Practice Problems

Problem 11.1:

Considering the following pairs of measurements:

| x	5	3	7	2	7	6	4
y	4	3	0	1	8	5	3

(a) What does the scattergram suggest about the relationship between x and y?

Figure 11.5   Scattergram for Problem 11.1
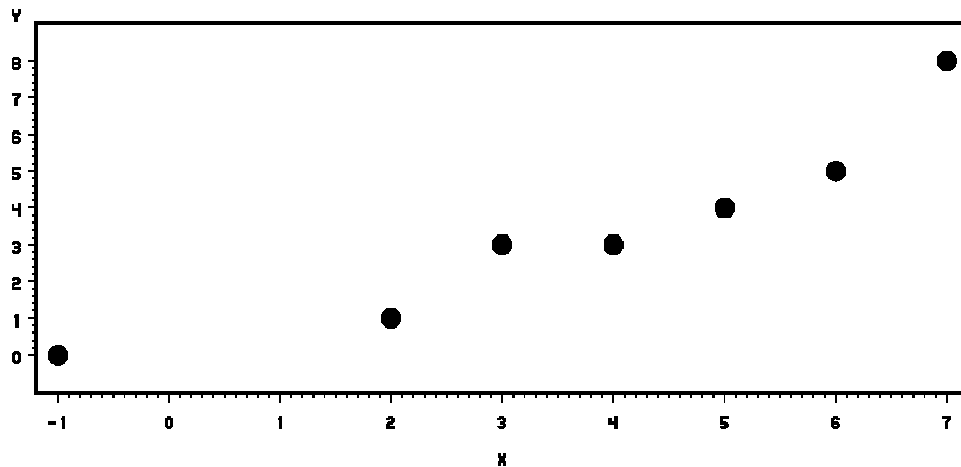
(b) Given that $SS_{xx} = 43.4286$, $SS_{xy} = 39.8571$, $\bar{y} = 3.4286$, and $\bar{x} = 3.7143$,

calculate the least squares estimates $\hat{\beta}_0$ and $\hat{\beta}_1$.

(c) Plot the least squares line on your plot. Does the line appear to fit the data well?

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Figure 11.6   Scattergram with Least Squares Line
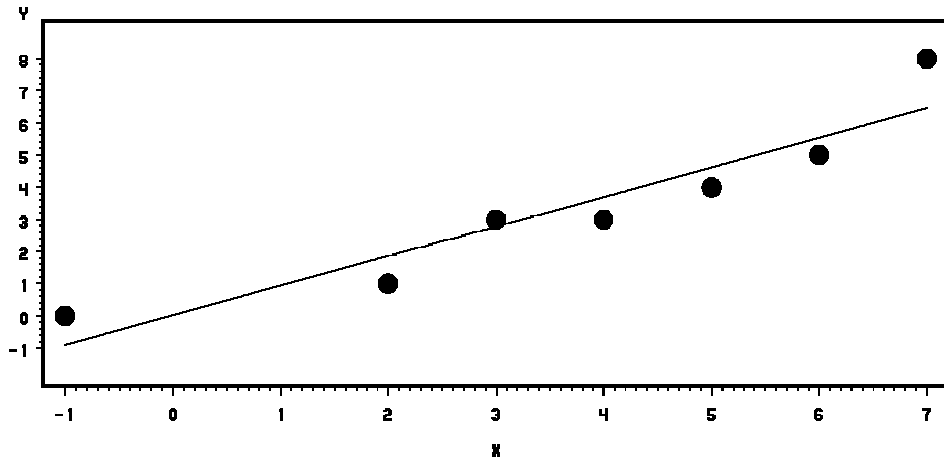
Problem 11.2:

An experiment was conducted to examine the effect of different concentrations of pectin on the firmness of canned sweet potatoes. Three concentrations were used: 0%, 1.5%, and 3% pectin by weight. Six number 303×406 cans were packed with sweet potatoes in a 25% (by weight) sugar solution. Two cans were randomly assigned to each of the pectin concentrations with the appropriate percentage of pectin added to the sugar syrup. The cans were then sealed and placed in a 25°C environment for 30 days. At the end of the storage time, the cans were opened and a firmness determination made for the contents of each can. These data appear below.

Pectin concentration	0%, 0%	1.5%, 1.5%	3.0%, 3.0%
Firmness reading	50.5, 46.8	62.3, 67.7	80.1, 79.2

(a) Let x denote the pectin concentration of a can and y denote the firmness reading following the 30 days of storage at 25°C. Plot the sample data in a scatter diagram.

(b) Obtain least squares estimates for the parameters in the model $y = \beta_0 + \beta_1 x + \varepsilon$, given
$\bar{x} = 15, \bar{y} = 64.43, SS_{xx} = 9, SS_{xy} = 93.$

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