Name: _____

MATH 108
Fall 2022
HW 7: Due 10/13

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

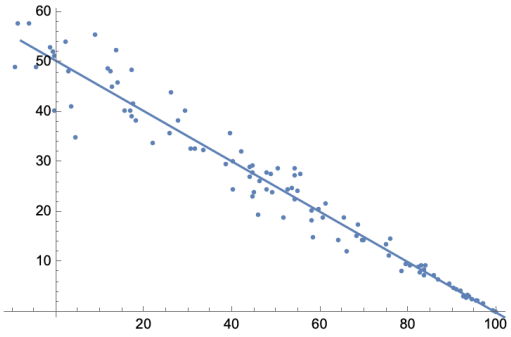
–John Galbraith

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.

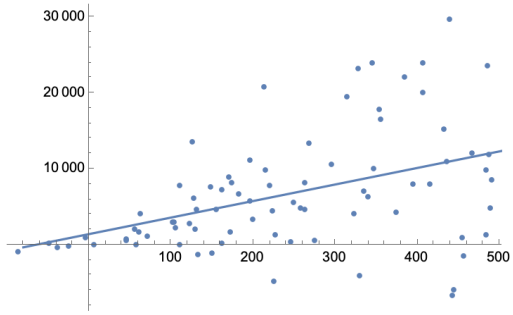
Problem 2. (10pt) Given the following information below, find the least square regression line. Show all your work.

$$\begin{array}{ll} n = 10 & R = -0.0023 \\ \overline{x} = 0.97 & s_x^2 = 30.32 \\ \overline{y} = -1.33 & s_y^2 = 36.54 \end{array}$$

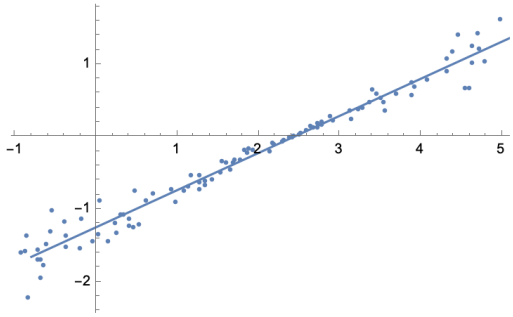
Problem 3. (10pt) Match each regression coefficient to its corresponding graph.



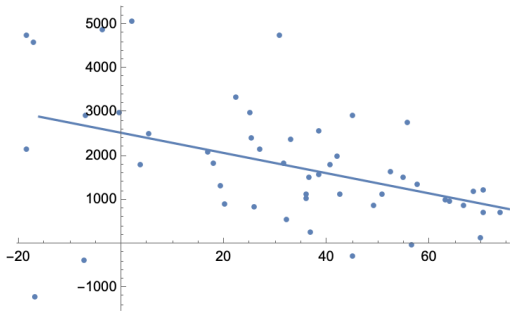
(a)



(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. The 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 penguins 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 penguins 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 penguins weight given its height? Explain.