PCC Math 60 Group Project Instructor: Jeff Pettit

Topics: Your group will choose a topic to research that relates to linear equations. You will find or measure two data points, graph that information on a graph, use the information to make a prediction, and finally create an equation based on the data. You will present your findings to the class with the graph of your data, the graph of your equation and an explanation of what the slope and y-intercept of your equation mean in context of your subject. Although our class focused on linear equations (and I encourage you to find linear data to use) if your group prefers: **you can use data sets that are not linear, or make linear approximations of data that are not linear**. I am willing and available to assist you in fitting equation(s) to data.

Submission #1, Due end of Week 5: Names of people in your group and your topic.
Submission #2, Due end of Week 6: Two data points, and what they represent.
Submission #3, Due end of Week 7: Graph of your data with appropriate scale and units.
Submission #4, Due end of Week 8: Graph of your data with appropriate scale and units and a sketch of the line between them, along with a prediction based on that line, and in interpretation of what that prediction point represents.
Submission #5, Due end of Week 9: The equation of your line from Submission #4 in slope-intercept form, with a description of what the slope and intercept represent (intercept may not have practical purpose, but it's implications should still be addressed.)

Presentation Format: Projects will consist of two parts:

1) Writing component – A brief written report beginning with a brief description of your topic and also including the following: a table of data; an accurate graph of your data; a graph of your equation; a graph of your prediction; your equation symbolically; an explanation of your equation (including slope and y-intercept). Your graph should have a correct scale and your expressions and equations should show proper notation and definition of variables. End the report with a brief interpretation of your findings and include any interesting aspects you discovered. I assume this will be approximately one page, more or less.
2) An oral or visual component (e.g. a PowerPoint presentation to the class or a poster or series of posters) explaining your topic. Your explanation should include discussion of your data, your graph and of your equation, with emphasis on the meaning of the slope and intercept.
3) Optional: Service learning component related to your topic. (e.g. planting trees, removing invasive species in Forest Park, working at the Oregon Food Bank, serving in a local soup kitchen) Depending on the type of service learning done, requirements vary, but approximately 8 hours of service learning is expected. Consult with the instructor if you believe you will have significantly less. A discussion of your service learning experience can take the place of your oral / visual component.

I. Sample project:
Student A, Student B Math 60 February 31, 2014
Gun deaths in the U.S.

Guns are a big topic in the news right now, so our group decided to examine this topic in our project, because I don't think people realize that gun violence has gone down! We found data based on the number of people killed by a gun in the U.S. per 100,000 people.

Below is a graph* from 1960 to 2008 showing the number of assault deaths per 100K people in the U.S. From this graph, I chose the ordered pairs: (2001,7) and (2005, 6).

