EXERCISE #6 - Regression

1. A plant manager wants to study the relationship between daily temperatures and plant output. What are the dependent and independent variables?

2. The general formula for linear regression is $\hat{y} = b_0 + b_1 x$
   Describe each of the variables $\hat{y},\ b_0,\ b_1,\ $ and x

3. What determines that a line is the "best fit" for the given data?

4. An engineer wants to study the relationship of several independent variables against soil acidity in a particular region. Why might you avoid putting both annual rainfall and depth of the water table in the same linear regression formula?

5. A company wants to determine the linear relationship between the selling price of their product in US dollars and the number of units sold in thousands. Perform a linear regression on the following data to determine the linear predictor function

$$\hat{y} = b_0 + b_1 x$$

Price (USD)	Units Sold (thousands)	$(x - \bar{x})$	$(y - \bar{y})$	$(x - \bar{x})(y - \bar{y})$	$(x - \bar{x})^2$
12	54				
14	57				
16	49				
18	48				
20	42				
Sum:			**Sum:**		

$\bar{x} =$ $\bar{y} =$

$$b_1 = \frac{\Sigma(x - \bar{x})(y - \bar{y})}{\Sigma(x - \bar{x})^2} = \underline{\quad\quad} = \underline{\quad\quad} =$$

$$b_0 = \bar{y} - b_1\bar{x} = (\quad\quad) - (\quad\quad)(\quad\quad) =$$

$$\hat{y} =$$