Name:
MATH 108
Fall 2022
HW 7: Due 10/13

"The only function of economic forecasting is to make astrology look respectable."

−John Galbraith

Problem 1. (10pt) As accurately as possible and showing all your work, find the least square regression line, along with the r and r^2 value, for the dataset $\{(1,0),(0,1),(1,1),(2,6)\}$. Show all your work.
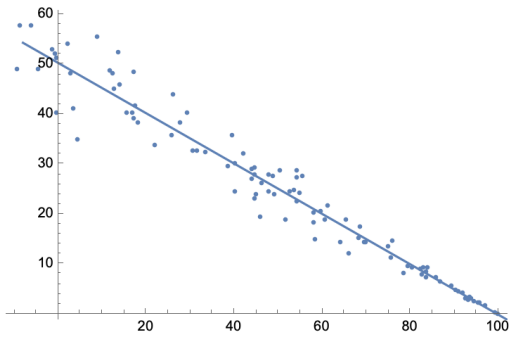
Problem 2. (10pt) Given the following information below, find the least square regression line. Show all your work.
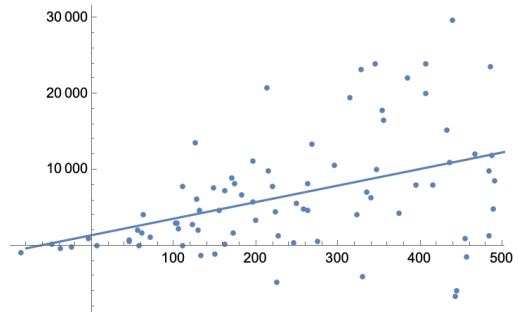
$$n = 10 \qquad R = -0.0023$$
$$\overline{x} = 0.97 \qquad s_x^2 = 30.32$$
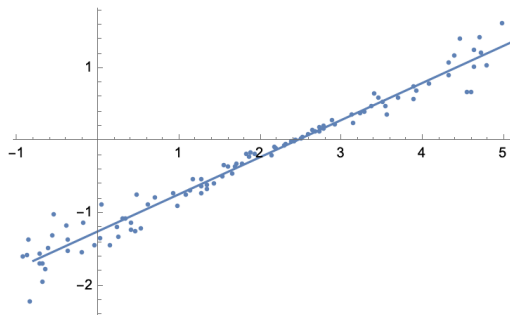$$\overline{y} = -1.33 \qquad s_y^2 = 36.54$$

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

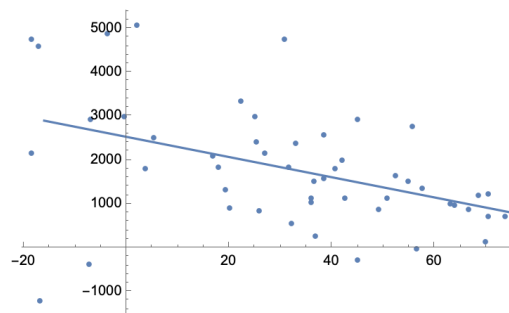(a)

(b)

(c)

(d)

(i) _____: $R = -0.9725$

(ii) _____: $R = -0.4639$

(iii) _____: $R = 0.4337$

(iv) _____: $R = 0.9826$

Problem 4. (10pt) A researcher is predicting penguin weights given their final adult height. They create a linear regression model for the weight of the penguin (in lbs), W, given its heigh in cm, h. Their model is $W(h) = 0.8h - 56.2$.

(a) What are b_0 and b_1 for this linear regression?

(b) How much does a penguin's weight increase per centimeter taller that it is, according to this model?

(c) Does the y-intercept for this model hold any meaning? Explain.

(d) Predict a penguin's weight if its height is 125 cm. Suppose one of the penguins in their dataset has a height of 125 cm and weight of 48.6 lbs. Find the residual for this datapoint.

(e) The researcher finds an R^2 value of 0.4329. Is this linear model a good predictor of a penguin's weight given its height? Explain.