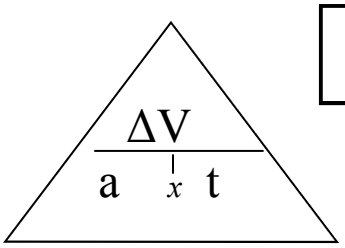
Calculating Acceleration

6



Name: _____

Group: _____

Acceleration is the rate of change in the speed of an object. To determine the rate of acceleration, you use the formula below. The units for acceleration are meters per second per second or m/s^2.

$$Acceleration = \frac{FinalVelocity - InitialVelocity}{Time} \qquad \text{or} \qquad a = \frac{V_f - V_i}{t}$$

A positive value for acceleration shows speeding up, and negative value for acceleration shows slowing down. Slowing down is also called *deceleration*, but you might get in trouble for saying that to a physicist.

1. While traveling along a highway a driver slows from 24 m/s to 15 m/s in 12 seconds. What is the automobile's acceleration? (Remember that a negative value indicates a slowing down or deceleration.)

2. A parachute on a racing dragster opens and changes the velocity of the car from 85 m/s to 45 m/s in a period of 4.5 seconds. What is the acceleration of the dragster?

3. A car traveling at a velocity of 30.0 m/s encounters an emergency and comes to a complete stop. How much time will it take for the car to stop if it decelerates at $-4.0\ m/s^2$?

4. If a car can go from 0 to 60 mi/hr in 8.0 seconds, what would be its final velocity after 5.0 seconds if its starting velocity was 50 mi/hr? (**HINT:** find acceleration of the car first & keep units in mi/hr)

5. A cart rolling down an incline for 5.0 seconds has an acceleration of $4.0\ m/s^2$. If the cart has a beginning speed of 2.0 m/s, what is its final velocity?