

Different Elevation Notes

A.) A ball is tossed straight up in the air beginning at height 20 meters with $V_{iy} = 30 \text{ m/s}$.

The ball reaches its peak and is then allowed to drop to the ground at 0 meters.

1. How much time does the ball spend in the air?

2. What is the ball's impact velocity?

* You will need to use the quadratic formula to find time.

$$\Delta y = V_{iy}t + \frac{1}{2}a_y t^2$$

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

$$0 = at^2 + bt + c$$

$$g = -10 \text{ m/s}^2$$

13.) A ball is tossed straight up in the air beginning at the 0m ground level with $V_{i,y} = 30 \text{ m/s}$. The ball reaches its peak and is then caught when it is 20 meters above the ground on its way down.

1. How much time does the ball spend in the air?

2. What is the ball's velocity when caught?

* You will need the quadratic formula to find time.

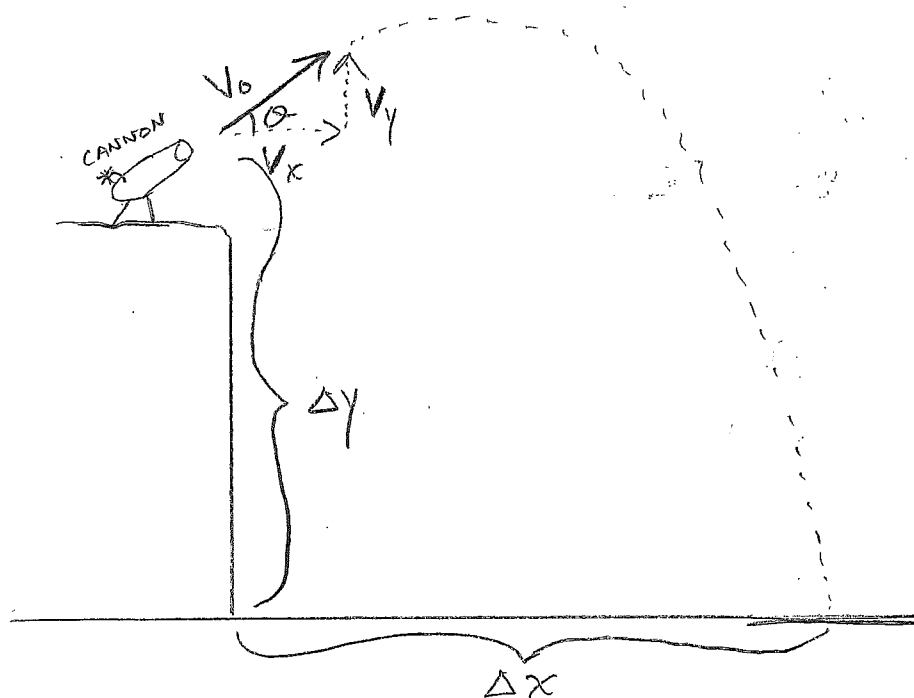
$$t = \frac{-b \pm \sqrt{b^2 - 4ac}}{2a}$$

$$g = -10 \text{ m/s}^2$$

$$0 = at^2 + bt + c$$

$$\Delta y = V_{i,y} t + \frac{1}{2} a_y t^2$$

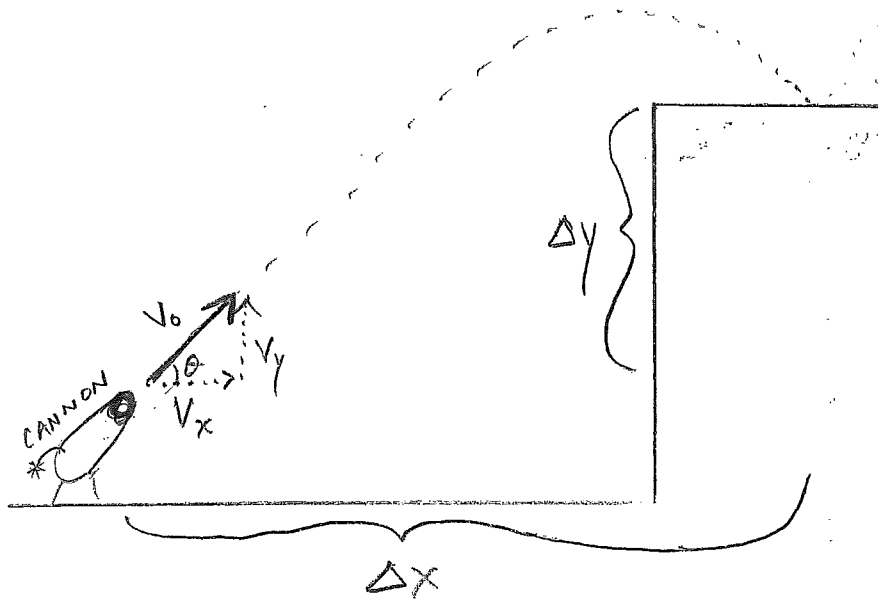
c.)



$$\Delta y = -30 \text{ m}$$
$$V_0 = 50 \text{ m/s}$$
$$\theta = 25^\circ$$
$$g = -10 \text{ m/s}^2$$

1. Find V_x and V_y .
2. Find time in the air.
3. Find Δx .
4. Find the impact velocity.
5. Find the angle of impact.

D.)



$$\Delta y = +10 \text{ m}$$

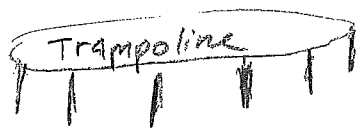
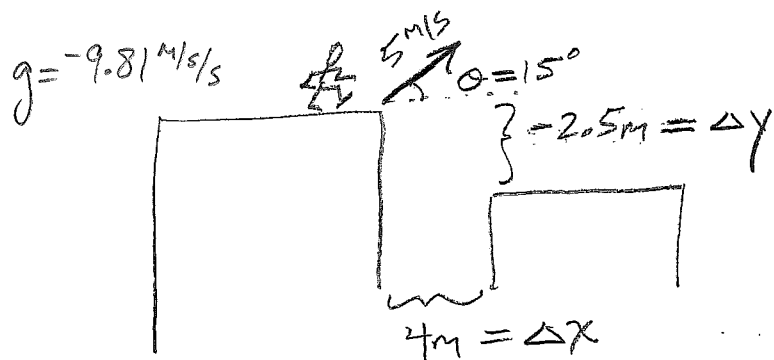
$$v_0 = 50 \text{ m/s}$$

$$\theta = 25^\circ$$

$$g = -10 \text{ m/s}^2$$

1. Find v_x and v_y .
2. Find time in the air.
3. Find Δx
4. Find impact velocity.
5. Find angle of impact.

E.) A person jumps from the top of one building to another building 4 meters away horizontally. The person leaps with a velocity of 5 m/s above the flat roof. Will the person make it to the top of the other roof if it is 2.5 meters shorter? $\theta = 15^\circ$ with the horizontal.



If the person makes it across the gap:

1. What are $V_{x,i}$ and $V_{y,i}$?
2. What is air time?
3. What are $V_{x,f}$ and $V_{y,f}$?
4. What is the impact angle?
5. What is the impact velocity?