Multiple Linear Regression Exercise

1) The following data were taken from the personnel records of 12 clerks (all male) working at an insurance company. Each record contains information on the number of days absent during the year, the duration of employment with the company, and a measure of attitude towards the company (part of a clinical interview with the company's psychologist). The attitude scale ranges from 1 (extremely favorable) to 13 (extremely unfavorable).

Clerk	Days Absent	Attitude	Experience
1	1	1	1
2	0	2	1
3	1	2	2
4	4	3	2
5	3	5	4
6	2	5	6
7	5	6	5
8	6	7	4
9	9	10	8
10	13	11	7
11	15	11	9
12	16	12	10
Mean	**6.25**	**6.25**	**4.92**
Std. Dev.	**5.68**	**3.93**	**3.12**

	Correlations		
	Days Absent	Attitude	Experience
Days Absent	1	.950	.890
Attitude	.950	1	.951
Experience	.890	.951	1

2) Suppose you believe new employees have fewer absences than more experienced employees. Write the coefficients for the least-squares regression line in the space below. Interpret the coefficients and calculate the coefficient of determination.

Absences = _____ + _____ (experience) R^2 = _____

3) You want to determine if experience is a significant predictor of absences. First, write out the full and reduced models you wish to compare. Then, run the omnibus F-test and write out your conclusion. Finally, complete an ANOVA summary table.

Reduced Model: _____

Full Model: _____

Omnibus F-Test: _____

ANOVA					
Source	Sum of Squares	df	Mean Squares	F	Sig.
Regression					
Error					
Total					

Clerk	Days Absent	Attitude	Experience
1	1	1	1
2	0	2	1
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$$R^2_{YX_1X_2} = 0.9037$$

4) We're interested in determining if an employee's attitude impacts their attendance at work. Specifically, we'd like to see if the combination of attitude and experience is a significant predictor of absences (compared to no predictors). A computer calculates the following regression equation:

$$\text{Absences} = -2.263 + 1.550(\text{attitude}) - 0.239(\text{experience})$$

Does the combination of 2 predictor variables in this model significantly predict absences? Write out the full and reduced models, run the omnibus F-test, and complete the ANOVA summary table.

Reduced Model: _____

Full Model: _____

Omnibus F-Test: _____

ANOVA					
Source	Sum of Squares	df	Mean Squares	F	Sig.
Regression					
Error					
Total					

5) Using your results from the previous two pages, determine if attitude significantly adds to the predictive accuracy of our model. In other words, determine if attitude impacts absences after controlling for experience.

Write out the full and reduced models, run the omnibus F-test, complete the ANOVA summary table, and write out conclusions.

Full Model: _____

Reduced Model: _____

Omnibus F-Test: _____

ANOVA					
Source	Sum of Squares	df	Mean Squares	F	Sig.
Exp & Att					
Attitude | Exp					
Error					
Total					

What is $R^2_{YX_2|X_1}$? _____

What is $\text{SSReg}_{X_2X_1} - \text{SSReg}_{X_1}$? _____