STT3851 Homework 7

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Load the `Carseats` data set from the `ISLR` library. Be sure to explore this data set before answering the questions below. When exploring, the R commands such as `?Carseats`, `str()`, `head()` might be helpful. Consider fitting a simple linear regression to predict the `Sales` using `Age`.

1. Obtain $\sum y_i$, $\sum x_i$, $\sum x_i^2$, $\sum x_i y_i$, $\sum y_i^2$, n *and* $\sum {e_i}^2$ using R.
2. Use the following four steps to check whether there is a linear relationship to exist between 'Age' and 'Sales'.
   (a) State the null and alternative hypothesis:
   (b) Calculate the t test statistic using the quantities you computed above (Hint: First find $\hat{\beta}_1$ and MSE. Secondly find $SE(\hat{\beta}_1)$)
   (c) Find the p-value using R. (I did not provide a command to do this in class.)
   (d) Make the decision:
3. Use the 'lm()' function along with the 'summary()' function to repeat the 4-step hypothesis test above
   (a) State the null and alternative hypothesis
   (b) Get the t test statistic from the output
   (c) Get the p-value from the output
   (d) Make the decision