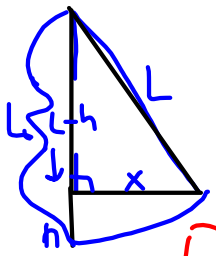
Ballistic Pendulum



$a = L - h$
$b = x$
$c = L$

$a^2 + b^2 = c^2$
$-b^2 \quad -b^2$
$\sqrt{a^2} = \sqrt{c^2 - b^2}$

$a = \sqrt{c^2 - b^2}$

$L - h = \sqrt{L^2 - x^2}$

$.735 - h = \sqrt{.735^2 - .053^2}$

$.735 - h = .7331$
$-.735 \quad -.735$

$-h = -.0019$

$h = .0019$

PART 1

PART 2

$K.E._{pd} = P.E._{pd}$

$\frac{1}{2}mv^2 = mgh$

$v^2 = 2gh$

$v_{pd} = \sqrt{2gh}$

$v_{pd} = \sqrt{2(9.8 m/s^2)(.0019 m)}$

$v_{pd} = .193 m/s = v'$

PART 3

$\Sigma p = \Sigma p'$

$m_p v_p + m_d v_d = m_p v' + m_d v'$

$0 + (.002)(v_d) = .193(.105 kg)$

$\frac{.002 v_d}{.002} = \frac{.020265 m/kg/s}{.002 kg}$

$v_d = 10.13 m/s$