Momentum Continued

$V_{2f} = 12.4 @ 14.9°$

$KE_i = \frac{1}{2}(8)(15)^2 = 900 J$

$KE_f = \frac{1}{2}(8)(4)^2 + \frac{1}{2}(10)(12.4)^2 = 835.3 J$

$\% lost = \partial KE / KE_i = 900 - 835.3 / 900 = 7.2\%$
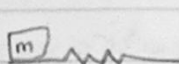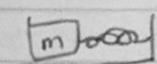
$V_f(m+M)$

$\frac{1}{2}(m+M)v_f^2 = (m+M)gh$

$V_f = \sqrt{2gh} = \sqrt{2(9.8)(.1)} = 1.4 m/s$

$.01 V_i = (.01 + 5.5)(1.4)$

$V_i = 770 m/s$

$KE = \mu_k mgd$

Center of mass (gravity)
  Discrete particles
  Continuous mass distributions (plate)

$X_{cm} = \frac{1}{M_T} \sum_{i=1}^{n} m_i x_i$

$\vec{V}_{cm} = \frac{1}{M_T} \sum_{i=1}^{n} m_i \vec{v}_i$

$\cdot (0.2, 0.5)$
    3

$(-0.3, 0.1)$
    5

$\cdot (0.5, -0.9)$
    2

$X_{cm} = \frac{1}{10}(3(.2) + 2(.5) + 5(-.3)) = .01 m$

$Y_{cm} = \frac{1}{10}(3(.5) + 2(-.9) + 5(-.1)) = -.08 m$