# Bivariate Data – Sample Task 2

The table below shows male life expectancy (male) and female life expectancy (female) for a number of countries in 2013. The scatterplot has been constructed from this data.

Life expectancy (in years) in 2013	
male	female
80	85
60	62
73	80
<mark>70</mark>	71
<mark>70</mark>	78
78	83
77	80
65	69
74	77
70	78
75	81
58	60
80	86
69	73
79	84
72	81
78	85
72	79
77	81
71	80



Title	Linear R
RegEqn	a+b*x
а	9.69093
b	0.807586
r²	0.9017

## Task.1

Name the *response variable* in the equation of this least squares line.

Response variable: Male life expectancy (years)

#### Task.2

Determine the *equation of the least squares line* in terms of the variables *male life expectancy* and *female life expectancy*. Write your answers in the appropriate boxes provided below. Round the numbers representing the intercept and slope to **three significant figures**.



## Task.3

Write the value of the *correlation coefficient* rounded to three decimal places.

r = **0.950** 

#### Task.4

Describe the *association* between the two variables, in terms of *direction, form* and *strength*.

This indicates there is a strong, positive, linear association between the Male Life Expectancy (years) and the Female Life Expectancy (days).

#### Task.5

Write the value of the *coefficient of determination* rounded to three decimal places.



## Task.6

Interpret the *coefficient of determination* in terms of *male life expectancy* and *female life expectancy*.

We can conclude from this that 90.2% of the variation in Male Life expectancy can be explained by the variation in the Female Life Expectancy.

Interpret the *slope* of the least squares line in terms of *male life expectancy and female life expectancy*.

*On average, for every extra year of Female Life Expectancy the Male Life Expectancy increases by 0.808 years.* 

## Task.8

Interpret the *y-intercept* of the least squares line in terms of male life expectancy and female life expectancy.

A Female Life expectancy of 0 years predicts a Male Life Expectancy of 9.69 years

## Task.9

One particular set of data from the table stated that a female life expectancy of 71 years had a male life expectancy of 70 years

Calculate the residual for this set of data, to two decimal places. Show workings out.

**Step.1** Calculate the predicted Male Life Expectancy (years) for a Female Life Expectancy of 71 years. *Male Life Expectancy (years)* =  $9.69 + 0.808 \times Female Life expectancy (years)$  *Male Life Expectancy (years)* =  $9.69 + 0.808 \times 71$ *Life span (years)* = 67.038

**Step.2** Calculate the residual for a Female Life Expectancy of 71 years Residual = (Actual y value) - (Predicted y value) Residual = 70 - 67.038Residual = 2.962

*residual* = **2.962** 

