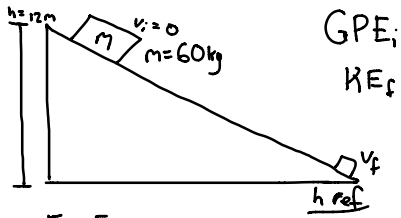
Potential Energy



$GPE_i = mgh$

$KE_f = \frac{1}{2}mv$

$E_i = E_f$

$KF_i + \quad = KF_f + GPE_f$

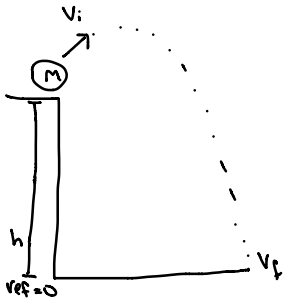
$\frac{1}{2}mv_i^2 + mgh = \frac{1}{2}mv_f^2 + mgh$

$0 + mgh = \frac{1}{2}mv_f^2 + 0$

$v_f^2 = 2gh$

$v_f = \sqrt{2(9.8)(1.2)}$

$v_f = 4.85\ m/s$

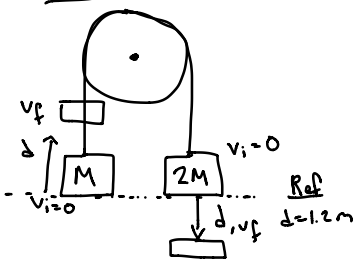


$E_i = E_f$

$\frac{1}{2}mv_i^2 + mgh = 0 + \frac{1}{2}mv_f^2$

$v_f^2 = v_i^2 + 2gh$

Given



Find a) a

Solve a) $(2m)gd - mgd = \frac{1}{2}(2m)v_f^2 + \frac{1}{2}(m)v_f^2$

$mgd = m\left(v_f^2 + \frac{1}{2}v_f^2\right)$

$gd = \left(\frac{3}{2}v_f^2\right)$

$v_f = \sqrt{\frac{2}{3}gd}$

$v_f = \sqrt{\frac{2}{3}(9.8)(1.2)}$

$= 2.8\ m/s$

$y_i = 0$

$y_f = 1.2$

$v_i = 0$

$v_f = 2.8$

$a =$ ☐

$t =$ ☐

$v_f^2 = v_i^2 + 2a(y_f - y_i)$

$(2.8)^2 = 0 + 2a(1.2)$

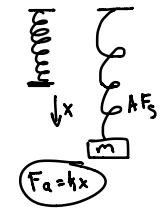
$a = \frac{(2.8)^2}{2.4}$

$a = 3.27\ m/s^2$

$a = \frac{g(2m-m)}{(2m+m)}$

$a = \frac{9.8(m)}{3(m)} = 3.27\ m/s^2$

Hooke Law



Linear Response

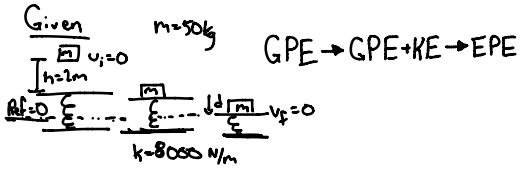
$F_s = -kx$

integrate ↓ ; ↑ spring constant

$EPE = \frac{1}{2}kx^2$

Given

$m = 50kg$



GPE → GPE+KE → EPE

Find a) d

Solve a) $mg(d+h) = \frac{1}{2}kd^2$

$(50)(9.8)(d+2) = \frac{1}{2}(8000)(d)^2$

$980 = 4000d^2 - 490d$

$d = 0.56m$