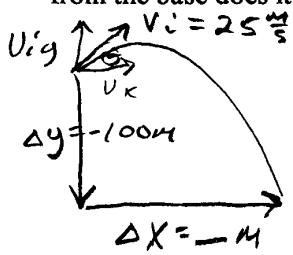
1° Honors Physics – Angled Projectile quiz 9 10-16-02

A ball is thrown at a 35° angle off a 100 m high cliff at 25.0 m/s. (a) How long does it take to hit? (b) How far from the base does it hit?



$V_x = V_i \cos\theta$
$= 25\,\frac{m}{s} \cos 35°$
$V_x = 20.5\,\frac{m}{s}$

$V_{iy} = V_i \sin\theta$
$= 25\,\frac{m}{s} \sin 35°$
$V_{iy} = 14.3\,\frac{m}{s}$

$\Delta y = V_{iy} t + \frac{1}{2} a t^2$
$-100 = 14.3t - 4.9t^2$
a) $\boxed{t = 6.21\,s}$, $-3.29\,s$

OR

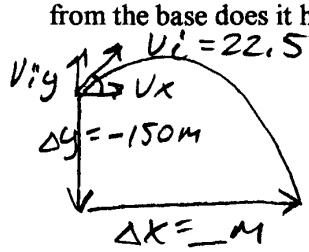
$V_{fy}^2 = V_{iy}^2 + 2a\Delta y$
$V_{fy}^2 = (14.3\,\frac{m}{s})^2 + 2(-9.8\,\frac{m}{s^2})(-100\,m)$
$V_{fy} = -46.5\,\frac{m}{s}$
$V_{fy} = V_{iy} + at$
$t = \frac{V_{fy} - V_{iy}}{a}$

$t = \frac{-46.5\,\frac{m}{s} - 14.3\,\frac{m}{s}}{-9.8\,\frac{m}{s^2}}$
$\boxed{t = 6.20\,s}$

$\Delta X = V_x t$
$= 20.5\,\frac{m}{s}(6.21\,s)$
b) $\boxed{\Delta X = 127\,m}$

3° Honors Physics – Angled Projectile quiz 9 10-16-02

A ball is thrown at a 38° angle off a 150 m high cliff at 22.5 m/s. (a) How long does it take to hit? (b) How far from the base does it hit?



$V_x = V_i \cos\theta$
$= 22.5\,\frac{m}{s} \cos 38°$
$V_x = 17.7\,\frac{m}{s}$

$V_{iy} = V_i \sin\theta$
$= 22.5\,\frac{m}{s} \sin 38°$
$V_{iy} = 13.9\,\frac{m}{s}$

$\Delta y = V_{iy} t + \frac{1}{2} a t^2$
$-150 = 13.9t - 4.9t^2$
a) $\boxed{t = 7.13\,s}$, $-4.29\,s$

OR

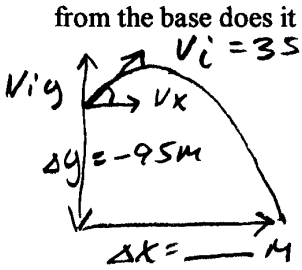
$V_{fy}^2 = V_{iy}^2 + 2a\Delta y$
$V_{fy}^2 = (13.9\,\frac{m}{s})^2 + 2(-9.8\,\frac{m}{s^2})(-150\,m)$
$V_{fy} = -56.0\,\frac{m}{s}$
$V_{fy} = V_{iy} + at$
$t = \frac{V_{fy} - V_{iy}}{a}$

$t = \frac{-56\,\frac{m}{s} - 13.9\,\frac{m}{s}}{-9.8\,\frac{m}{s^2}}$
$\boxed{t = 7.13\,s}$

$\Delta X = V_x t$
$= 17.7\,\frac{m}{s}(7.13\,s)$
b) $\boxed{\Delta X = 126\,m}$

8° Honors Physics – Angled Projectile quiz 9 10-16-02

A ball is thrown at a 42° angle off a 95 m high cliff at 35.0 m/s. (a) How long does it take to hit? (b) How far from the base does it hit?



$V_x = V_i \cos\theta$
$= 35\,\frac{m}{s} \cos 42°$
$V_x = 26.0\,\frac{m}{s}$

$V_{iy} = V_i \sin\theta$
$= 35\,\frac{m}{s} \sin 42°$
$V_{iy} = 23.4\,\frac{m}{s}$

$\Delta y = V_{iy} t + \frac{1}{2} a t^2$
$-95 = 23.4t - 4.9t^2$
a) $\boxed{t = 7.40\,s}$, $-2.62\,\frac{m}{s}$

OR

$V_{fy}^2 = V_{iy}^2 + 2a\Delta y$
$V_{fy}^2 = (23.4\,\frac{m}{s})^2 + 2(-9.8\,\frac{m}{s^2})(-95\,m)$
$V_{fy} = -49.1\,\frac{m}{s}$
$V_{fy} = V_{iy} + at$
$t = \frac{V_{fy} - V_{iy}}{a}$

$t = \frac{-49.1\,\frac{m}{s} - 23.4\,\frac{m}{s}}{-9.8\,\frac{m}{s^2}}$
$\boxed{t = 7.43\,s}$

$\Delta X = V_x t$
$= 26.0\,\frac{m}{s}(7.40\,s)$
b) $\boxed{\Delta X = 192\,m}$