MAS 250 Homework Assignment 7

Due: November 30 (Wednesday) 1 pm

Instruction: Turn in homework as **a single pdf file**.

1. The data are the catches of Peruvian anchovies (x, in millions of metric tons) and the prices of fish meal (y, in current dollars per ton) for 14 consecutive years.

Price of fish meal (y)	190	160	134	129	172	197	167
Anchovy (x)	7.23	8.53	9.82	10.26	8.96	12.27	10.28
Price of fish meal (y)	239	542	372	245	376	454	410
Anchovy (x)	4.45	1.78	4.0	3.3	4.3	0.8	0.5

   Answer the following questions by **both hand and R**.

   (a) (R only) Draw a scatter plot and interpret it.

   (b) Calculate the sample correlation coefficient and interpret the result. Conduct a test for the population correlation coefficient ρ, i.e. $H_0 : \rho = 0$ and $H_1 : \rho \neq 0$ at $\alpha = 0.05$.

   (c) Find the least squares line.

   (d) Estimate the standard deviation of the error term, $\hat{\sigma}$.

   (e) Is there sufficient evidence that y is linearly related to x? Answer this question using the t test on the slope of the regression line at $\alpha = .05$ What is the relationship with the test in (a)?

   (f) Calculate the coefficient of determination, and interpret the number. Relate the result with the correlation coefficient in (a).

   (g) Predict price when the catches of anchovy is 5 and find a 95% confidence interval for the expected response $E(Y)$.

   (h) (R only) Draw a scatter plot with the fitted line and 95% confidence interval.

   (i) Find a 95% prediction interval for a new individual Y_{n+1} with $x = 5$.

   (j) Create the standardized residual plot and Q-Q plot using R, and check the assumptions of the regression model by interpreting the plots.

2. From the exercise problems in Chapter 9:

   29

3. (Suggested: no submission)

   4, 8, 9, 10, 12, 17, 25, 26, 31