Regression using MATLAB

_____
(PRINT YOUR NAME)

1. Use MATLAB as follows:
   At a MATLAB prompt >> type **regressiondemo1**
   Enter your name and the last 4 digits of your TU ID in the box and then Click the Start Button.
   Click the Use the Mouse to Select Data button. In the grid displayed click the mouse in about the center of the boxes containing an X as shown on Figure 1. This will select 6 points. Next press Q on the keyboard and **adjust the sliders so that you get close to the regression line**. When you are within 5% of the Exact error for the regression line a button names See Regression Line will appear click it.

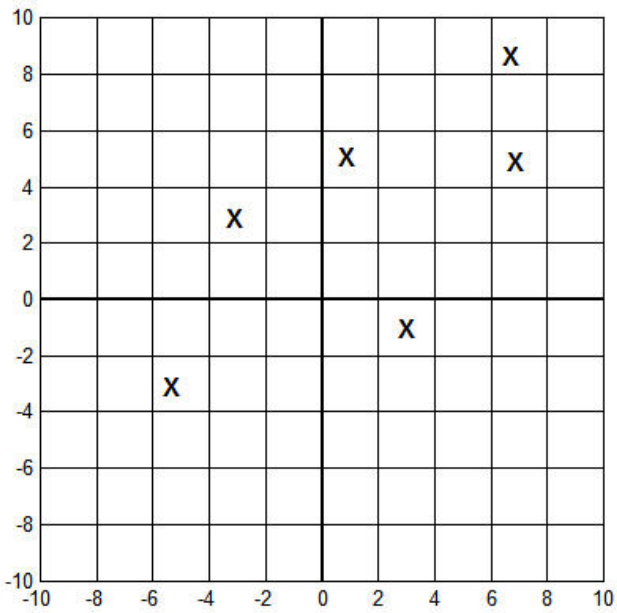

Figure 1.

   Accurately draw the regression line on Figure 1, draw a vertical line from each point to the regression line, and write the equation for your (approximate) regression line and the value of the "Error" near the bottom of Figure 1.

2. <u>BEFORE you use MATLAB as directed below make a guess at where the regression line will be in Figure. Draw it on Figure 2.</u>
   Now use MATLAB as follows:
   At a MATLAB prompt >> type **regressiondemo1**
   Enter your name and the last 4 digits of your TU ID in the box and then Click the Start Button.
   Click the Use the Mouse to Select Data button. In the grid displayed click the mouse at the intersection of the grid lines where the dots appear in Figure 2. This will select 6 points. Next press Q on the keyboard and **adjust the sliders so that you get close to the regression line**. When you are within 5% of the Exact error for the regression line a button names See Regression Line will appear click it.

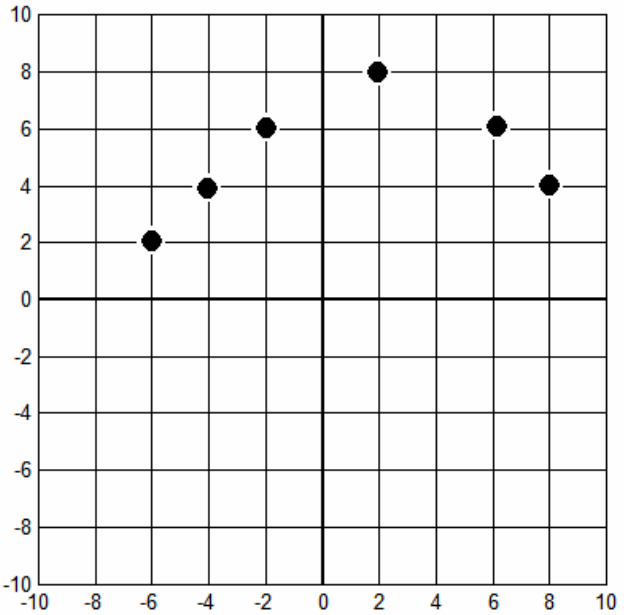

Figure 2.

   Accurately draw the regression line on Figure 2, draw a vertical line from each point to the regression line, and write the equation for your (approximate) regression line and the value of the "Error" near the bottom of Figure 2. **How good was your "guess"?**

3. In Figure 3 is an approximate regression line for the data set $S = \{(-3,5), (2,2), (0,-1), (-1,3)\}$. The equation of the line is y = 2x + 4. Plot the points from S on Figure 3, draw a vertical line from each point to the line, and then compute the sum of the squares of the vertical distances from the points to the line. Record your answer below.

Sum of squares of the vertical distances = _____
(Show your work here.)

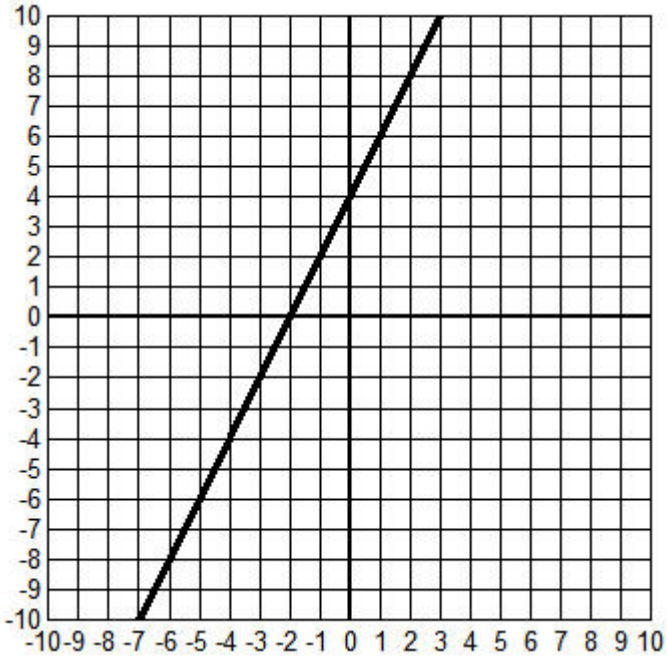

Figure 3.

4. The men's Olympic Shotput event was started in 1896 and held at every Olympics through 2004. When the regression line for the winning distance of the shotput data is constructed we get the equation $y = 0.306x - 537.941$ where x is the year and y is the distance of the winning toss in feet.

   (a) Using the regression line predict the winning distance at the 2008 Olympics. Answer = _____feet

   (b) **Find** the actual winning toss at the 2008 games. Answer = _____feet

   (c) Compute the per cent of error in the 2008 prediction made by the regression line. Answer = _____

5. The absent minded professor brews a cup of coffee whose initial temperature is 90°C. He is then distracted and doesn't drink the brew. It sits on his desk and the temperature of the coffee is given in the following table:

Time in Minutes	0	2	4	6	8	10
Temperature in °C	90	85.5	81	78	74	71.5

   (a) Over which 2 minute interval does the coffee cool the most? Answer = _____

   (b) The regression line for this data is $y = -1.8571x + 89.286$ where x is the time in minutes and y is the temperature in °C. Determine the temperature of the coffee predicted by the regression line after 20 minutes. Answer = _____

   (c) The professor forgets all about the coffee and goes to class returning several hours later. What is the (approximate) temperature of the coffee?

   Answer = _____ (Hint: use a nonnumeric answer.)