**ANALYSIS OF THE RELETIONSHIP BETWEEN A DIAMOND’S WEIGHT AND ITS PRICE**

1. Compute a Pearson Correlation and linear regression to investigate relationship between a diamond’s weight and its price. From the output, identify the following:

1. Slope associated with the predictor variable?

*11598.88*

1. Constant for the regression equation?

*-2298.36*

1. Mean weight and price of the diamond?

*Mean weight = 0.63 carats, Mean price = $5,019.48*

1. Correlation between weight and diamond. Is the correlation significant?

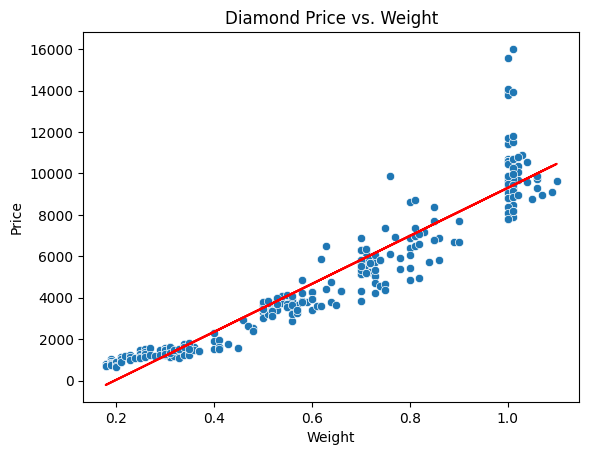
*Correlation coefficient (r): 0.945.*

*The p-value is extremely small 3.04 × 10⁻¹⁵⁰ (< 0.001), meaning this correlation is statistically significant.*

1. Write a regression equation?

*Price= −2298.36+11598.88×Weight*

2. Also create a scatterplot. Plot the line of best fit (regression line) on the graph. What does the scatterplot indicate regarding the predictability of the dependent variable (price)?

*****Strong Positive Linear Relationship exists: The points form a tight, upward-sloping cluster around the regression line suggesting that as weight increases, price also increases—almost proportionally.*

*High Predictability: Given that most data points lie close to the line of best fit, there is low dispersion, meaning weight is a strong predictor of price.*

3. Is the price significantly related to the diamond’s weight? Interpret the results of the regression analysis to answer the question.

*R-squared = 0.893, This is close to 89.3% of the variation in diamond price is explained by its weight.*

*p-value for WEIGHT < .001 The weight of a diamond is highly statistically significant in predicting price.*

*F-statistic = 2541, p < .001 Hence the model as a whole is statistically significant.*

*Conclusion: Price is significantly related to a diamond's weight. The regression model is strong, and weight explains a major portion of the variation in price.*

**RESULT OF THE ANALYSIS.**

The purpose of this study was to explore the relationship between a diamond’s weight and price. A Pearson correlation was conducted to examine the relationship between a diamond’s weight and its price. The results indicated a strong, positive correlation, (*r*) = .945, *p* < .001, suggesting that as the weight of a diamond increases, so does its price.

To further investigate this relationship, a simple linear regression was performed with weight as the predictor variable and price as the outcome variable. The regression model was statistically significant, *F* = 2541.00, *p* < .001, and explained approximately 89.3% of the variance in diamond price (*R²* = .893, Adjusted *R²* = .892). The regression equation was:

Price=−2298.36+11598.88×Weight

The unstandardized coefficient for weight was significant, *B* = 11,598.88, *t* = 50.41, *p* < .001, indicating that for each additional weight, the price of a diamond increases by approximately $11,599. The constant was also significant, *B* = -2298.36, *t* = -14.50, *p* < .001.

Furthermore, the scatterplot visually confirms that **diamond weight is highly predictive of price**, making it a reliable variable for modeling and forecasting diamond values. The close fit of the data points to the regression line further reinforces the **accuracy and strength** of the linear relationship.

These findings thereby confirmed that diamond weight is a significant and strong predictor of price, and the predictive model fits the data very well.