

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.

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.



Window: _____

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

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

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 .

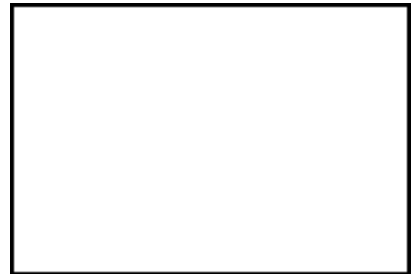
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8. From physics, the braking distance of a car is directly proportional to the square of the velocity. Write this statement mathematically.

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

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

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 .



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

Window: _____

13. How well does your equation fit the data?

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**?

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