

Kinematics
Approach

Energy
Approach

$$W = \Delta E_k$$

$$\vec{F} \cdot d = \frac{1}{2} m \Delta v^2$$

$$(m a) \cdot d = \frac{1}{2} m (v_f - v_i)^2$$

$$m \left[\frac{(v_f^2 - v_i^2)}{2d} \right] d = \frac{1}{2} m (v_f - v_i)^2$$

$$\frac{1}{2} m (v_f^2 - v_i^2) = \frac{1}{2} m (v_f - v_i)^2$$