

Extra Credit | Due Date: 12/5 by 10 PM

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Problem 1 (5 points): Take the given information $df_{Error} = 21$, $df_{Total} = 24$, $SSR = 345$, and $SSE = 903$ to construct an ANOVA table and show all steps for overall fit of regression ($p\text{-value} = 0.1536$).

Source of Variation	Df	Sum of Squares (SS)	Mean Squares (MS)	F-Statistic	P-Value
Regression	3	345	115	2.6744	0.1536
Error	21	903	43	N/A	N/A
Total	24	1248	52	N/A	N/A

From the given values in the question prompt, we can construct the table above.

Testing the overall fit of regression

Step 1: Setting up the H_0 and H_A

$H_0: \beta_1 = 0, \beta_2 = 0, \dots, \beta_p = 0 \mid H_A: \beta_j \neq 0$ for at least one value of j

Step 2: Set level of significance $\rightarrow \alpha = 0.05$

Step 3: F-Test Statistic $\rightarrow F_{3,21} = 2.6744$

Step 4: P-Value $\rightarrow 0.1536$

Step 5: Conclusion

P-Value > Level of significance. We can conclude that, at 5% level of significance we do not have enough evidence to reject the null hypothesis (H_0). This means that none of the predictors in the model is statistically significant and we **do not** have enough evidence to conclude that at least one of the predictors are statistically significant.

Problem 2 (5 points): The following regression model is based on a data that consists of 20 weeks of a firm's accounting and production records on cost information about the firm's shipping department:

$$Lab = \beta_0 + \beta_1 Tws + \beta_2 Pst + \beta_3 Asw + \beta_4 Num + \epsilon, \quad (1)$$

where Lab = weekly labor hours, Tws = total weight shipped in thousands of pounds, Pst = proportion shipped by truck, Asw = average shipment weight in pounds, and Num = week number.

Model	Sample Size	Multiple R-squared	Adjusted Multiple R-squared	Std. Error
1	20	0.8196	0.7715	9.103

Complete the ANOVA table.

ANOVA TABLE

Model	df	SS	MS	F-stat	Pr(>F)
Regression	4	5,646.05	1411.513	17.035	.000
Residual	15	1,242.898	82.8599	N/A	N/A
Total	19	6,888.95	362.5763	N/A	N/A

