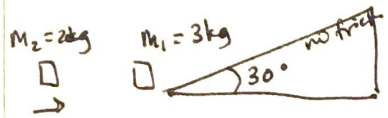
#2



What's v_f of m_1?

$\Sigma p_{ix} + \cancel{F_{ot}^{\to 0}} = \Sigma p_{fx}$

$(m_2)v_i + 0 = m_1 v_f + m_2 v_{f_2}$

$(2)(3.5) = (3kg)v_f + (2kg)(-0.25\ m/s)$

$v_f = 2.5\ m/s$

Impulse on m_2?

$F_{ot} = \Delta p = p_f - p_i$

$= m_2(v_f - v_i)$

$= (2kg)(-0.25 - 3.5\ m/s)$

$= -7.5\ kg\ m/s$

Elastic or inelastic?

$KE_i = \frac{1}{2}(2kg)(3.5\ m/s)^2 = 12.25\ J$

$KE_f = \frac{1}{2}(2)(-0.25\ m/s)^2 + \frac{1}{2}(3kg)(2.5\ m/s)^2 = 9.44\ J$

inelastic : E "lost"

$W_{ext\ in\ collision} = \Delta KE = 9.44J - 12.25J = -2.81\ J$

F_{ot} on m_1? $= \Delta p$

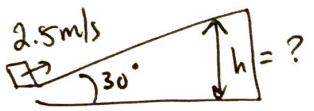
$= m_1(v_f - v_i)$

$= (3kg)(2.5\ m/s - 0)$

$= 7.5\ kg\ m/s$

F_{ot} are =/ opp. ✓

How high will m_1 slide before rest?

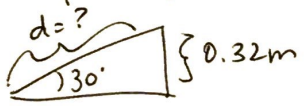


$\Sigma K_1 + \cancel{\Sigma U_1^{\to 0}} + \cancel{\Sigma W_{ext}^{\to 0}} = \cancel{\Sigma K_2^{\to 0\ rest}} + \Sigma U_2$

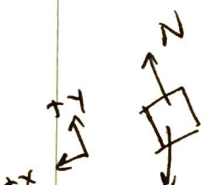
$\frac{1}{2}\cancel{m_1}v^2 = \cancel{m_1}gh$

$h = \frac{v^2}{2g} = \frac{(2.5\ m/s)^2}{2(9.81\ m/s^2)} = 0.32m$

How far up incline is that?



$\sin 30 = \frac{O}{H} = \frac{0.32m}{d} \Rightarrow d = \frac{0.32m}{\sin 30} = 0.64m$



$\Sigma F_y = \cancel{ma_y^{\to 0}}$

$N - mg\cos\theta = 0$

$N = mg\cos\theta = (29.4N)\cos 30$

$N = 25.5N$

$mg = (3kg)(9.81\ m/s^2)$

$= 29.4N$

accel up ramp?

$\Sigma F_x = ma_x$

$-\cancel{m}g\sin 30 = \cancel{m}a_x$

$a_x = -(9.81\ m/s^2)\sin 30 = -4.9\ m/s^2$

check dist w/ kin:

$\cancel{v_f^{2\ \to 0}} = v_i^2 + 2a\Delta x$

$0 = (2.5\ m/s)^2 + 2(-4.9\ m/s^2)\Delta x$

$\Delta x = 0.64\ m$ ✓

t to stop?

$v_f = v_i + at$

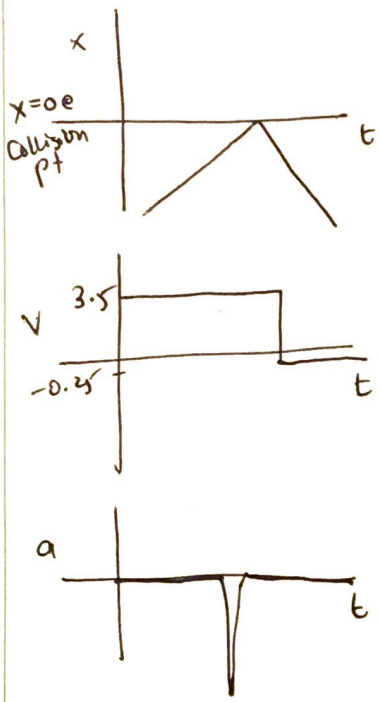
$0 = 2.5\ m/s - 4.9\ m/s^2\,(t)$

$t = 0.5\ sec$

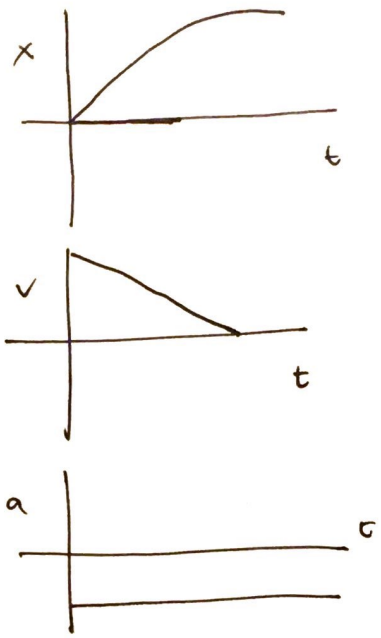
Impulse to stop? $F_{gx}\,\Delta t = (mg \sin 30)(\Delta t) = (29.4\,N)\sin 30\,(0.5\,s) = \boxed{-7.5\,N\cdot s}$

Δp? $m(v_f - v_i) = (3kg)(0 - 2.5\,m/s) = \boxed{-7.5\,N\cdot s}$ ✓

For m_2:



For m_1 on ramp after collision



Energy: