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STA-216

Homework 4

Part 1

1. The two main methods of performing a statistical inference are hypothesis tests and confidence intervals.
   1. Since we already have the population data, we do not need to do any statistical inference. We already know all the data points so we are not predicting anything else.
   2. Since we are looking at real estate prices, we are unable to get a list of every single real estate on the market to be able to run statistical inference tests on so running one of these tests will help us make a prediction on the outcome.

Part 2

* + 1. In this case, the residual graph seems to show that the linearity of the graph is violated since there appears to be a small representation of a curve.
    2. It also appears that the predicted plot displays a sign of the constant variance being violated as well because there does not seem to be an even distribution of points above and below the 0 residual.
  1. Y(hat) = -7181.30 + 14638(0.8) = $4529.10
     1. The residual graph shows that the linearity is satisfied because the points seem to follow a consistent closeness to the residual line.
     2. It also looks like the constant variance is satisfied because there is an even distribution of predicted points above and below the residual.
  2. Y(hat) = -522.70 + 2385.98(0.8) + 4498.20(0.8) = $4984.64
  3. The y-axis range on the left is based off the square root values the price which is why the values are smaller.
     1. In this graph, the linearity is satisfied since the points on the graph consistently follow the residual and do not have any curvature to them.
     2. The constant variance also seems to be satisfied since there is an even distribution above and below the 0 residual, like the last problem.
  4. Y(hat)= (7.84 + 70.59(0.8)) ^2 = 4136.03

1. We would need to create 6 dummy variables in this case because we have 7 variables and we are testing the rest of them against the *main* variable each time.

Part 3

1. The reference category of heat type is **electric heating.**
   1. Hot Air Heating= Price(hat) = 20930 + 115.83(sqft)
   2. Hot Water Heating = Price(hat) = -537.32 + 115.83(sqft)
   3. Electric Heating = Price(hat) = -6030.81 + 115.83(sqft)
   4. The coefficient for Living\_area is 115.83 which means the predicted price increases by $115.83 for every increase in 1 square foot.
   5. The coefficient for Dhotair is 26960 which means that the predicted price increases by $26,960 if you have a hot air heater, if both houses have the same square feet.
   6. Hot Air Heating= Price(hat) = 11848 + (91.22 + 29.66)\*(sqft)
   7. Hot Water Heating= Price(hat) = 13162 + (91.22 + 17.04)\*(sqft)
   8. Electric Heating(hat) = Price = 28461 + 91.22(sqft)
   9. The coefficient of Living\_Area is 91.22 which is the slope for Electric Heating only. This means that the predicted price rises $91.22 for every increase in 1 square foot.
   10. The coefficient of sqftxDhotwater is 17.04 which means that the slope of the line for Hot Water Heating is 17.04 more than the line for Electric Heating. This means that the predicted price of houses with hot water heating increases by $17.04 more for every 1 square foot than for electric heating.