

Name \_\_\_\_\_

Date \_\_\_\_\_

MAT 101

## REGRESSION-NOTES

**Regression:** a process used to relate two quantitative variables.

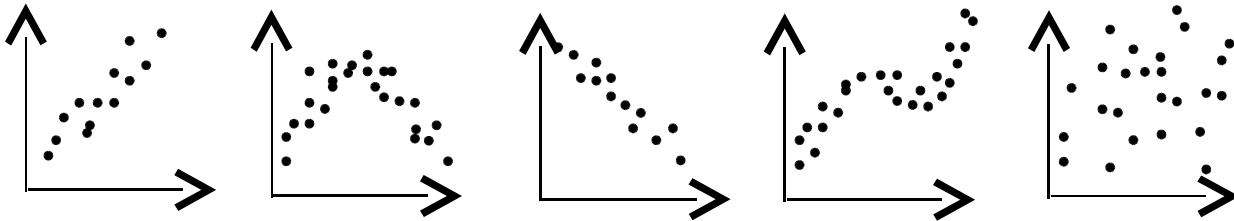
**Independent variable:** the  $x$  variable (*or explanatory variable*)

**Dependent variable:** the  $y$  variable

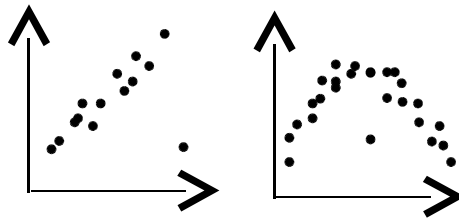
**To interpret the scatterplot, identify the following:**

**Form:** the function that best describes the relationship between the 2 variables.

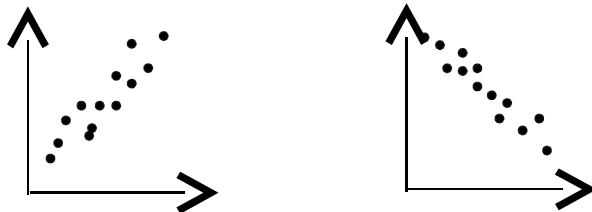
(Some possible forms would be linear, quadratic, cubic, exponential, or logarithmic.)



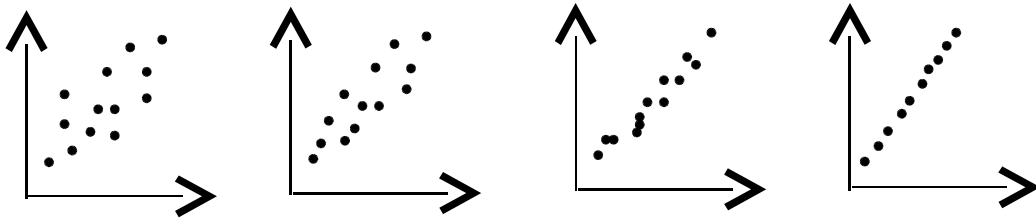
**Outlier(s):** any values that do not follow the general pattern of the data; stray points.



**Direction:** a positive or negative direction can be found when looking at linear regression lines only. The direction is found by looking at the **sign** of the slope.



**Strength:** how closely the points in the data are gathered around the form.



**Entering in the data:**

Hit **[STAT]** then the Edit menu appears. Select **1**: Edit. Then type in the data values for the independent variable in column L1 and the data values for the dependent variable in column L2.

**Making the scatterplot:**

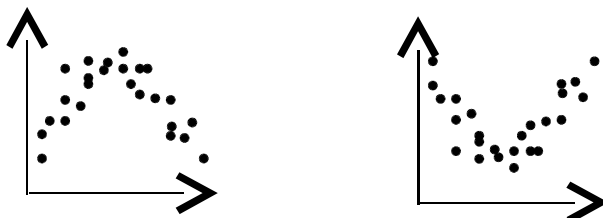
Hit **[Y=]** then highlight **Plot 1** by cursoring up and hitting **[ENTER]**. Hit **[GRAPH]**. Most likely the scatterplot will not be visible using the standard viewing window. To make the scatterplot viewable, appropriate window settings need to be selected. To set the appropriate window settings hit **[WINDOW]** and then entering appropriate values for Xmin, Xmax, Ymin, and Ymax. (OR, a personal favorite, **[ZOOM]** **9**: ZoomStat, which automatically adjusts the window settings according to your values.)

**Choosing the appropriate type of regression:**

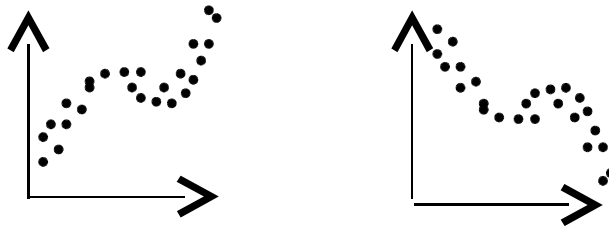
Linear Regression (straight line form)- menu option 4:LinReg(ax+b)



Quadratic Regression (parabolic form)- menu option 5:QuadReg



Cubic Regression (cubic form)- menu option 6:CubicReg



**Getting the regression equation (and storing it to graph on the scatterplot):**

*As long as your independent variable is listed in L1 and your dependent variable is listed in L2, then:*

Hit **[STAT]** then cursor over to **CALC** to display the CALC menu. Select **4: LinReg(ax+b)**

\* then hit **[VARS]** then cursor over to **Y-VARS** then select **1: Function** then select **1: Y1**

then hit **[ENTER]**

*\* If your independent and dependent variables are NOT listed in L1 and L2 respectively, then you must insert (at the star) these steps in the directions above:*

**[2nd]** then L1 (in yellow above 1) then **[,]** then **[2nd]** then L2 (in yellow above 2) then **[,]**

**Note:** The directions above refer to linear regression. If a different type of regression is more appropriate, replace 4:LinReg(ax+b) with the more appropriate regression type.

**Making predictions:**

Predictions should **only** be made for values of  $x$  within the span of the  $x$ -values in the data set. Predictions made outside the data set are called extrapolations, which can be dangerous and ridiculous, thus extrapolating is not recommended.

To make a prediction within the span of the  $x$ -values, hit **[GRAPH]** then **[TRACE]**. Next, arrow up **[▲]** or down **[▼]** until the regression equation appears in the upper-left hand corner then type in the  $x$ -value and hit **[ENTER]**.