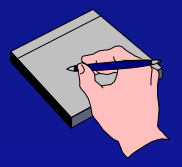
Kinematics Example



- A car is traveling 30 m/s and applies its breaks to stop after a distance of 150 m.
- How fast is the car going after it has traveled ½ the distance (75 meters) ?

A) v < 15 m/s B) v = 15 m/s C) v > 15 m/s

$$v^2 = v_o^2 + 2a\Delta x$$

$$a = \frac{v_f^2 - v_o^2}{2(150)} = \frac{-30^2}{2(150)}$$

$$v_{75}^2 = 30^2 + 2a(75)$$

$$v_{75}^2 = 30^2 + 2\frac{(-30^2)}{2(150)}(75)$$

$$v_{75}^2 = 30^2 + \frac{1}{2}(-30^2)$$

$$v_{75}^2 = \frac{1}{2}30^2$$

$$v_{75} = \sqrt{\frac{1}{2}}30 = 21 m/s$$