

Name: _____

MATH 108

Fall 2021

HW 9: Due 11/04

*"I did not attend his funeral, but I sent a
nice letter saying I approved of it."*

—Mark Twain

Problem 1. (10pt) Find the least square regression line for the points: $(1, 1), (1, 0), (2, 3), (3, 4)$.
Show all your work.

Problem 2. (10pt) Given the following information below, find the least square regression line. Show all your work.

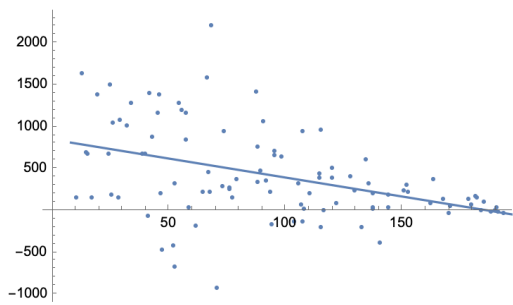
$$n = 11$$

$$\bar{x} = 3.45, \quad \sigma_x^2 = 7.073$$

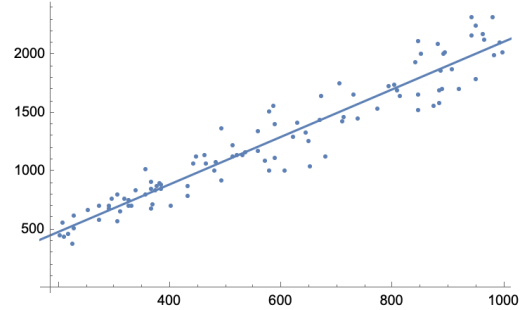
$$\bar{y} = 6.81, \quad \sigma_y^2 = 5.371$$

$$R = 0.802$$

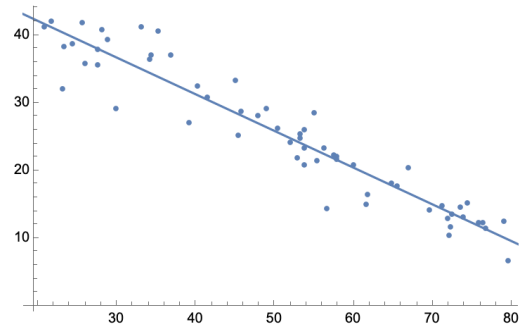
Problem 3. (10pt) Match each regression coefficient to its corresponding graph.



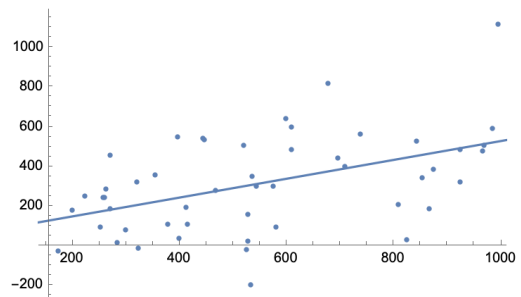
(a)



(b)



(c)



(d)

- (i) _____: $R = -0.9529$
- (ii) _____: $R = -0.4354$
- (iii) _____: $R = 0.4759$
- (iv) _____: $R = 0.9573$

Problem 4. (10pt) The lengths (in cm) of twenty snakes are taken 6 months after hatching and 2 years after hatching. The data is given below.

(41.2, 163.6), (18.1, 68.9), (42.3, 151.6), (13.2, 43.9), (45.8, 189.5),
(42.7, 180.5), (24.4, 92.8), (49.0, 166.), (24.6, 101.1), (18.9, 77.5),
(16.3, 63.6), (36.3, 142.2), (32.2, 124.3), (36.3, 121.), (24.7, 77.8),
(40.1, 139.7), (22.3, 72.8), (42.4, 182.2), (21.4, 73.), (12.3, 53.1)

A linear regression for this data was found to be $\hat{y} = 3.9x - 3.1$ with $R = 0.9381$.

- (a) Was the linear regression a good fit for the data? Explain.
- (b) Find the residual for the data point (41.2, 163.6). Was the model under or over prediction for the length of the snake? Explain.
- (c) Given this data and model, predict the length of a snake after 2 years that measures 32.7 cm 6 months after hatching.
- (d) Should this model be used to predict the length of a snake which is 65 cm six months after hatching? Explain.