Stopping Distances
Exploring Quadratic Functions

Name______________________________

Date_______________________________

1. Use the information found at **MJS Traffic Accident Investigations**, complete the following about the braking/stopping distances of a car at the speeds given.

MPH	Ft/Sec	Braking Distance	Perception-Reaction Distance	Total Stopping Distance
10	14.7			
20	29.3			
30	44			
40	58.7			
50	73.3			
60	88			
70	102.7			
80	117.3			
90	132			

1. The Perception-Reaction Distance is the distance that a car travels in the time it takes to recognize a need to stop and to begin to stop. Predict the type of function that would model the data.

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2. Enter the MPH in L_1 and the Perception-Reaction Distances in L_2. Set up a scatter plot of the Perception-Reaction Distances versus MPH. Sketch the results.

3. Find the equation of the line that best fits this data. Enter your equation in Y1.

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4. What are the units of the slope? Interpret the meaning of the slope.

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5. What are the units of the y-intercept? Interpret the meaning of the y-interpret.

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6. The braking distance is the distance that a car will travel from the time the brakes are applied until the car stops. Enter the Braking Distance in L_3. Set up a scatter plot of the braking distance versus MPH. Sketch the results.

7. Find the quadratic regression of the data. Enter your equation in Y_2.

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8. From physics, the braking distance of a car is directly proportional to the square of the velocity. Write this statement mathematically.

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9. How does your model compare to the theoretical model?

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10. Graph the equation on the scatter plot of the braking distance versus MPH. How well does the equation fit the data?

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11. The total stopping distance is the sum of the perception-reaction distance and the braking distance. Find an expression for the total stopping distance using the equations from questions 3 and 7. Enter your equation in Y_3.

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12. Enter the data for the Total Stopping Distance in L_4. Set up a scatter plot of the total stopping distance versus MPH.

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13. How well does your equation fit the data?

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14. Use your model to predict the stopping distance of a car traveling 55 mph. Compare this to the value given at **MJS Traffic Accident Investigations**?

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15. If it takes a car 280 feet to stop from the time an emergency is sighted, how fast was the car traveling?

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