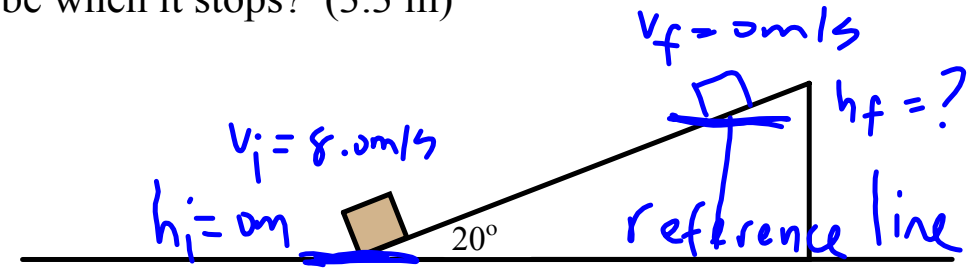
Example: A box is shot up a frictionless 20° incline with an initial speed of 8.0 m/s. How high above the floor will the box be when it stops? (3.3 m)



$E_{Ki} + E_{gi} + E_{ei} = E_{Kf} + E_{gf} + E_{ef}$

v_i? h? $v_f = ?$ h?

$E_{Ki} = E_{gf}$ ←

$\frac{1}{2} m v_i^2 = mgh_f$ ←

$\frac{v_i^2}{2g} = \frac{gh_f}{g}$

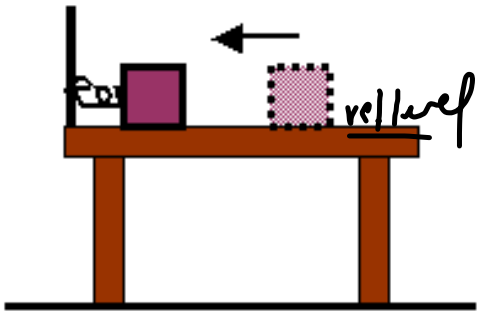
$h_f = \frac{v_i^2}{2g}$

$h_f = \frac{(8.0)^2}{2(9.80)}$

$h_f = 3.3m$

Example:

An object is sliding along a frictionless table with an initial speed of 0.64 m/s. It strikes a coiled spring with a spring constant of 450 N/m and compresses it 7.8 cm. What was the mass of the object?



$E_{ki} + E_{gi} + E_{ei} = E_{kf} + E_{gf} + E_{ef}$

$E_{ki} = E_{ef}$

$\frac{1}{2} m v_i^2 = \frac{1}{2} k x_f^2$

$m v_i^2 = k x_f^2$

$m = \frac{k x_f^2}{v_i^2}$

$m = \frac{(450)(0.078)^2}{(0.64)^2}$

$m = 6.7\ kg$