Using Regression to Find Equations to Fit Data

Video 1 *You will need to repeat everything found in Video 1 each time you start a new analysis!

Open **4C - TI-83.1 - Clearing the RAM** on the GilbertMath YouTube channel.

Watch the video and work along with it.

Write out a list of steps in the space provided on your Unit 3 Cheat Sheet
You will be allowed to bring this cheat sheet in with you to your unit test!

Video 2-5

Repeat the above instructions for videos 2 - 5.

Open **4C - TI-83.2 - Entering Data** on the GilbertMath YouTube channel.

Open **4C - TI-83.3 - Making Scatter Plots** on the GilbertMath YouTube channel.

Open **4C - TI-83.4 - Linear Regression** on the GilbertMath YouTube channel.

Open **4C - TI-83.5 - Quadratic and Exponential Regression** on the GilbertMath YouTube channel.

The Data Set

Year	Number of Crimes
2001	2,622,453
2002	2,667,918
2003	2,819,346
2004	2,863,255
2005	2,756,880
2006	2,697,647

Follow-Up Questions
Linear Regression

The table below shows the value of a share of a stock at the end of each week for 7 weeks.

***Before beginning, be sure to repeat everything that was done in Video 1!**

1. Enter the data given below into your TI-83 graphing calculator.
   (**Video 2**)
2. Create a scatter plot of the data on the TI-83 and draw a sketch of the plot in the space provided.
   (**Video 3**)
3. Run a linear regression on the data. Provide the resulting equation and r^2 value. What percent confidence does the r^2 suggest? Is this model a good fit for the data?
   (**Video 4**)

Week	Share Value ($)
0	1.22
1	1.30
2	1.50
3	1.63
4	1.80
5	1.85
6	2.02
7	2.14

Rough Recreation of TI-83 Scatter Plot

Regression Equation:	r^2 Value: % Confidence:

4. Based on the regression equation, what was the initial share value of the stock? How far off from the actual share value is this?

5. Based on the regression equation, by how much is the share price increasing each week?

6. Use the regression equation to determine the value of a share after 12 weeks.

Follow-Up Questions
Quadratic Regression

The table below shows the revenue of a hot dog stand based on the price of a hot dog.
It is often the case, in business, that profits increase to a point called the *max profit*. After this point, profits will begin to decrease.
In this example, as the hot dogs become more expensive, the stand makes more money. However, how many people do you know that would pay $5 for a hot dog? What about $10? As you can imagine, as the price increases, fewer people will purchase them, resulting in lower revenue.

The key is to find that sweet spot where you can maximize revenue!

***Before beginning, be sure to repeat everything that was done in Video 1!**

1. Enter the data given below into your TI-83 graphing calculator.
   (**Video 2**)
2. Create a scatter plot of the data on the TI-83 and draw a sketch of the plot in the space provided.
   (**Video 3**)
3. Run a quadratic regression on the data. Provide the resulting equation and r^2 value. What percent confidence does the r^2 suggest? Is this model a good fit for the data?
   (**Video 5**)

Price ($)	**Revenue ($)**
2.00	240.00
2.10	245.14
2.20	250.80
2.30	254.32
2.40	260.75
2.50	261.67
2.60	268.89
2.70	270.55

Rough Recreation of TI-83 Scatter Plot

Regression Equation:	r^2 Value: % Confidence:

4. Use your regression equation to determine the revenue of the hot dog stand if you charge $3.00 for a hot dog.

5. Open **4C - TI-83.6 – Finding the Max Value of a Parabola** and work through the video to determine the price that maximizes revenue and what that max revenue is.

Follow-Up Questions
Exponential Regression

Andrew drew cards from a standard deck of 52 playing card until he drew a heart. He repeated the experiment several times. Each time, Andrew recorded the number of cards he drew before drawing a heart. The table given below summarizes his results.

***Before beginning, be sure to repeat everything that was done in Video 1!**

1. Enter the data given below into your TI-83 graphing calculator. (**Video 2**)
2. Create a scatter plot of the data on the TI-83 and draw a sketch of the plot in the space provided. (**Video 3**)
3. Run an exponential regression on the data. Provide the resulting equation and r^2 value. What percent confidence does the r^2 suggest? Is this model a good fit for the data? (**Video 5**)

Number of Cards	**Frequency**
0	50
1	39
2	29
3	21
4	12
5	10
6	8

Rough Recreation of TI-83 Scatter Plot

Regression Equation:	r^2 Value: % Confidence:

4. Use your regression equation to predict the frequency of drawing eight cards before drawing a heart.