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Project 4

Exercise:

100 Gram sample of various raw foods							Total
Y	Carbohydrates	15.25	16.55	11.10	13.01	14.13	15.11	85.15
X	Kilocalories	59	72	43	55	56	59	344

Scatter Plot:

○ Carb - Cal
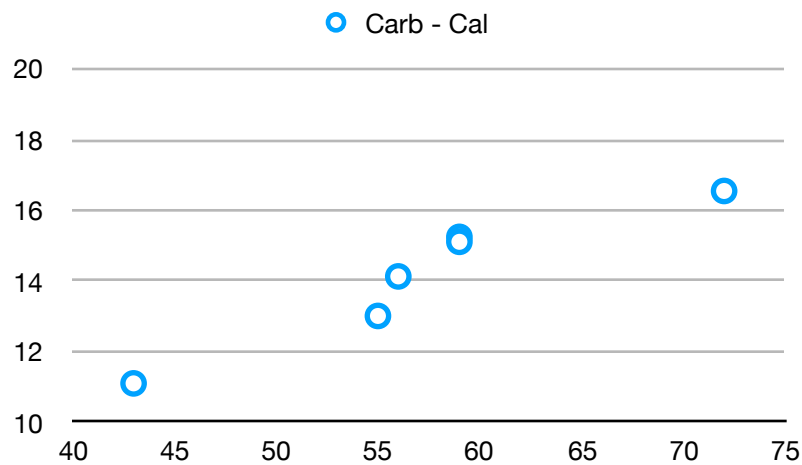
Compute r:

$$r = \frac{n(\sum xy) - (\sum x)(\sum y)}{\sqrt{[n(\sum x^2) - (\sum x)^2][n(\sum y^2) - (\sum y)^2]}}$$

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Y	Carbohydrates	15.25	16.55	11.10	13.01	14.13	15.11	85.15
	Carbohydrates^2	232.5625	273.9025	123.21	169.2601	199.6569	228.3121	1226.904
X	Kilocalories	59	72	43	55	56	59	344
	Kilocalories^2	3481	5184	1849	3025	3136	3481	20156
	Carb x Kilo	899.75	1191.6	477.3	715.55	791.28	891.49	4966.97

$$r = \frac{6(4966) - (344)(85.15)}{\sqrt{[6(20156) - (344)^2][6(1226.904) - (85.15)^2]}}$$

$$r = \frac{504.4}{536.9766} = 0.939333$$

Hypothesis Test:

Given r = 0.939333

$$H_1 = r\sqrt{\frac{n-2}{1-r^2}}$$

$$\Rightarrow 0.93933\sqrt{\frac{6-2}{1-(0.939333)^2}} = 0.939333\sqrt{\frac{4}{1-0.882346}}$$

$$= 5.477066$$

Correlation Type:

- This relationship seems to be a Cause and Effect Correlation. The body burns through calories in order to perform activity, however it cannot do so until it has carbohydrates as a fuel. Since carbohydrates is required for calories to burn, it is henceforth cause and effect. One must exist for the other to exist.

Regression Line:

$$y' = a + bx \qquad a = \frac{(\sum y)(\sum x^2) - (\sum x)(\sum xy)}{n(\sum x^2) - (\sum x)^2}$$

$$b = \frac{n(\sum xy) - (\sum x)(\sum y)}{n(\sum x^2) - (\sum x)^2}$$

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$$a = \frac{(85.15 * 20156) - (344 * 4966.97)}{6(20156) - (344)^2} \Rightarrow a = 2.94066$$

$$b = \frac{6(4966.97) - (344 * 85.15)}{6(20156) - (344)^2} \Rightarrow b = 0.196238$$

$$y' = 2.940 + 0.196x \text{ <} - \text{ this is the approximate Regression Line}$$

Prediction of Future Values:

    1. If x = 70 then

$$y' = 2.940 + 0.196(70) = 16.677$$

    2. if x = 58 then

$$y' = 2.940 + 0.196(58) = 14.322$$

    3. if x = 40 then

$$y' = 2.940 + 0.196(40) = 10.790$$

    4. if x = 100 then

$$y' = 2.940 + 0.196(100) = 22.565$$

    5. if x = 200 then

$$y' = 2.940 + 0.196(200) = 42.188$$