

Regression Problems

Problem 1.

Weight (in grams) and heart rate (in beats per minute) for six species of tarantula spiders are tabulated to the right. The correlation coefficient is $r = -0.872$.

- (a) Find the regression equation to predict heart rate from weight.
- (b) Fill in the blank and include units in your answer. For every gram increase in weight for a species of tarantula, the heart rate changes by _____.
- (c) Predict the heart rate of a 20 gram tarantula using the regression equation.
- (d) Comment on the validity of the prediction.

Weight (g)	Heart Rate (beats/min)
10.75	11
11.10	13
8.01	14
13.80	10
12.60	11
11.40	12
$\bar{x} = 11.277$	$\bar{y} = 11.83$
$s_x = 1.955$	$s_y = 1.47$

Problem 2.

Year	1940	1950	1960	1970	1980
Farm population	30.5	23.0	15.6	9.7	7.2

The population of people living on American farms (tabulated in millions) has changed through the years.

- (a) Plot the data. Does it appear that there is a linear relationship between year and farm population?
- (b) Find the least squares regression line (the values of a and b) to fit the relationship

$$(\text{farm population}) = a + b(\text{year})$$

You may use the fact that the correlation coefficient is $r = -0.986$.

- (c) Fill in the blank (and include units in your answer).
In the period from 1940 to 1980, American farm population decreased at a rate of _____.
- (d) Predict the American farm population in the year 2000. Discuss the validity of the prediction.