

Finding Pearson's Correlation Coefficient by Hand

Person	Age (x)	Glucose (y)	xy	x ²	y ²
1	43	99	4257	1849	9801
2	21	65	1365	441	4225
3	25	79	1975	625	6241
4	42	75	3150	1764	5625
5	57	87	4959	3249	7569
6	59	81	4779	3481	6561
Totals:	247	486	20485	11409	40022

$n=6$

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

$$\begin{aligned} r &= \frac{6(20485) - 247(486)}{\sqrt{[6(11409) - (247)^2][6(40022) - (486)^2]}} \\ &= \frac{122910 - 120042}{\sqrt{7445(3936)}} \\ &= \frac{2868}{\sqrt{29303520}} \\ &= 0.530 \end{aligned}$$

Be sure to
check in the
calculator!!!

Finding the Linear Regression Equation by Hand

$$y = mx + b, \text{ where}$$

$$b = \frac{(\Sigma y)(\Sigma x^2) - (\Sigma x)(\Sigma xy)}{n(\Sigma x^2) - (\Sigma x)^2} \quad \text{and} \quad m = \frac{n(\Sigma xy) - (\Sigma x)(\Sigma y)}{n(\Sigma x^2) - (\Sigma x)^2}$$

Use the values from the table on the first page...

$$\Sigma x = 247, \quad \Sigma y = 486, \quad \Sigma xy = 20485, \quad \Sigma x^2 = 11409, \quad \Sigma y^2 = 40022$$

$$b = \frac{486(11409) - 247(20485)}{6(11409) - (247)^2} = \frac{484979}{7445} = 65.1$$

$$m = \frac{6(20485) - 247(486)}{6(11409) - (247)^2} = \frac{2868}{7445} = .385$$

$$y = .385x + 65.1$$