Project: Diamond Prices

Complete each section. When you are ready, save your file as a PDF document and submit it in your classroom.

Step 1: Understanding the Model

Answer the following questions:

1. According to the model, if a diamond is 1 carat heavier than another with the same cut and clarity, how much more should I expect to pay? Why?

   Answer:

   You are expected to pay an additional amount of $ 8,413.

   Explanation:

   # Calculating base amount
   Price of diamond with Carat = 1, Cut = 1 Clarity = 1:
   = -5,269 + 8,413*Carat + 158.1*Cut + 454*Clarity
   = -5,269 + 8,413*1 + 158.1*1 + 454*1
   = $ 3,756.10

   # Carat is increased to 2 and other values stay the same
   Price of diamond with Carat = 2, Cut = 1 Clarity = 1:
   = -5,269 + 8,413*Carat + 158.1*Cut + 454*Clarity
   = -5,269 + 8,413*2 + 158.1*1 + 454*1
   = $ 12,169.10

   Additional price: $ 12,169.10 - $ 3,756.10 = $ 8,413

2. If you were interested in a 1.5 carat diamond with a **Very Good** cut (represented by a 3 in the model) and a **VS2** clarity rating (represented by a 5 in the model), how much would the model predict you should pay for it?

   Answer:
   The model predicts that I should pay $ 10,094.80 for a diamond with the above specification.

Explanation:

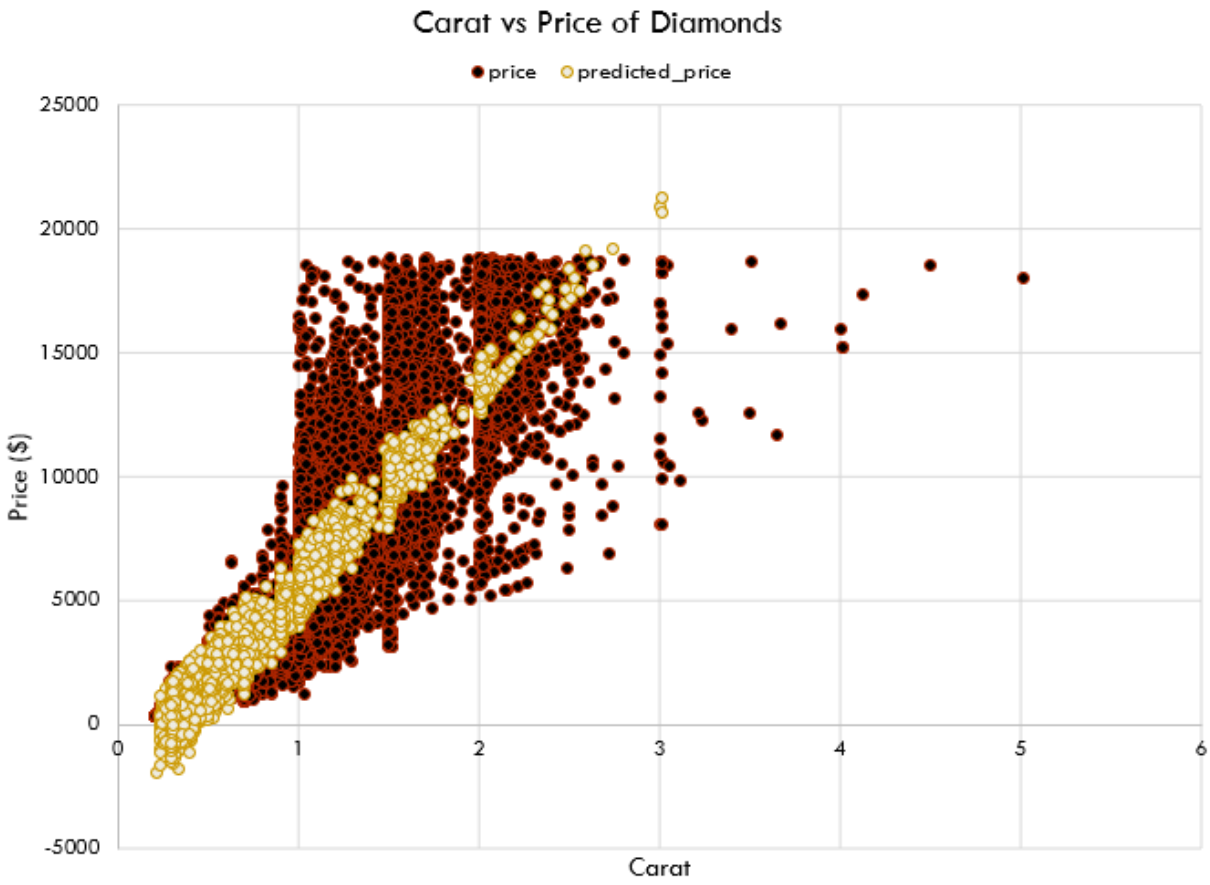
 # Calculating price when carat = 1.5, cut = 3, clarity = 5
= -5,269 + 8,413*Carat + 158.1*Cut + 454*Clarity
= -5,269 + 8,413*1.5 + 158.1*3 + 454*5
= $ 10,094.80

Step 2: Visualize the Data

Make sure to plot and include the visualizations in this report. For example, you can create graphs in Excel and copy and paste the graphs into this Word document.

1. Plot 1 - Plot the data for the diamonds in the database, with carat on the x-axis and price on the y-axis.
2. Plot 2 - Plot the data for the diamonds for which you are predicting prices with carat on the x-axis and predicted price on the y-axis.
    - **Note**: You can also plot both sets of data on the same chart in different colors.
3. What strikes you about this comparison? After seeing this plot, do you feel confident in the model's ability to predict prices?

Answer & Explanation:



The predicted prices for diamonds are closer together compared to the actual prices. I noticed a linear trend associated with both, the actual prices and predicted prices. However, the actual prices are more spread out. Next, the model predicted negative prices for 291 diamonds that have less than 1 carat. Thus, I do not feel confident with the model's ability to predict prices and believe that a better model can be generated by including additional predictors.

Step 3: Make a Recommendation

Answer the following questions:

1. What price do you recommend the jewelry company to bid? Please explain how you arrived at that number.

Answer:

I would recommend the jewelry company to offer a bid of $ 8,309,267.40 for the whole set of diamonds.

Explanation:

The model predicted negative prices for 291 diamonds totaling to $ 136,860. There are 2,709 diamonds with positive prices totaling to $ 11,870,382. Since only 10.7% of the diamonds are negatively priced, I approximated these prices as $0. The diamonds are usually bought at 70% of the price, so the final price is $ 8,309,267.40.

Some Excel formulas used:

=SUM(D2:D3001) → $11,733,523 (All prices included)

=SUMIF(D:D,">0") → $11,870,382 (Only positive prices included)

=SUMIF(D:D,"<0") → $136,860 (Only negative prices included)

=COUNTIF(D:D,">0") → 2709 (Total diamond with positive prices)

=COUNTIF(D:D,"<0") → 291 (Total diamond with negative prices)

=$11,870,382 *0.7 → $8,309,267.40 (Final price for the whole set)