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-value=0.1536).

Model	Df	SS	MS	F-stat	Pr(>F)
Regression	3	345	115	2.67	0.1536
Residual	21	903	43		
Total	24	1248	52		

Overall Fit of Regression: Hypothesis test to see if at least one of the predictors in the model are explaining variability in response.

Step1: Set null and alternate hypotheses

$$H_0: \beta_1 = 0, \beta_2 = 0, \beta_3 = 0$$
$$H_a: \beta_j \neq 0 \text{ for at least one value of j=1,2,3}$$

Step2: $\alpha = 0.05$

Step3: Compute Test Statistic F=2.67 ~ $F_{3,21}$

Step4: P-value = 0.1536

Step5: Since P-value > 0.05, do not reject H_0 to conclude that none of these predictors explain any significant amount of variability in Y.

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:

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

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

Model	Df	SS	MS	F-stat	Pr(>F)
Regression	4	5646.052	1411.513	17.03494	.000
Residual	15	1242.898	82.85987		
Total	19	6888.95	362.5763		