Linear Regression: Stopping Distances **Name** _____

In a study on speed control, the main reasons for regulations were to make traffic flow more efficient and to minimize the risk of danger. An area that was focused on in the study was the distance required to completely stop a vehicle at various speeds. Use the following data. Assume that speed is going to be used to predict stopping distance. *Show all work on the front and back of this page*.

Speed (mph)	Braking Distance (Feet)
20	20
30	45
40	81
50	133
60	205
80	411

1. Which of the two variables is the independent variable? _____
   Which is the dependent variable? _____

2. What type of variable (quantitative, qualitative, discrete, continuous) is the independent variable? Be as specific as possible. _____

   What type of variable is the dependent variable? _____

3. Use Excel (TI calculator _____) to construct a scatter plot for the data. Be sure to clearly label the axes, use appropriate scaling on each axis.

4. Have Excel (TI calculator _____) fit the "line of best fit" to the scatter plot, calculate the R^2 value and calculate the coefficients for the equation of the line. Print out the chart, scatter plot, and regression outputs. Use 4 decimal places for each constant or coefficient.

   Equation: _____ R value: _____

5. Is there a strong linear correlation between the two variables? Use the correlation coefficient, R, to perform the appropriate hypothesis test. Include a statement about the strength and type of relationship in your conclusion. Use $\alpha = 0.05$, and show all 5 steps.

6. What is the slope and y-intercept of the line of best fit?

   Slope: _____ Y-intercept: _____

7 Can braking distance be accurately predicted from MPH? If so, give two numerical examples within the 20 to 100 mph range. In each case, round to the nearest foot.