MA 542 SPRING - 2018
REGRESSION ANALYSIS

Quiz-1 Name: Key

Last year, five randomly selected students took a math aptitude test before they began their statistics course. The following table show the data (X-scores on the aptitude test and Y-statistics grades) and the fitted values of the simple linear regression model. The fitted model is $Y = 26.768 + 0.644X$.

i	1	2	3	4	5
X_i	95	85	80	70	60
Y_i	85	95	70	65	70
$\hat{Y}_i$	81.5	88	72	68.5	72

a) Calculate the least square estimate of the error standard deviation.

$$\hat{\sigma}^2 = \frac{\Sigma (Y_i - \hat{Y}_i)^2}{n-2}$$

$$= \frac{(85-81.5)^2 + (95-88)^2 + (70-72)^2 + (65-68.5)^2 + (70-72)^2}{5-2}$$

$$= \frac{81.5}{3} = 27.1667$$

∴ Estimate of the error standard deviation $= \hat{\sigma} = \sqrt{27.1667}$

$= 5.212$

b) Interpret the parameters (β_0 and β_2) in the simple linear regression model for this example.

β_0 : Mean Statistics Score when aptitude Score is zero.

β_1 : Change in the mean statistics score (the rate) when aptitude Score is increased by one.