

An article in the *Journal of Statistics Education* reported the price of diamonds of different sizes in Singapore dollars (SGD). The following table contains a data set that is consistent with this data, adjusted to US dollars in 2004:

2004 US \$	Carat
494.82	0.12
768.03	0.17
1105.03	0.20
1508.88	0.25
1826.18	0.33
688.24	0.15
944.90	0.18
1071.75	0.21
1504.44	0.26
1908.28	0.29
2409.76	0.35
748.10	0.16
1076.18	0.19
1289.20	0.23
1597.63	0.27
2038.09	0.32

1. Make a scatterplot and describe the association (direction, form, strength) between the size of the diamond (carat) and the cost (in US dollars). Draw a rough sketch of the scatterplot from the calculator.



Looking at the scatterplot, it appears there is a positive strong and linear association between the size (carat) of a diamond and the cost (us dollars). The correlation of $r = .98$ strengthens this.

2. Create a model to predict diamond costs from the size of the diamond. Round your parameters to two decimal places.

$$\hat{y} = -480 + 7788(x)$$

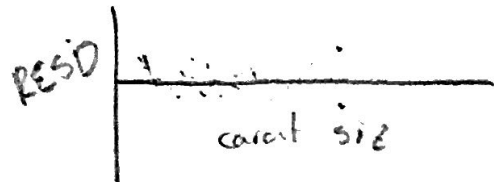
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\hat{y} = pred cost (us)

x = size of diamond (carat)

3. Do you think a linear model is appropriate here? Explain and draw a sketch of your plot to support your answer.

Yes, a linear model would be appropriate based on there is no pattern in the residual plot of



4. Interpret the slope of your model in context.

As the size of the diamond increase the cost increases.

5. Interpret the intercept of your model in context.

If there was no diamond, it would cost the business money rather than a customer.

6. What is the correlation between cost and size? $r = .98$

7. Explain the meaning of R^2 in the context of this problem.

The coefficient of determination of shows 96% (.96) of the predicted cost is accounted for when associated with diamond carat size.

8. Would it be better for a customer buying a diamond to have a negative residual or a positive residual from this model? Explain.

A negative residual because as size increases, cost of diamonds would decrease.