

X-Y Independence Video Notes

If we could shoot a ball sideways, and drop another ball at exactly the same time, which do you think would hit the ground first? _____

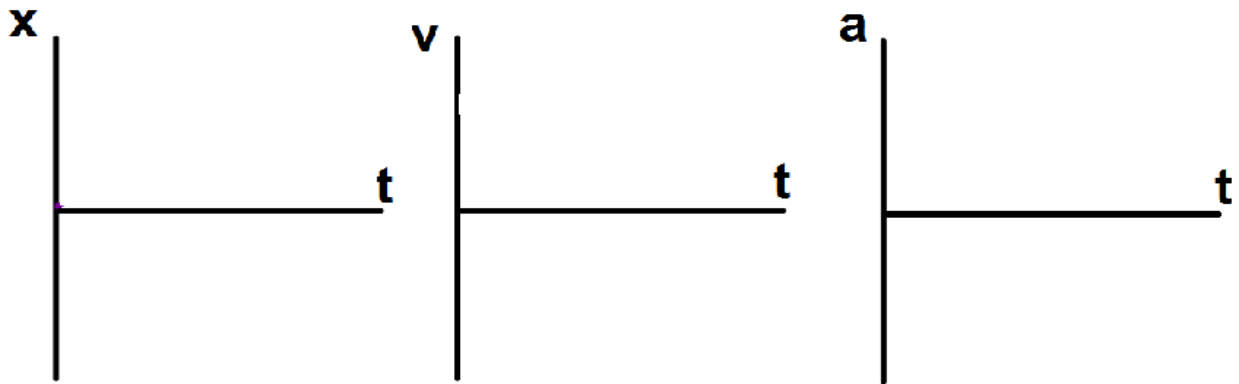
What actually happened in the slow motion video? _____

This happened because the x and y dimensions _____ .

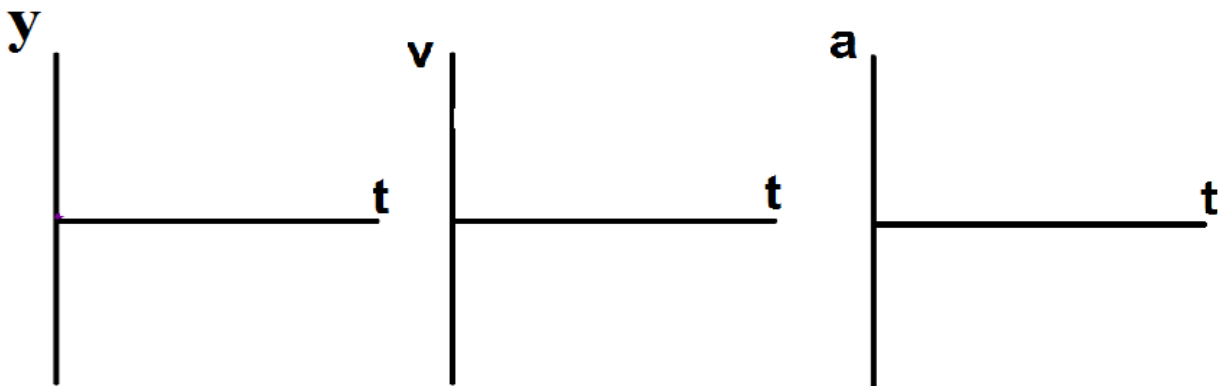
The fact that the shot ball is also moving in the x direction, has _____ on the freefall in the y direction.

My graphs of the shot ball look like this:

