Stat763 HW02

1. A sample for a simple linear regression produced

 $n = 8, \overline{x} = 1.375, \overline{y} = 3.125, Sxx = 19.875, Syy = 18.875, Sxy = 10.625.$

For each required computation below, keep 3 digits after decimal point for final results.

(1) Complete ANOVA table

Source	SS	DF	MS	\mathbf{F}	р
Model	5.680	1	5.680	2.583	0.159
Error	13.195	6	2.199		
C. Total	18.875	7			

- (2) Is the model useful? Support your conclusion by a test for the significance of regression.
 - $\begin{array}{l} H_0: \ \beta_1 = 0 \ \text{versus} \ H_a: \ \beta_1 \neq 0 \\ \text{Test statistic:} \ F = \frac{MSM}{MSE} \\ \text{p-value:} \ P(F(1, n-2) > F_{ob}) \\ F_{ob} = 2.583 \\ \text{p-value:} \ P(F(1, 6) > 2.583) = 0.159 \\ \text{Fail to reject} \ H_0 \\ \text{Data do not support the usefulness of the model} \end{array}$
- 2. A researcher has an incomplete ANOVA table for a simple linear regression.

For required computations keep 3 digits after decimal point for final results.

(1) Complete the ANOVA table

Source	\mathbf{SS}	DF	MS	\mathbf{F}
Model	57.857	1	57.857	10.347
Error	39.143	7	5.592	
U. Total	97	8		

(2) Is the researcher's model useful with the data? Support your conclusion by a test at the level 0.05 using rejection region.

 $\begin{array}{l} H_0: \ \beta = 0 \ \text{versus} \ H_a: \ \beta \neq 0 \\ \text{Test Statistic:} \ F = \frac{MSM}{MSE} \\ \text{Reject} \ H_0 \ \text{if} \ F > 5.592 \ \text{for} \ \alpha = 0.05 \\ F_{ob} = 10.347 \\ \text{Reject} \ H_0. \ \text{The model} \ y = \beta x + \epsilon \ \text{is useful} \end{array}$