Name: $\qquad$
Date: $\qquad$ Hour $\qquad$
Adapted from Holt High School Mathematics Department
The stopping distance for a car is a function of the speed of the car, i.e. the speed of the car will determine how much distance is required to bring the car to a stop. This function can be approximately represented algebraically by the equation:

$$
f(x)=0.042(x+12.5)^{2}-6.5625
$$

where $\mathbf{x}$ is the speed of the car in miles per hour and $f(\mathbf{x})$ is the stopping distance in feet.
Please note that the symbolic rule above can be used as an approximation. The actual rule is more complicated because the road surface, rubber type for the tires, weight of the car, and other variables need to be considered.

1. How far would a car take to stop if it was traveling 70 miles per hour?
2. If a car took 200 feet to stop, how fast was it going?
3. If a detective was investigating 15 car accidents and has the distances it took to stop for each of the cars, how would you suggest for the detective to analyze the speed of each car?

4. a. Graph this function.
b. State the domain of this function.
c. Does the shape of the graph make sense for this situation? How do you know?


The stopping distance for a car on wet pavement is a function of the speed of the car, i.e. the speed of the car will determine how much distance is required to bring the car to a stop. This function can be approximately represented algebraically by the equation:

$$
f(x)=0.1(x+5)^{2}-2.5
$$

where $\mathbf{x}$ is the speed of the car in miles per hour and $f(\mathbf{x})$ is the stopping distance in feet.
5. How far would a car take to stop if it was traveling 70 miles per hour?
6. If a car took 200 feet to stop, how fast was it going?
7. Why do you get a bigger stopping distance for your answer to \#5 as opposed to \#1?
8. If a detective was investigating 15 car accidents and has the distances it took to stop for each of the cars, how would you suggest for the detective to analyze the speed of each car?

9. a. Graph this function.
b. State the domain of this function.
c. Does the shape of the graph make sense for this situation? How do you know?

