EE 325 Practice

1. In Table 1.a. X_i is total microeconomics exam point (total points are 100) and Y_i is GPA of each student.

Table 1.a

Student	Y_i	X_i
1	2.8	63
2	3.4	72
3	3	78
4	3.5	81
5	3.6	87
6	3.0	75
7	2.7	75
8	3.7	90

1.1 Now consider the two-variable model $Y_i = \beta_1 + \beta_2 X_i + u_i,\ u_i \sim NIID(0, \sigma^2)$ Use OLS to find the estimator of $\beta_1 and \beta_2$. Interpret the regression.

1.2 Find $\hat{Y}_i\ and\ \hat{u}_i$ and show that $\sum_{i=1}^{n} \hat{u}_i \approx 0$

1.3 Find $\text{var}(\hat{u}_i), \text{var}(\hat{\beta}_1), and\ \ \text{var}(\hat{\beta}_2)$

1.4 Test the hypothesis that total microeconomics exam point has no influence on GPA at $\alpha = 5\%$

1.5 What percentage of the total variation in Y explained by the regression model?

1.6 Establish a 95 percent confidence interval for $E(Y \mid X = 77.6)$

1.7 Establish a 95 percent confidence interval for $E(Y \mid X = 100)$. Compare the answer with 1.6 whether the confidence interval is wider or narrower?

2. Given Y is wages per hour (\$), X is year of schooling (years) from a sample of 528 observations

$$\hat{Y}_t = 0.7437 + 0.6416X_t$$
$$se = (0.8355)(0.0664)$$
$$r^2 = 0.8944, \hat{\sigma}^2 = 0.8040$$

2.1 Test the hypothesis that year of schooling has a positive influence on wages per hour at $\alpha = 5\%$

2.2 Interpret the regression

2.3 If Miss Lily has 8 years of schooling, what is the predicted average on wages per hour (\$)?

3. Consider the two-variable model $Y_i = \beta_1 + \beta_2 X_i + u_i$ Y is Supply for good (unit: hundred pieces), X is price of good (unit: thousand baht) from a sample of 5 observation

$$\hat{Y}_i = 475.9444 - 0.4579X_i$$
$$se = (\_\_\_\_\_) \quad (0.0828)$$
$$t = (8.7606) \quad (\_\_\_\_\_)$$
$$\hat{\sigma}^2 = 2364.7694$$
$$\text{TSS} = 43245.2$$
$$\text{RSS} = 7094.3080$$

3.1 Fill in the blank and Test the hypothesis at $\alpha = 5\%$
3.2 Interpret the regression
3.3 Establish a 95 percent confidence interval for β_2 and Test the hypothesis that $\beta_2 = -0.6$ or not.
3.4 What percentage of the total variation in Y explained by the regression model?
3.5 If the unit Supply for good changes from hundred pieces to piece. What is the estimator for β_1 *and* β_2 ? Interpret the regression
3.6 If the unit price of good changes from thousand baht to baht. What is the estimator for β_1 *and* β_2 ? Interpret the regression
3.7 If the unit Supply for good changes from hundred pieces to piece and the unit price of good changes from thousand baht to baht. What is the estimator for β_1 *and* β_2 ? Interpret the regression