Phy 4A Office Hour 11/10

Thursday, November 10, 2016 6:56 PM

Elastic Collisions:

$$P_i = P_f \Rightarrow \boxed{m v_1 = m_2 v_2}$$

$$K_i = K_f \Rightarrow \boxed{\frac{1}{2} m_1 v_1^2 = \frac{1}{2} m_2 v_2^2}$$

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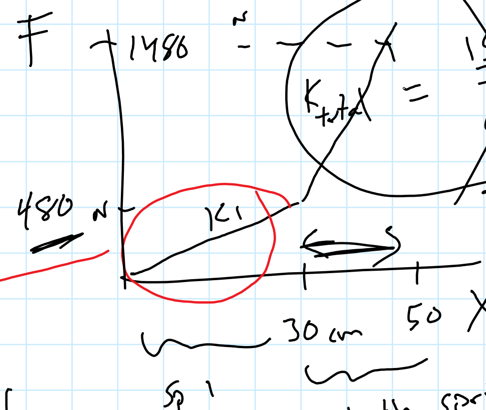
$k_1 = 1600 \ \frac{N}{m}$

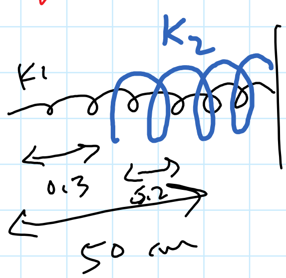
$k_2 = 3400 \ \frac{N}{m}$

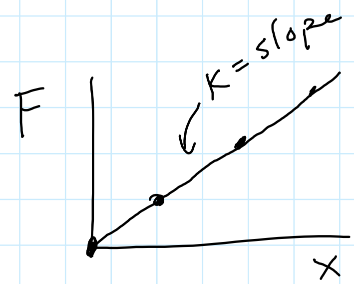
$K_{total} = k_1 + k_2 = 5000 \ \frac{N}{m}$



$$K_{total} = \frac{1500 - 500}{0.50 - 0.3} = 5000 \ \frac{N}{m}$$

$$K_1 = \frac{500 - 0}{0.3 - 0} =$$





$F = kx$

find v_i

$$W_{net} = \Delta K$$

$$W_{0 \to 0.3} + W_{0.3 \to 0.5} = \cancel{K_f}^{0} - K_i$$

$$-\frac{1}{2} K_1 (0.3)^2 - \frac{1}{2} K_{total} (0.2)^2 = -\frac{1}{2} m v_i^2$$

solve for v_i

Same

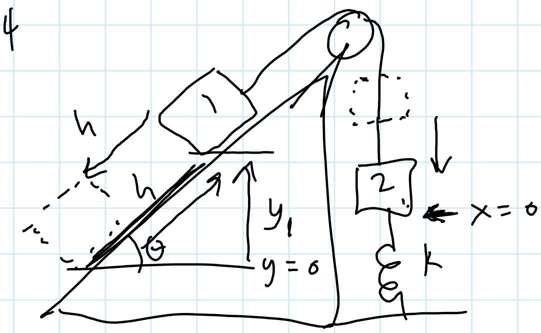
$W_{net} = W \ \ + \ W$

Saw…

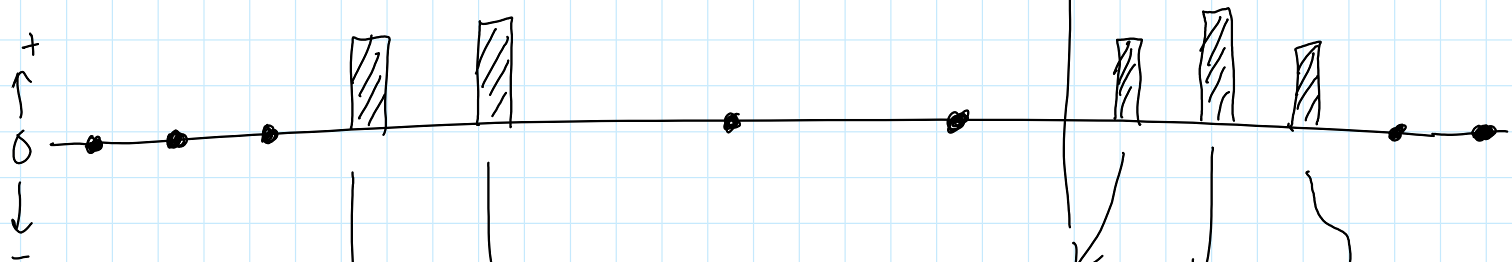
$$W_{net} = W_{sp1} + W_{sp2}$$

$$= -\frac{1}{2} K_1 (0.5)^2 - \frac{1}{2} K_2 (0.2)^2$$

Ch 8 #64



E_i					During		E_f				
K_1	K_2	U_{g1}	U_{g2}	U_{sp}	$W_{friction}$	W_{ext}	K_1	K_2	U_{g1}	U_{g2}	U_{sp}