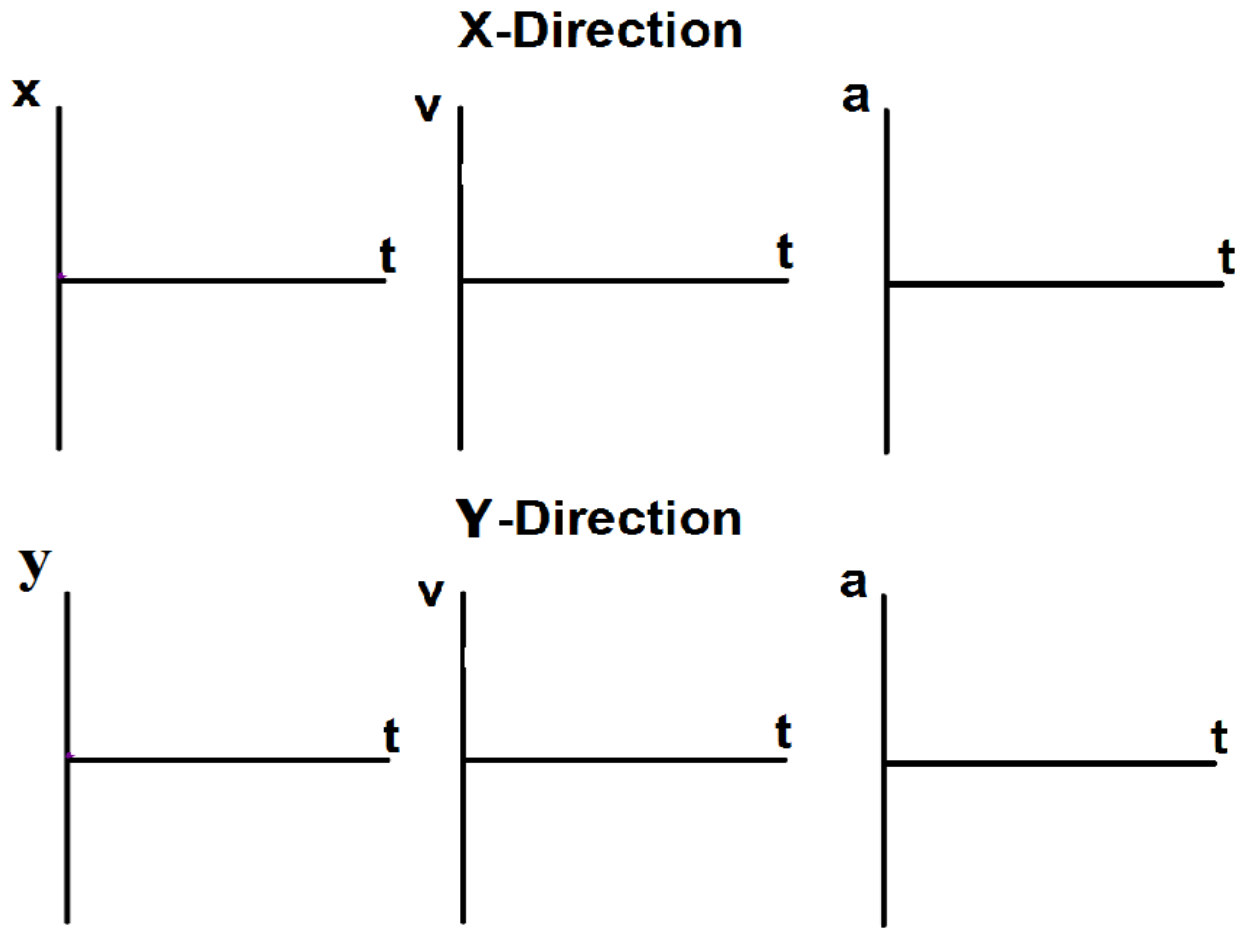
X-Direction



Y-Direction



The correctly drawn graphs of the shot ball look like this:



This also works for bullets. How did the mythbusters prove this?

What happened in the Japanese video? Why did that happen?

Vectors Video Notes

Before vectors were understood, we thought _____
_____ .

We draw a vector as an _____ .

We can add vectors like this:



And subtract vectors like this:

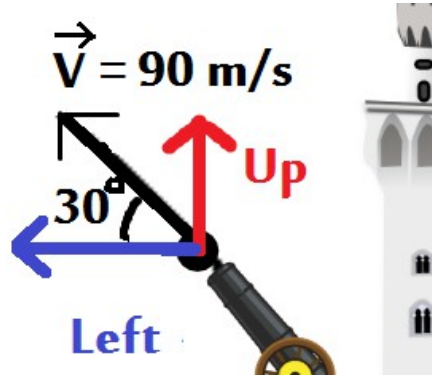


In physics, we need to split vectors into their x and y components.

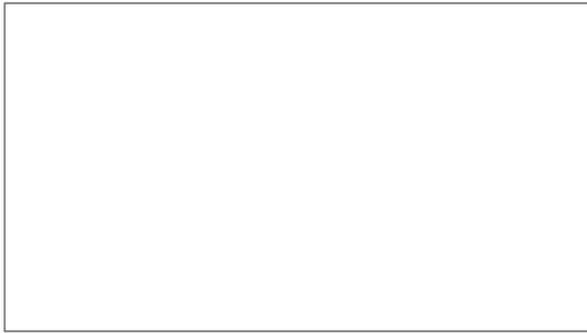
Cannonball path diagram:



Example with numbers:



Move the up component to make a vector triangle:



Then use SOHCAHTOA to find equations for the up part (V_y) and the left part (V_x):

$$\cos \theta = \frac{\boxed{}}{\boxed{}} = \frac{\boxed{}}{\boxed{}}$$

Plug numbers into the equation to get:

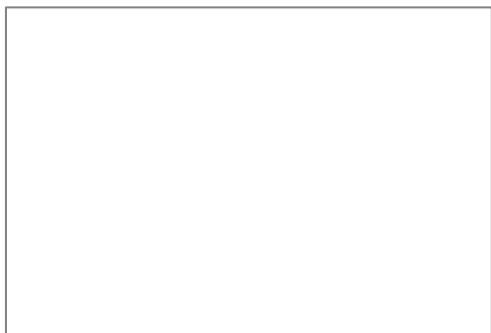
$$V_y = \frac{\boxed{}}{\boxed{}} = \boxed{} \text{ m/s up}$$

$$V_x = \frac{\boxed{}}{\boxed{}} = \boxed{} \text{ m/s left}$$

You can draw a vector triangle for anything that's a vector. Examples:

Force:

Electric Field:



V_x is a constant velocity in the x direction. V_i is an initial velocity. It will change over time because of _____.

V_x can be used in this equation:

V_i can be used in the equations of _____.