.</p>	_____/10
<p>Student followed all directions and electronically submitted the assignment on time (DUE WEDNESDAY, MARCH 4TH BY BEGINNING OF CLASS)</p> <p>Student created a word document that contains all project requirements in the order above. Student shared this document with their teacher's magnet account by 8:20AM of the due date and did not edit after the deadline.</p>	_____/10

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