**Linear Functions: A Real-World Application**

For several years now, there has been a focus on automobile emissions and their impact on our environment. On many fronts, engineers, scientists, and politicians are seeking new automobile fuel products which reduce the total amount of fuel burned in automobiles, and thereby reduce the amount of harmful gases and chemicals emitted into our atmosphere by automobile use.

In addition, burning less fuel, by increasing the number of miles one may drive per gallon of fuel, simply makes good economic sense. Consider these two scenarios:

* Erica drives an older, standard-sized sedan, with a fuel tank capacity of 20 gallons. She uses regular gasoline, and has determined that she can drive an average of 16 miles per gallon.
* Kevon has purchased a new compact car, with a fuel tank capacity of 14.5 gallons. He uses a hybrid fuel (a mix of methanol and gasoline) and estimates he can drive an average of 32 miles per gallon.

For each scenario:

1. Determine the equation of the linear function, D(*g*), which describes the total distance (D) each person is able to drive, as a function of the number of gallons (*g*) in the fuel tank:

Erica: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

Kevon: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

1. Assuming each driver begins with a full tank of fuel, determine the equation of the linear function, F(*m*), to determine the amount of fuel *left* in the tank, as a function of miles (*m*) driven. What are the respective slopes of these functions?

Erica: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

Kevon: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

1. If regular gasoline costs $2.50 per gallon, and hybrid fuel costs $2.80, which driver pays more for a trip of 400 miles? Why? Which drive makes the most fueling stops? Why?

\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_