Practice Problems

Problem 12.3:

A sample of twenty observations yielded the following least squares model:

$$\hat{y} = 3 + 2x_1 + 3x_2 - 1.25x_3$$

where $R^2 = 0.85$ and $s_{\hat{\beta}_3} = 0.55.$

(a) Is there evidence to indicate that the overall model is useful? Test at $\alpha = 0.05$.

(b) Is there evidence to indicate that the variable x_3 is important in this model? Test at $\alpha = 0.05$.

Problem 12.4: (Continuation of Problem 12.1)

SAS Printout for Problem 12.4

Model: MODEL1
Dependent Variable: Y Weight Loss (Y)
Analysis of Variance

Source	DF	Sum of Squares	Mean Square	F Value	Prob>F
Model	2	31.12417	15.56208	104.133	0.0001
Error	9	1.34500	0.14944		
C Total	11	32.46917			

Root MSE	0.38658	R-square	0.9586
Dep Mean	5.50833	Adj R-sq	0.9494
C.V.	7.01810		

Parameter Estimates

Variable	DF	Parameter Estimate	Standard Error	T for H0: Parameter=0	Prob > |T|
INTERCEP	1	0.666667	0.69423219	0.960	0.3620
X1	1	1.316667	0.09981464	13.191	0.0001
X2	1	-8.000000	1.36676829	-5.853	0.0002

Variable	DF	Variable Label
INTERCEP	1	Intercept
X1	1	Exposure Time (X1)
X2	1	Relative Humidity (X2)

(a) Interpret the value of R^2.

(b) Is the model of any use in predicting y? Test the null hypothesis that $E(y) = \beta_0$, that is, test H_0: $\beta_1 = \beta_2 = 0$ against the alternative hypothesis H_a: At least one $\beta_i \neq 0$, $i = 1, 2$. ($\alpha = 0.05$)