

# Statistics homework

[Science](#), [Statistics](#)



## Statistics homework

### Summary

Multiple regression usually has one variable to be forecast (dependent variable) and several other predictor variables (also known as explanatory variables). As an example we consider prediction of sales ( $s$ ) based on advertising expenditures for children's television ( $c$ ), daytime television ( $d$ ), and newspapers ( $n$ ). The regression forecast usually involves computation of confidence interval; and a forecast interval for an individual value is called a prediction interval. In most instances, prediction involves the process of extrapolation, which is a process of estimating, beyond the original observation range, the value of a variable on the basis of its relationship with another variable. When it comes to making forecasts using multiple regression, we must consider not only whether each independent variable value is reasonable by itself, but also whether the chosen combination of predictor values is reasonable.

From the multiple regression, it is possible to compare the slopes of two or more regression lines and test whether the slopes and intercepts are significantly different". The null hypothesis could read that the slopes for the two groups are not significantly different. We compare the p-value with the If  $p\text{-value} < \alpha$  we reject the null hypothesis and conclude that the slopes for the two groups are different.

### Question Two

a) Properties with no garage and properties with a one-car garage.

From the figure below, R-squared value is 0.09232 implying that only

approximately 9.232% of variation in price is explained by carA. The coefficient of carA on the other hand is -28463, this shows that the price of cars with no garage is much more, those with garage are -28463 cheaper.

b) Properties with a one-car garage and properties with a two-car garage.

From the figure below, R-squared value is 0.01968 implying that only approximately 1.968% of variation in price is explained by carA. The coefficient of carA on the other hand is -14845, this shows that the price of cars with one garage is much more, those with more than one garage are -14845 cheaper.

c) Properties with no garage and properties with a two-car garage.

From the figure below, R-squared value is 0.1549 implying that only approximately 1.968% of variation in price is explained by carA and carB. The coefficient of carA -32147 while that of carB is -18417.

### Question Three

In this section we summarize section 12.6-12.7

We seek to test a hypothesis that;

Now using Minitab we get the following values;

From table 1 above the coefficient for age is -127.433 and the (significance level). We thus fail to reject the null hypothesis and conclude that

### Question Four

a) Formulated model;

Based on the R-output, we can formulate the model as follows;

b) What combination of model parameters represents the difference between a five bedroom, one-garage home and a two-bedroom, two-garage home?

Based on the R-output, we can formulate the model as follows;

#### Question Five

Using the 9 variable model, give a 95% prediction interval for a house that has 2 baths, 3 bedrooms, 1 car garage, is 10 years old, has 2000 square yard lot and has been on the market for 60 days.

We have the model as follows;

Using R, the 95% Confidence Interval (C. I) is;