MTH 325, Homework #5, Spring 2023 Name _____

Instructions: Show work or attach R code used to perform calculations (or any other technology used). Be sure to answer all parts of each problem as completely as possible, and attach work to this cover sheet with a staple.

1. Consider the provided in the table below.

Week	Cart Notice	Coupon	Price reduction	Sales
1	Yes	Yes	0	36
2	Yes	Yes	1	38
3	Yes	Yes	2	40
4	Yes	No	0	40
5	Yes	No	1	42
6	Yes	No	2	44
7	No	Yes	0	12
8	No	Yes	1	20
9	No	Yes	2	30
10	No	No	0	8
11	No	No	1	16
12	No	No	2	33

   a. Convert the Cart Notice and Coupon variables to dummy variables: 1 for Yes, 0 for No.
   b. Create a table of correlations. Which variable appears most strongly related to Sales?
   c. Use the forward selection method starting with the variable with the highest correlation to predict sales. State your one-variable model. Then add another variable. Does it improve the model? State the equation of the model and the R^2 value. If there is improvement, and the coefficient of the new variable passes a test of significance, keep the model and add another variable. If the model does not significantly improve, replace the second variable with another. Continue in this vein until you have added or tested all the variables.
   d. State your final model. How good is the R^2 value? Are there any variables you didn't use?

2. Repeat the problem but with the backward selection method. Start with all the variables in the model and remove any variables that lack significance, one at a time, until you have a model where all coefficients have a p-value less than 0.05. State your final model and R^2 value. Does it agree with your previous model?

3. Describe what you would need to do to test all possible regression models to find the one with the best fit? How many models would you have to test in this case?