**DSO 510 HW 4: Falak Jain**

**Q1.**

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
|  | *df* | *SS* | *MS* | *F* | *Significance F* |  |  |  |
| Regression | 1 | 73.53983 | 73.53983 | 53.92252 | 1.21E-11 |  |  |  |
| Residual | 151 | 205.9346 | 1.363806 |  |  |  |  |  |
| Total | 152 | 279.4745 |  |  |  |  |  |  |
|  |  |  |  |  |  |  |  |  |
|  | *Coefficients* | *Standard Error* | *t Stat* | *P-value* | *Lower 95%* | *Upper 95%* | *Lower 95.0%* | *Upper 95.0%* |
| Intercept | 8.295411 | 0.667476 | 12.42803 | 7.18E-25 | 6.976613 | 9.61421 | 6.976613 | 9.61421 |
| X Variable 1 | -1.51595 | 0.206442 | -7.3432 | 1.21E-11 | -1.92383 | -1.10806 | -1.92383 | -1.10806 |

* A 1% change in price is associated with a reduction of 1.51% in sales.
* Yes, the relationship is statistically different than zero as the p-value for the price variable is less than the 0.05 threshold value due to which we reject the null hypothesis

**Q2.**



* Therefore, controlling for other variables, a 1% increase in price leads to a reduction of 2.23% in sales.
* Yes, the relationship is more significant than 0 as the p-val is less than 0.05 and we can therefore reject the null hypothesis

**Q3.**



* Controlling for other variables there is an increase of 3.49 in sales for cars of brand 2 rather than brand 3.
* However, since the p-val for that term is 0.88 which is greater than 0.05 we fail to reject the null and conclude that the expected difference in sales for cars 2 & 3 is 0.

**Q4.**



* We first filter the data to only retain data for car brands 3 & 4.
* Our null hypothesis is that the relationship in price and sales is the same for car brands 3 and 4 while our alternate hypothesis is that the relationship in price and sales is different for car brands 3 & 4.
* The p-value for the interaction term in the regression equation is greater than 0.05. Therefore, we cannot reject the null hypothesis and conclude that the relationship in price and sales is the same for car brands 3 & 4.