13 - Assignment

Use SAS.

Problem 1

Our cholesterol-conscious world is demanding leaner lambmeat. In order to study the relationship between fatness and size in ram lambs, a sample of twelve ram lambs were slaughtered and a standard fatness measurement recorded along with the carcass weight for each lamb. These data are given in the table.

carcass weight (x)	**Fatness (y)**
14.4	7
14.8	8
15.2	7
16.1	9
16.7	12
17.2	14
17.5	16
17.8	15
18.6	16
18.8	20
19.6	15
19.7	17

In CSV format:

```
Carcase weight (x),Fatness (y)
14.4,7
14.8,8
15.2,7
16.1,9
16.7,12
17.2,14
17.5,16
17.8,15
18.6,16
18.8,20
19.6,15
19.7,17
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(a) Fit the regression equation in the form $y = ax + b$.

(b) Write out the vectors y, the predicted values vector $\hat{y}$, and the error or residual vector for the data.

(c) Write out what SSM (sum of squares model aka sum of squares regression), SSE (sum of squares error), and SST (sum of squares total) are for this problem. Write out the expression for SSM by writing out $\|\hat{y} - \bar{y}\|^2$ for this dataset.

(d) Manually compute F-statistic, R squared, and adjusted R squared from SSM, SSE, SST from the ANOVA table.

(e) Check the assumptions of normality and constancy of variance by doing a histogram of the errors and plotting the errors against the fitted values.

(f) Test the claim: "There is no (linear) effect of carcass weight on fatness" by calculating the appropriate test statistic. What is your conclusion?