

## 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

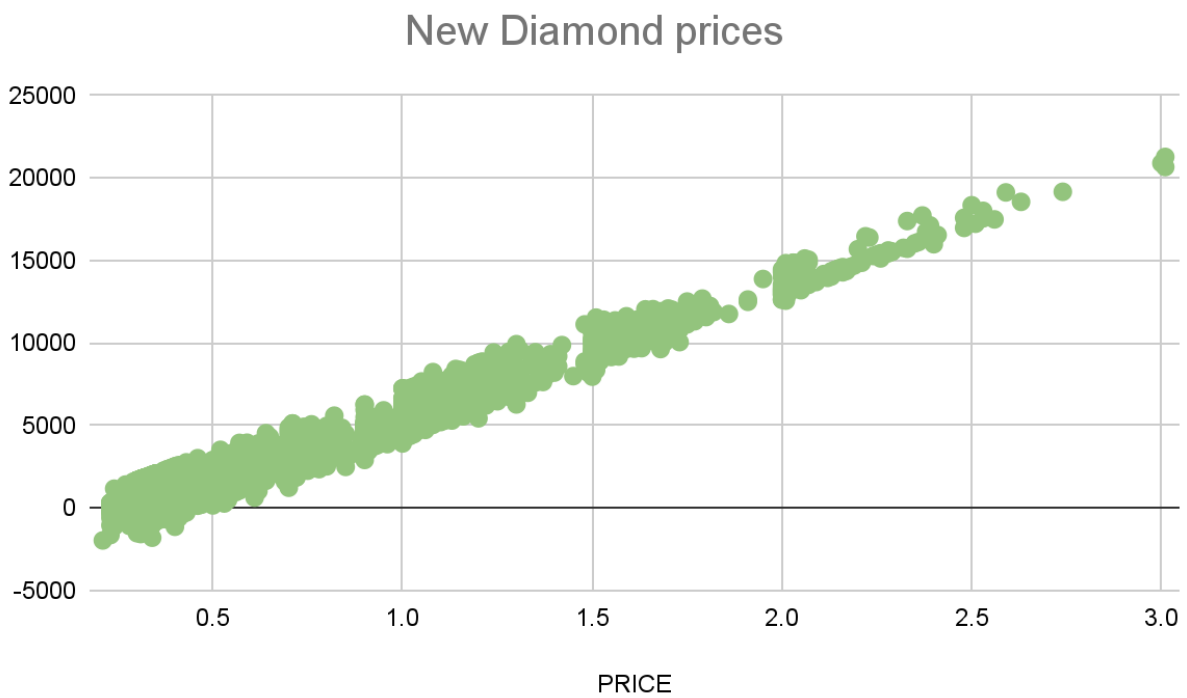
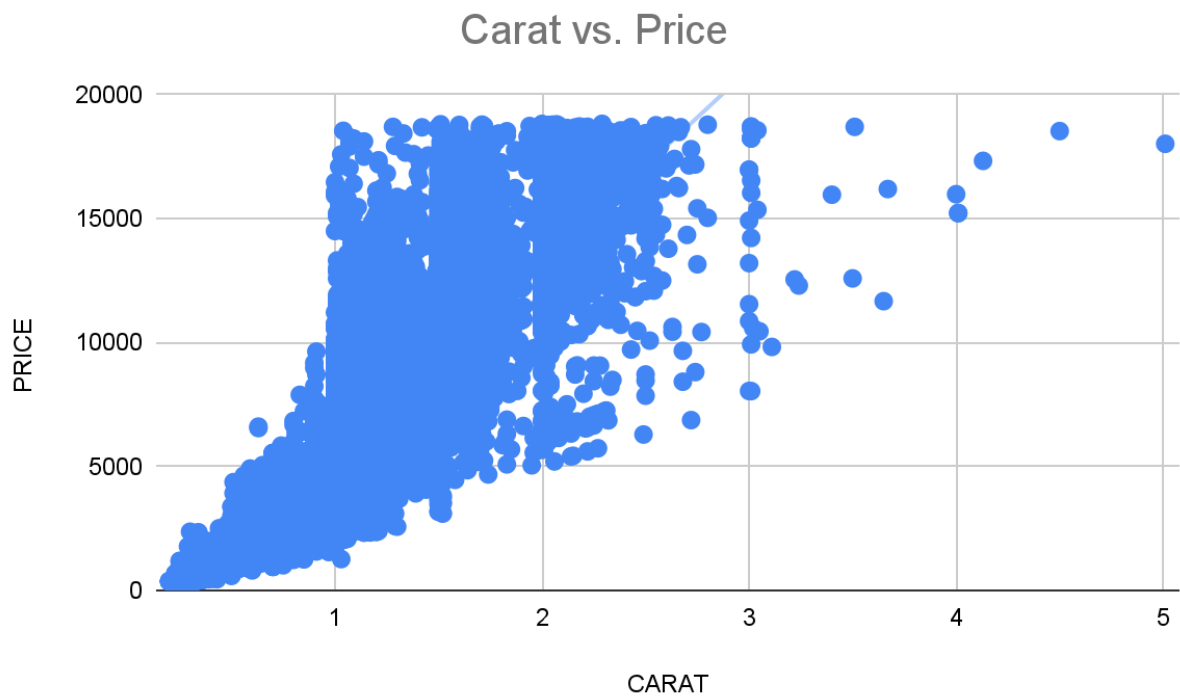
*Answer the following questions:*

- According to the model, if a diamond is 1 carat heavier than another with the same cut, how much more should I expect to pay? Why?
- Using the linear regression equation, then finding the difference between both carats will give the difference and how much we expect to pay.
  - Equation:
    - $\text{Price} = -5,269 + 8,413 \times \text{Carat} + 158.1 \times \text{Cut} + 454 \times \text{Clarity}$
  - 1 carat difference:
$$\text{Price} = -5,269 + 8,413 \times 1 + 158.1 \times 3 + 454 \times 4 = 5434.3$$
$$\text{Price} = -5,269 + 8,413 \times 2 + 158.1 \times 3 + 454 \times 4 = 13847.3$$
$$\text{Difference} = 8413$$
- 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?
  - The formula is  $\text{Price} = -5,269 + 8,413 \times \text{Carat} + 158.1 \times \text{Cut} + 454 \times \text{Clarity}$ 
    - Now we will plug in the values for the different variables
    - $\text{Price} = -5,269 + 8,413 \times 1.5 + 158.1 \times 3 + 454 \times 5$
    - $\text{Price} = 10094.8$

### 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.

- Plot 1 - Plot the data for the diamonds in the database, with carat on the x-axis and price on the y-axis.
- 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.



- What strikes you about this comparison? After seeing this plot, do you feel confident in the model's ability to predict prices?

- There is a positive correlation between carat size and price. Yes I feel confident in the model's ability to predict prices.

## Step 3: Make a Recommendation

*Answer the following questions:*

- What price do you recommend the jewelry company to bid? Please explain how you arrived at that number?
  - I recommend a bid of \$8,213,465.932. I arrived at this number by using a formula from the regression model provided that was based on previous diamond prices and applied it to the diamonds that were up for bid. I then factored in the percentage of 70% for the purchase of diamonds from the distributors so I multiplied the total predicted amount \$11733522.76 by %70 to get the final predicted bid of \$8,213,465.932.