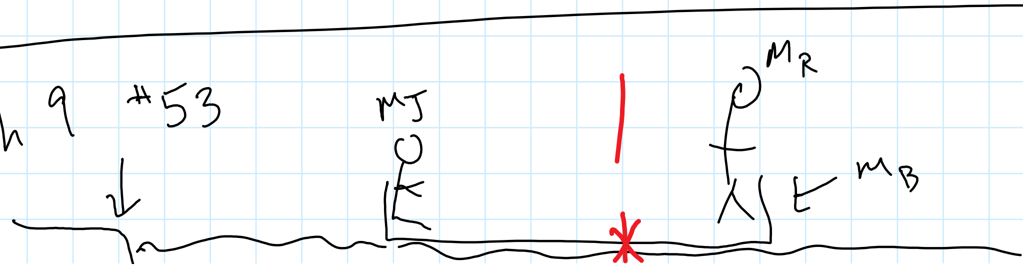


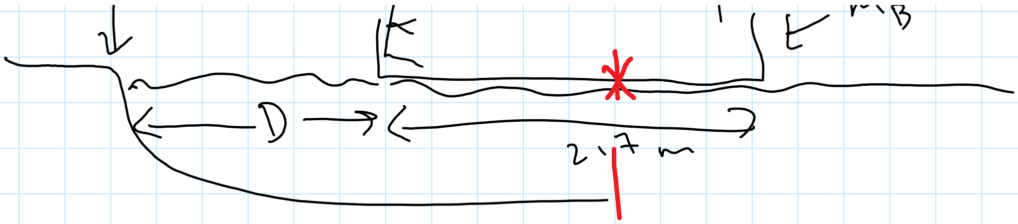
$$m_2 g h + \frac{1}{2} K h^2 = \frac{1}{2} m_1 v_f^2 + \frac{1}{2} m_2 v_f^2 + m_1 g y_1$$

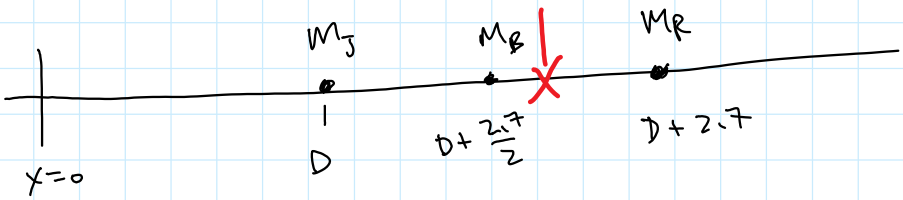
$y_1 = h \sin\theta$

Solve for v_f

Ch 9 #53





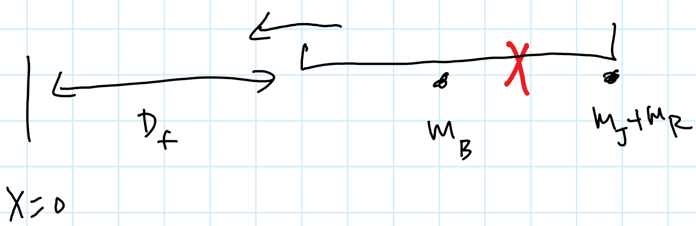


Find $(x_{cm})_i = \dfrac{m_J x_J + m_B x_B + m_R x_R}{m_J + m_B + m_R}$

$$= \frac{m_J D_i + m_B\left(D_i + \frac{2.7}{2}\right) + m_R\left(D_i + 2.7\right)}{M_{total}}$$

Let $D_i = 0$

after:



$$(X_{cm})_f = \frac{m_B\left(D_f + \frac{2.7}{2}\right) + (m_J+m_R)\left(D_f + 2.7\right)}{M_{total}}$$

Now:

$$(X_{cm})_i = (X_{cm})_f$$

$$m_B\left(\frac{2.7}{2}\right) + m_R(2.7) = m_B\left(D_f + \frac{2.7}{2}\right) + (m_J+m_R)\left(D_f + 2.7\right)$$

