

### Answer on Question #56413, Physics / Other

A race car can be slowed with a constant acceleration of  $-9 \text{ m/s}^2$ .

(a) If the car is going  $51 \text{ m/s}$ , how many meters will it travel before it stops?

(b) How many meters will it take to stop a car going twice as fast?

#### Solution:

(a) Kinematics equation

$$2ad = v^2 - v_0^2$$

where  $a = -9 \text{ m/s}^2$  is acceleration,  $d$  is distance,  $v_0 = 51 \text{ m/s}$  is initial velocity and  $v = 0$  is final velocity.

Thus,

$$d = \frac{-v_0^2}{2a} = \frac{-51^2}{2 \cdot (-9)} = 144.5 \text{ m}$$

(b)

$$d = \frac{-v_0^2}{2a} = \frac{-(51 \cdot 2)^2}{2 \cdot (-9)} = 578 \text{ m}$$

**Answer:** (a)  $144.5 \text{ m}$ ; (b)  $578 \text{ m}$ .