

Motion in One Dimension

Math Skills**Acceleration**

A car is traveling down a straight road. The driver then applies the brake, and the car decelerates with a constant acceleration until it stops. Refer to the equations below to answer the questions.

$$\Delta x = \frac{1}{2}(v_i + v_f)\Delta t \quad v_f = v_i + a(\Delta t)$$

$$\Delta x = v_i(\Delta t) + \frac{1}{2}a(\Delta t)^2 \quad v_f^2 = v_i^2 + 2a\Delta x$$

1. What is the car's final speed v_f ? Explain your answer.

2. You are given the distance the car travels and the length of time it takes for the car to come to a complete stop after the driver applies the brakes. What is the expression for the car's initial speed?

3. You are given the car's initial speed and the length of time it takes for the car to come to a full stop after the driver applies the brakes. What is the expression for the magnitude of the car's acceleration?

4. You are given the car's initial speed and the distance the car travels before it comes to a complete stop after the driver applies the brakes. What is the expression for the magnitude of the car's acceleration?

5. You are given the magnitude of the car's acceleration and the length of time it takes for the car to come to a full stop after the driver applies the brakes. What is the expression for the initial speed of the car, and what is the expression for the distance it traveled before it came to a complete stop?