Solve for D_f

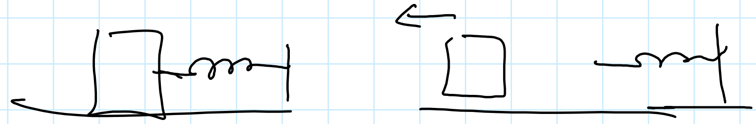
should be –

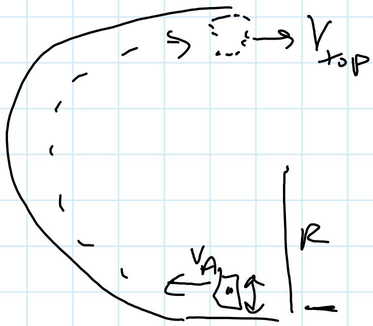
Ch 8 #65

Ch 9 #81

Ch 8 #65

initial





$U_{sp} = K$

$\frac{1}{2} k x^2 = \frac{1}{2} m v^2$

solve for x

$(f_k)_{ave} = 7\ N$

$E_i + W_{friction} + W_{ext} = E_f$

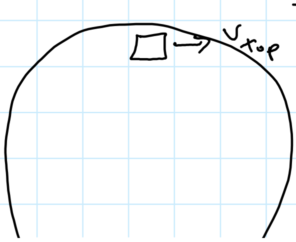
$K_i - f_k d = K_f + (U_g)_f$

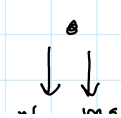
$\frac{1}{2} m v_i^2 - (7\ N)(\pi R) = \frac{1}{2} m v_{top}^2 + mg(2R)$

solve for v_{top}

if $v^2 = \sqrt{-(\quad)}$ doesn't make it

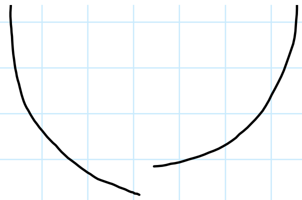
if $v = +(\quad)$

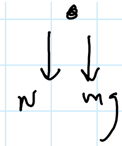




$\Sigma F_{radial} = m\frac{v^2}{R}$ $\downarrow +$

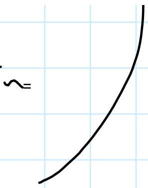
$\cancel{N}^{0} + \cancel{m}g = \cancel{m}v_{min}^2$



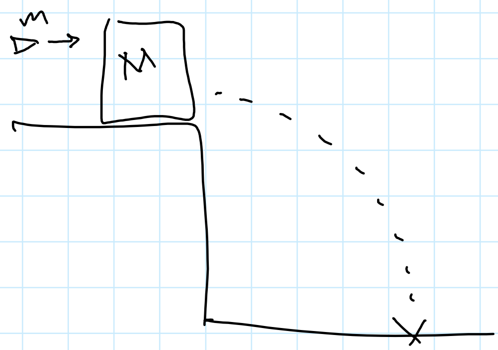


$$\cancel{N}^{0} + \cancel{m} g = \frac{\cancel{m} v_{min}^2}{R}$$

$$\sqrt{Rg} = v_{min}$$



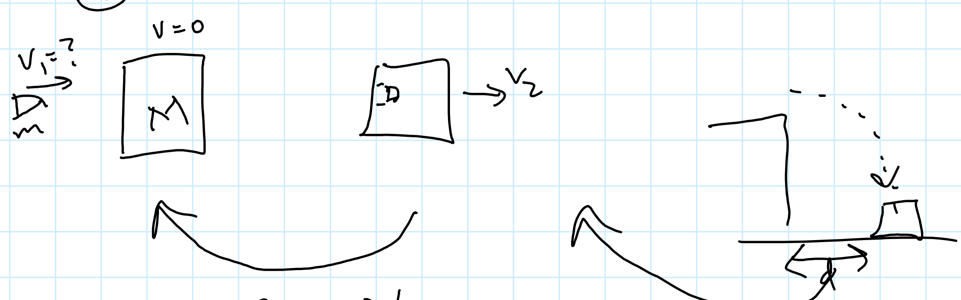
Ch 9 #81



Just before collision ①

Just after ②

Later ③



$P_1 = P_2 \rightarrow t$

Use Kinematics to find V_2

$$m v_1 + M(0) = (m+M) V_2$$

$$m v_1 = (m+M) V_2$$

Need to find V_2

use y direction to get t

$$d = V_2 t$$

$$V_2 = \frac{d}{t}$$

$$V_1 = \left(\frac{m+M}{m}\right) V_2$$

$(m+M) \quad d$

$$= \left(\frac{m+M}{m}\right)\frac{d}{t}$$