## Bomber vs. Cannon Problems

There are slight differences between bomber and cannon problems, and these slight variations usually confuse students. So let's organize our thoughts into one worksheet.

**Bomber Problems:**

**How do you know it's a bomber problem?**

Initial Velocity Is Horizontal only $V_y = 0$

**Draw the Path Here**

$v_x$

$dy$

$V_{yf}$

$dx$
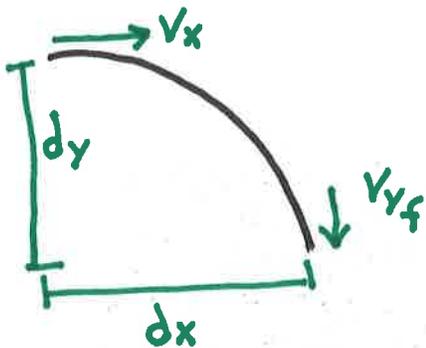
**Write down the x and y equations**

|   X   |   Y   |

$dy = \frac{1}{2}at^2$

$V_{yf} = -9.8t$

$dx = V_x \cdot t$

**Create the x/y chart**

| | X | Y |
|---|---|---|
| $V_i$ | $V_x$ | 0 |
| $V_f$ | $V_x$ | $V_{yf}$ |
| $d$ | $dx$ | $dy$ |
| $a$ | 0 | $-9.8$ |
| $t$ | Same | Same |

SAME for all Bomber Problems

**Cannon Problems:**

**How do you know it's a Cannon problem?**

Initial Velocity is Both Horizontal & Vertical

@TOP
(T/2)

**Draw the Path Here**

$v_y$ ... $dy @ t/2$ ... $V_y$

$v_x$ ... $V_y$ ... $V_x$

$dx$

$\theta$
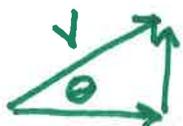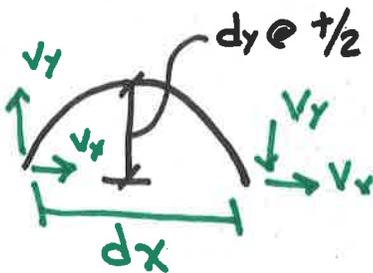
$V_x = V\cos\theta$

$V_y = V\sin\theta$

**Write down the x and y equations**

|   X   |   Y   |

(@Top Time ÷2)

$V_y = at$

$dy = \frac{1}{2}at^2$

(Total time)

$dx = V_x \cdot t$

**Create the x/y chart**

| | X | Y | @Top (T/2) |
|---|---|---|---|
| $V_i$ | $V_x$ | $V_y$ | $V_y$ |
| $V_f$ | $V_x$ | $-V_y$ | 0 |
| $d$ | $dx$ | 0 | $dy$ |
| $a$ | 0 | $-9.8$ | $-9.8$ |
| $t$ | Total | Total | Total/2 |