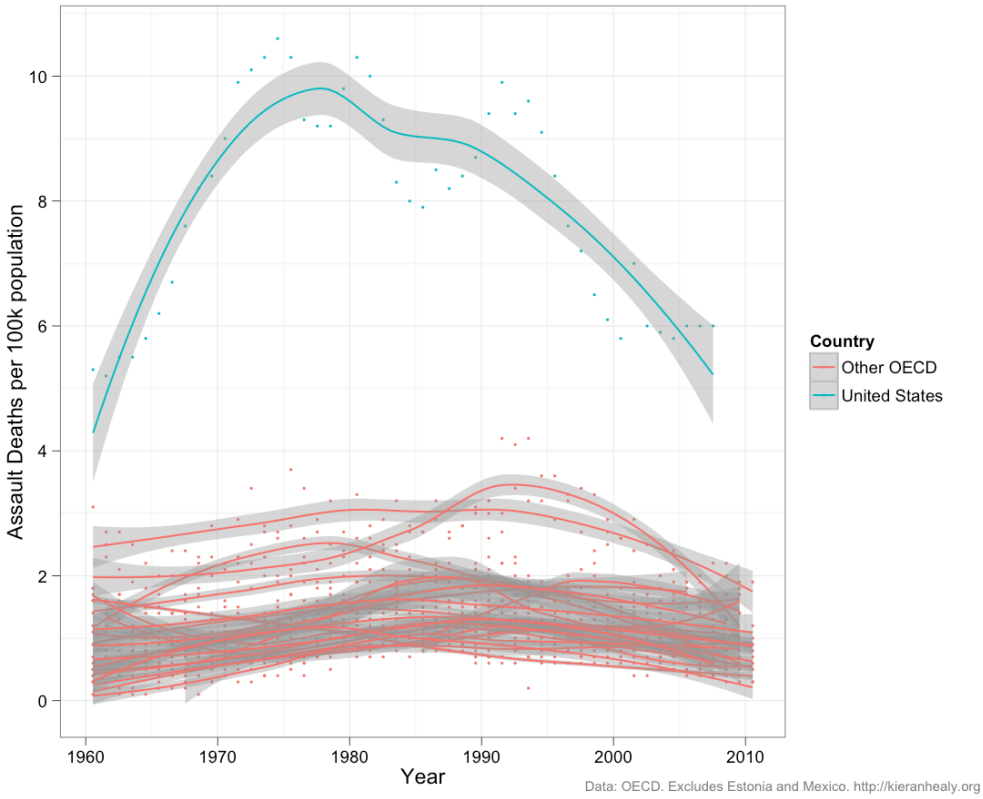

Figure 1

X, Years after 2000	Y, Assault deaths per 100K population
1	7
5	6

Table 1

*http://www.washingtonpost.com/blogs/wonkblog/wp/2012/07/23/six-facts-about-guns-violence-and-gun-control/

As described in Table 1, in the year 2001, out of 100,000 people in the U.S., 7 people were killed. In the year 2005, four years later, there were only 6 people killed out of 100,000. This is a decline of one person per 100K over four years.

The equation for the line between these two points would be $y = -0.25x + 7.25$ where x is the years after 2000 and y is the number of assault deaths per 100,000. Here the slope of -0.25 represents the decline per year (a drop of one fourth of a person per year). The y-intercept of 7.25 represents the value for y, when x is zero (or in the year 2000). This means that based on this model, 7.25 people per 100,000 people would be killed by assault with a gun in the year 2000.

We wanted to predict if the trend would continue, so we used the model to predict the number of deaths by assault weapon in the year 2012. Our model suggests it would be:

$$y = -0.25(12) + 7.25$$
$$= -3 + 7.25$$
$$= 4.25$$

This suggests that there would be only 4.25 people per 100000 people killed in 2012 using our model. We tried to compare that number with the actual number, but we couldn't find that information.

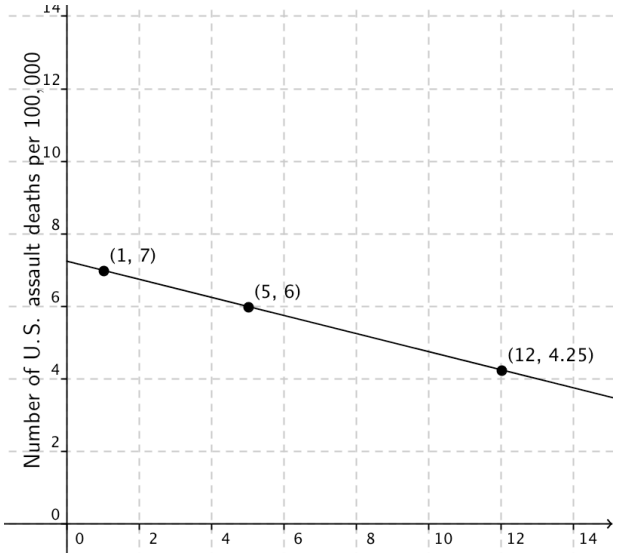

Figure 2

In conclusion, we believe the incidents of deadly assault by gun will continue to go down until we are relatively equal with other countries. Also, in doing this research, we found that Mexico had the highest incident and has been higher than the U.S. for several years.