

Worksheet – Sections 4.3-4.4

Regression equation: $y = a + bx$, where

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

Correlation coefficient:

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

Coefficient of determination: r^2

1) A person observed the number of trees and the number of bird nests in 3 different gardens.

# trees	1	2	4
# nests	2	1	5

a) Find by hand the equation of the regression line of this data set. Use the number of trees as x -variable and the number of nests as y -variable.

b) Find by hand the correlation coefficient.

c) Find the coefficient of determination in percentage.

2) The table below shows the heights (inches), weights (pounds), waist (inches) for six young adults. Use StatCrunch to do the following problems.

Height	63	66	67	69	71	74
Weight	142	128	171	156	204	188
Waist	30.5	28	34.5	31	38	35.5

a) Find the regression equation that describes the relationship between height and weight. Use height as x -variable and weight as y -variable.

b) Find the correlation coefficient. What does this number indicate about the trend?

c) Find the coefficient of determination in percentage. What is the meaning of this number?

d) Do a), b), c) but now with the relationship between waist and weight. Use waist as x -variable and weight as y -variable.

e) If you use centimeter instead of inch as the unit for height and waist, how does that change the correlation coefficient and coefficient of determination?

f) Make a prediction about the weight and waist of a young adult who is 65 inches tall.