

# UMUC Math-107

## Linear Modeling Project

### Instructions

The **Linear Modeling Project** is **10% of your grade**. Students will be required to find a unique set of linear data, create a scatterplot of the data, apply curve-fitting techniques to find a linear model of the data, assess the fit of this linear model to the data and interpret the results. Student projects must be submitted by the due date in the Assignments Folder. Here are more details about what is expected for your project..

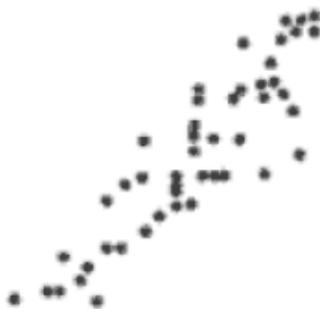
(1) Find a unique set of **Linear Data** .... For this part of the Project you are required to describe your topic, provide a table or list of your data (at least 8 data points), and cite any sources for your data. There are many sets of data that can be used for this project. You can search for something on the internet (Google "Linear Model Data") or develop your own set of data. I only ask that your data be unique and not duplicated by another student. So, once you have an idea of what data you would like to use for your project, then post your ideas in the discussions area for others to see. *DO NOT wait until the last minute to start your Project.*

(2) Create a **Scatterplot** of the data .... This can be done using EXCEL, another graphing program (i.e., [http://www.mathcracker.com/scatter\\_plot.php](http://www.mathcracker.com/scatter_plot.php)), or even by hand on graph paper. This is basically a typical X-Y graph of your (x,y) data points. Choose your X and Y axis and label the axes. It is important that your data has some linear trend. By that, I mean that your data should appear to have an upward or downward trend that could be estimated with a line.

This is NOT a good set of data ...



This is a GOOD set of data ...



(3) Apply curve-fitting techniques to find a **Linear Model** ... At this point we need to find the equation of a line that best fits our data. This is called a "Regression Line" and will be in the form of a typical linear equation:  $Y = mX + b$ , where  $m$ =slope and  $b$ =y-intercept. State your linear model equation and discuss the meaning of its slope in a sentence or two. You can use EXCEL for this step, or one of many online "linear regression" or "simple regression" tools. Here is one example ... [http://people.hofstra.edu/Stefan\\_Waner/newgraph/regressionframes.html](http://people.hofstra.edu/Stefan_Waner/newgraph/regressionframes.html)

(4) Find the **Correlation Coefficient** ... Assess the fit of the linear model to the data by finding the "Correlation Coefficient", or "r". In most of the linear regression tools (EXCEL or online) you will find that they give you the  $r^2$  or r correlation results. Discuss your findings in a few sentences. Is the Correlation Coefficient (r) positive or negative? Is the linear relationship very strong, moderately strong, weak, or nonexistent? Remember that a set of data with a positive slope will have a positive correlation coefficient and a set of data with a negative slope will have a negative correlation coefficient. Check out the internet for examples of "strong" linear relationships and "poor" or "weak" linear relationships. A few examples are shown below. The closer "r" is to 1.0 or -1.0, the better the linear relationship.



Correlation  $r = 0.5$



Correlation  $r = -0.99$

Students should submit their work in WORD, PDF or JPEG (image) format. Each project report should be about 1-2 pages and include the sections (1 to 4) listed above. This is NOT meant to be a hard project, so enjoy your project and learn a little about linear modeling !!! For an example of a report, you can download my sample project in another post.