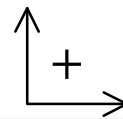


# P11 - 2.0 - Kin Summary Detail Notes



**Over  $a = \#$**

$t = 5$   
 $d = 40$

$a = 0$

$v = \frac{d}{t}$   
 $v = \frac{40}{5}$   
 $v = 8 \frac{m}{s}$

$t$	$d$
0	0
1	8
2	16
3	24
4	32
5	40

$v_i = 0$     $v_f = 10$

$t = 2$

$a = 5$

$d = 10$

$v_f = v_i + at$   
 $10 = 0 + a(2)$   
 $a = \frac{10}{2}$   
 $a = 5 \frac{m}{s^2}$

$v_f^2 = v_i^2 + 2ad$   
 $10^2 = 0^2 + 2a(10)$   
 $100 = 20a$   
 $a = \frac{100}{20}$   
 $a = 5 \frac{m}{s^2}$

**$a = -9.8$**   
**Down**

$v_i = 0$

10.1

$t = 1.44$

$v_f = -14.1$

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

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

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

$t = 1.44s$

$v_f = v_i + at$   
 $v_f = at$   
 $v_f = (-9.8)(1.44)$   
 $v_f = -14.11 \frac{m}{s}$

**h vs t**

**Up/Down**

$v = 0$

$t = 2.04s$

$d = 5.1$

$v_i = 10 \frac{m}{s}$

$v_f^2 = v_i^2 + 2ad$   
 $0 = v_i^2 + 2ad$   
 $d = \frac{-v_i^2}{2a}$   
 $d = \frac{-10^2}{2(-9.8)}$   
 $d = 5.1m$

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

$0 = 10t + \frac{1}{2}(-9.8)t^2$

$0 = -10t - 4.9t^2$

$0 = -4.9t(t - 2.04)$

$-4.9t = 0$     $t - 2.04 = 0$

$t = 0s$     $t = 2.04s$

$x = \frac{-b \pm \sqrt{b^2 - 4ac}}{2a}$

Or Quadform

$v_f = 0$

$t = 2.46$

$d = 10.1$

5m

$v_i = 10$

$v_f^2 = v_i^2 + 2ad$   
 $0 = v_i^2 + 2ad$   
 $d = \frac{-v_i^2}{2a}$   
 $d = \frac{-10^2}{2(-9.8)}$   
 $d = 5.1m$

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

$-5 = 10t + \frac{1}{2}(-9.8)t^2$

$0 = -4.9t^2 + 10t + 5.0$

$t = -ve$     $t = 2.46s$

Quadform

$\leftarrow 2.46 = 2.04 + 0.42$

5m

$v_i = -10 \frac{m}{s}$

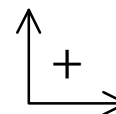
$t = 0.42$

$v_f = -14.1$

$v_f^2 = v_i^2 + 2ad$   
 $v_f^2 = (-10)^2 + 2(-9.8)(-5)$   
 $v_f^2 = 198$   
 $v_f = -14.1 \frac{m}{s}$

$v_f = v_i + at$   
 $-14.1 = -10 + (-9.8)t$   
 $t = 0.42s$

# P11 - 2.0 - Kin Summary Detail Notes



**Down Trig!**

5m

$v_i = 10 \frac{m}{s}$

1.01s

$d = 10.1m$

$v = 10$

$\theta = 44.7^\circ$

$v = -9.9$

$v_r = 14.1$

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

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

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

$t = \sqrt{\frac{2(-5)}{-9.8}}$

$t = 1.01s$

$v = v_i + at$

$v = at$

$v = (-9.8)(1.01)$

$v = -9.9 \frac{m}{s}$

**Over**

$v = \frac{d}{t}$

$d = vt$

$d = 10(1.01)$

$d = 10.1m$

Plane

Target

When should the plane/ballon drop/shoot the package to hit the target. Same problem as above. Angles may be involved

Logic

5m

$\theta = 15^\circ$

$v_r = 10$

$d = 7.8m$

**Over**

$v = 9.66 \frac{m}{s}$

$v = -2.59 \frac{m}{s}$

$v = 9.66 \frac{m}{s}$

$\theta = 46.6^\circ$

$v = -10.2 \frac{m}{s}$

$v_r = 14.1$

$v_r = 14.1 \frac{m}{s} \ 46.6^\circ \text{ Bel Hor}^*$

## Trig! Down

$v_r = 50 \frac{m}{s}$

40°

$v \sin \theta$

$h = 52.6m$

$v \cos \theta$

$d = 251m$

**Trig!**

**Up/Down**

**Over**

40°

$v_r = 50 \frac{m}{s}$

## Logic

$v_r = 40 \frac{m}{s}$

50°

**Trig!**

$h = 47.8m$

$h = 60m$

**Up/Down**

**Over**

$d = 200.5m$

$\theta$

$V_r$

Balloon

Target