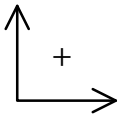
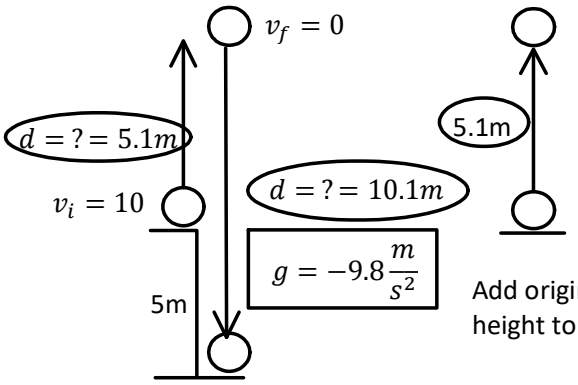
P11 - 2.5 - Ball Throw Up from Building Notes





$v_f^2 = v_i^2 + 2ad$
$0^2 = 10^2 + 2(-9.8)d$
$0 = 100 - 19.6d$
$19.6d = 100$
$d = 5.1m$

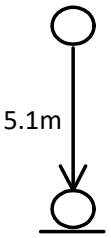
Add original height to rise

$d = 5 + 5.1$
$d = 10.1m$

Up

$v_f^2 = v_i^2 + 2ad$
$0 = v_i^2 + 2ad$
$d = \frac{-v_i^2}{2d}$
$d = \frac{-10_i^2}{2d}$
$d = 5.1m$

$Max\ Height = 10.1m$



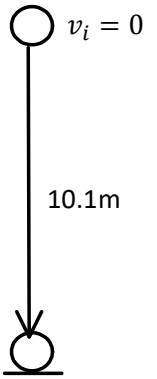
$\Delta d = v_i t + \frac{1}{2}at^2$
$-5.1 = 0 \times t + \frac{1}{2}(-9.8)t^2$
$-5.1 = -4.9t^2$
$1.04 = t^2$
$t = 1.02s$

$\Delta d = d_f - d_i$
$\Delta d = 0 - 5.1$
$\Delta d = -5.1m$

$Time\ to\ Max\ Height = 1.02s$

$\Delta d = v_i t + \frac{1}{2}at^2$
$t = \sqrt{\frac{2d}{a}}$
$t = \sqrt{\frac{2(5.1)}{-9.8}}$
$t = 1.02s$

Down



$\Delta d = v_i t + \frac{1}{2}at^2$
$-10.1 = 0 \times t + \frac{1}{2}(-9.8)t^2$
$-10.1 = -4.9t^2$
$2.06 = t^2$
$t = 1.44s$

$\Delta d = d_f - d_i$
$\Delta d = 0 - 10.1$
$\Delta d = -10.1m$

$Time\ to\ Fall = 1.44s$

$\Delta d = v_i t + \frac{1}{2}at^2$
$t = \sqrt{\frac{2d}{a}}$
$t = \sqrt{\frac{2(10.1)}{-9.8}}$
$t = 1.44s$

Add Times

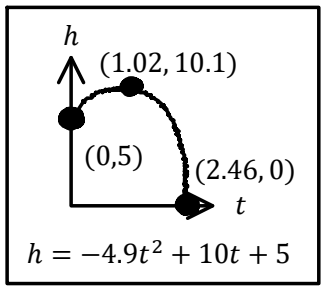
$t = 1.02 + 1.44$
$t = 2.46s$

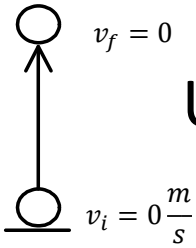
$Total\ Time = 2.46s$

Up/Down

OR

$h\ vs\ t$





Up

$v_f = v_i + at$
$0 = 10 + (-9.8)t$
$t = 1.02s$

$v_f = v_i + at$
$t = \frac{-v_i}{a}$
$t = \frac{-10}{-9.8}$
$t = 1.02s$

$Time\ to\ Max\ Height = 1.02s$

$\Delta d = v_i t + \frac{1}{2}at^2$
$\Delta d = (10)(1.02) + \frac{1}{2}(-9.8)(1.02)^2$
$\Delta d = 5.1m$

...

$\Delta d = v_i t + \frac{1}{2}at^2$
$-5 = 10t + \frac{1}{2}(-9.8)t^2$
$0 = -4.9t^2 + 10t + 5.0$

Quadform

$t = -ve$ $t = 2.46s$

$\Delta d = d_f - d_i$
$\Delta d = 0 - 5.1$
$\Delta d = -5.1m$

$Total\ Time = 2.46s$

Up/Down