$$K = \frac{1}{2}mv^2 \qquad p = mv$$

$$F = ma \rightarrow F = m\frac{dv}{dt}$$

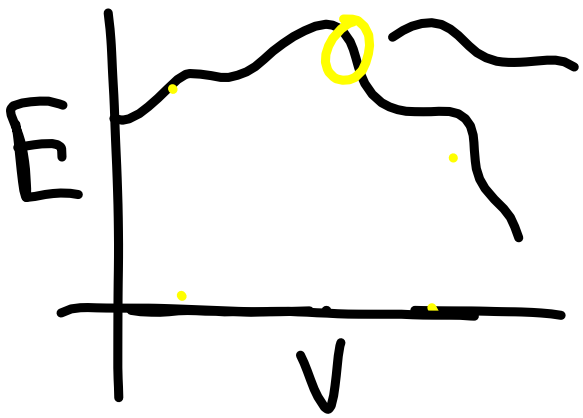
$$F = m\left(\frac{v_f^2 - v_i^2}{2d}\right) \qquad F = \frac{d\,mv}{dt}$$

$$Fd = m\left(\frac{v_f^2 - v_i^2}{2}\right) \qquad F = \frac{dp}{dt}$$

$$Fd = \frac{1}{2}mv_f^2 - \frac{1}{2}mv_i^2 = \Delta K$$

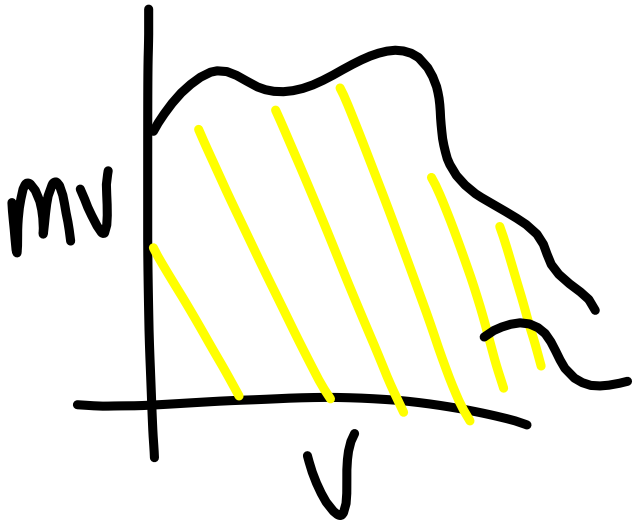
$$V = \frac{d}{t}$$

$$W = \int F(s)\,ds \qquad J = \int F(t)\,dt$$



$$\frac{J}{\frac{m}{s}} = \frac{N \cdot m}{\frac{m}{s}} = \frac{N \cdot \cancel{m}}{T} \cdot \frac{s}{\cancel{m}} = N \cdot s$$

$$\frac{kg \cdot m}{s}$$



$\frac{kg \cdot m}{s} \cdot \frac{m}{s} = \frac{kg \cdot m^2}{s^2} = N \cdot m$

work = ΔE

① O ⟶ $45.0 \frac{m}{s}$

$M_b = 0.145\ kg$

$J = \Delta p$

$\Delta p = p_F - p_i$

O ⟵ $55.0 \frac{m}{s}$

→ ⊕

$\Delta p = (mv_F) - (mv_i)$

$\Delta p = (.145)(-55) - (.145)(45)$

$\Delta p = -7.975 + -6.525$

$\Delta p = -14.5\ Ns$

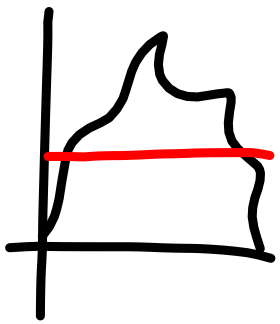
$J = \Delta p$

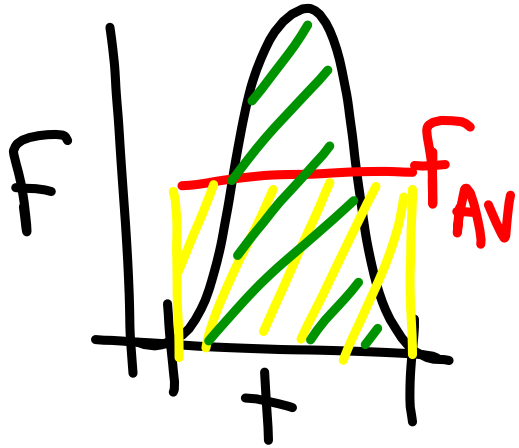
$J = p_f - p_i$

$F = \frac{dp}{dt}$

$f = \frac{p_f - p_i}{\Delta t}$

$F\Delta t = \Delta p$





$F(.002) = -14.5$

$f = \frac{-14.5}{.002} = 7250\,N$