Teacher Notes

Activity 7

Stopping Distances

Objective

- The student will collect data about the distance required to stop a car and find a model for the data.

Applicable TI Interactive! Functions

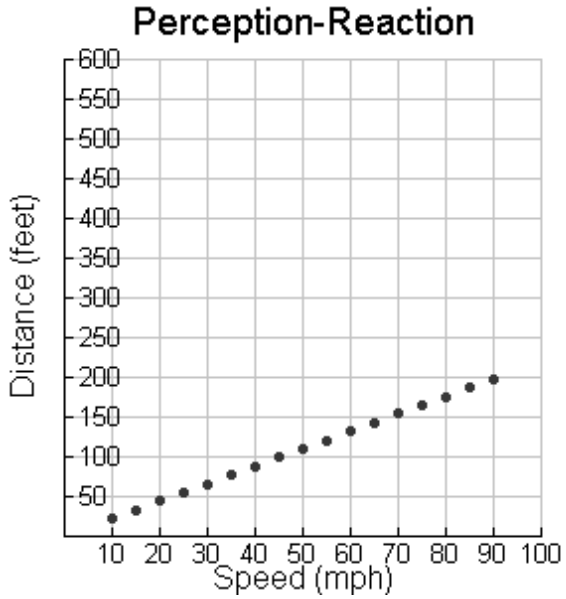
- Graph 
- Data Editor 
- Stat Regression Tool 
- Browser 

Problem

Two factors that affect the distance that is required to stop a moving vehicle are the reaction time of the driver and the velocity of the car. In this activity, students will collect data from the Internet and find a model for the total distance required to stop a moving vehicle.

Perception-Reaction Distance Exploration

1. through 11.

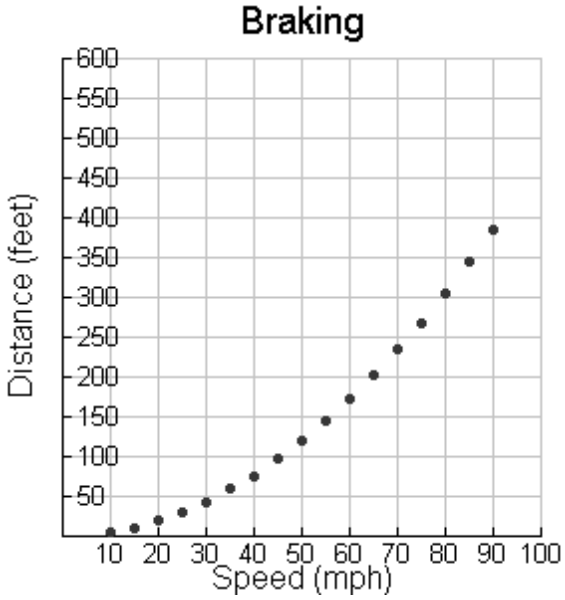


Perception-Reaction Distance Analysis

1. A linear equation will model the data.
2. $r(x) = 2.2x$. The constant is very near to 0.
3. The equation fits the data very well.
4. The slope is 2.2. For each additional mph, an additional 2.2 feet is needed to stop the vehicle.
5. The y-intercept is 0. At 0 mph, 0 feet are needed to stop the vehicle.

Braking Distance Exploration

1. through 4.

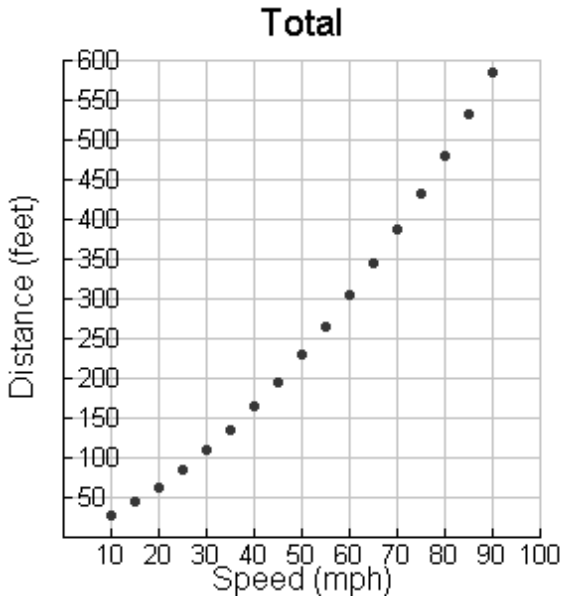


Braking Distance Analysis

1. Quadratic or exponential.
2. $D = kv^2$.
3. $b(x) = 0.048x^2 + 0.0001x + 0.157$.
4. They should be 0. The equation would be $D = .048v^2$.
5. The equation fits the data very well.

Total Stopping Distance Exploration

1. through 4.



Total Stopping Distance Analysis

1. Quadratic.

2. $D = .048v^2 + 2.2v$. Students should note that this is the sum of the equations $r(x)$ and $b(x)$.

3. The equation fits the data very well.

4. $0.048(55)^2 + 2.2(55) = 266.2$ feet

5. $280 = 0.048v^2 + 2.2v$ so $v = 56.8$ mph. Students can solve the equation by selecting Math Box and typing **solve(280 = 0.048v^2 + 2.2v, v)**.