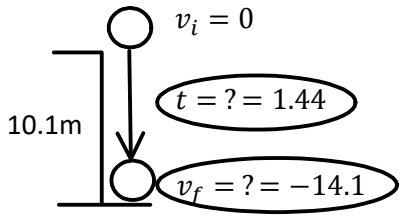
P11 - 2.3 - Ball Drop Notes

$\Delta d = v_i t + \frac{1}{2} a t^2$

$v_f^2 = v_i^2 + 2ad$

$v_f = v_i + at$

+



$a = g = -9.8 \frac{m}{s^2}$

$\Delta d = v_i t + \frac{1}{2} a t^2$

$-10.1 = 0 \times t + \frac{1}{2}(-9.8)t^2$

$-10.1 = \frac{1}{2}(-9.8)t^2$

$-10.1 = -4.9t^2$

$2.06 = t^2$

$t = 1.44s$

$\Delta d = d_f - d_i$

$\Delta d = 0 - 10.1$

$\Delta d = -10.1m$

Down

Time to Fall $= 1.44s$

$\Delta d = v_i t + \frac{1}{2} a t^2$

$\Delta d = \frac{1}{2} a t^2$

$t = \sqrt{\frac{2d}{a}}$

$t = \sqrt{\frac{2(-10.1)}{-9.8}}$

$t = 1.44s$

Velocity before impact $v_f = v_{before\ impact}$

$v_f^2 = v_i^2 + 2ad$

$v_f^2 = (0)^2 + 2(-9.8)(-10.1)$

$v_f^2 = 197.96$

$v_f = -14.1 \frac{m}{s}$

$v_f^2 = v_i^2 + 2ad$

$v_f^2 = 2ad$

$v_f = \sqrt{2ad}$

$v_f = \sqrt{2(-9.8)(-10.1)}$

$v_b = -14.1 \frac{m}{s}$

OR

$v_f = v_i + at$

$v_f = at$

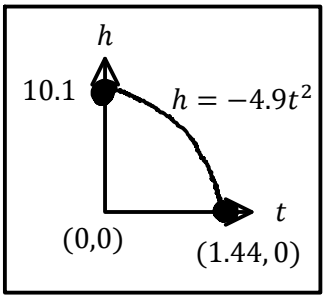
$v_f = (-9.8)(1.44)$

$v_f = -14.1 \frac{m}{s}$

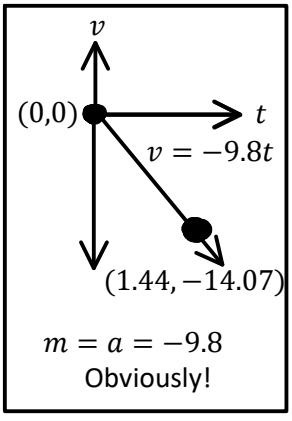
Rounding!

Velocity Before Impact $= -14.07 \frac{m}{s}$ $-ve\ ; Down!$

h vs t



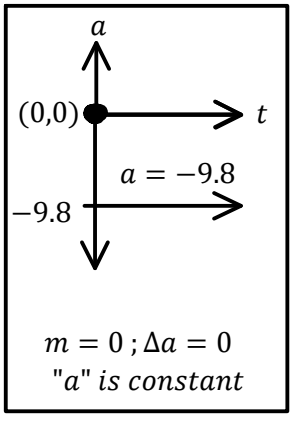
v vs t



$m = a = -9.8$

Obviously!

a vs t



$m = 0\ ; \Delta a = 0$

"a" *is constant*