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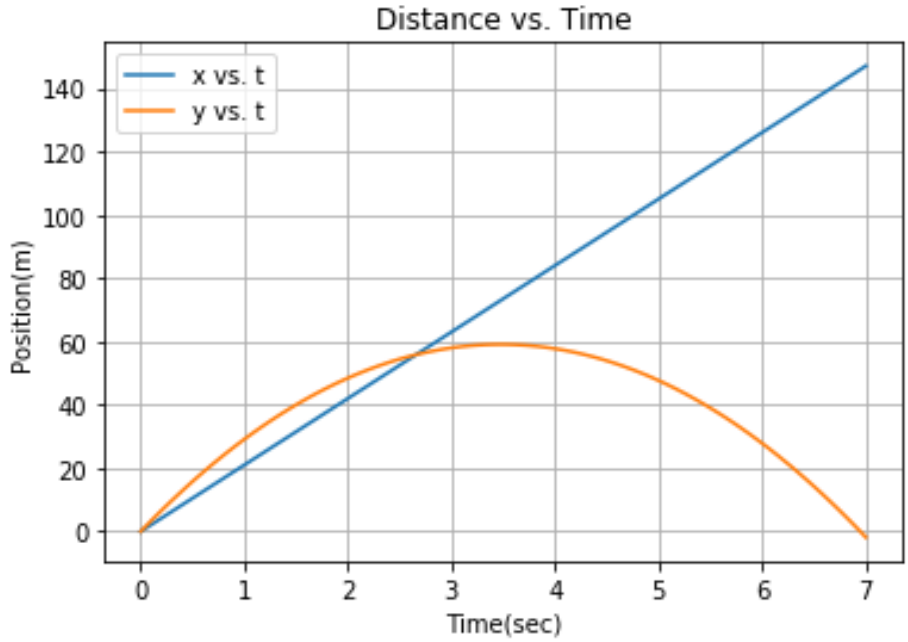
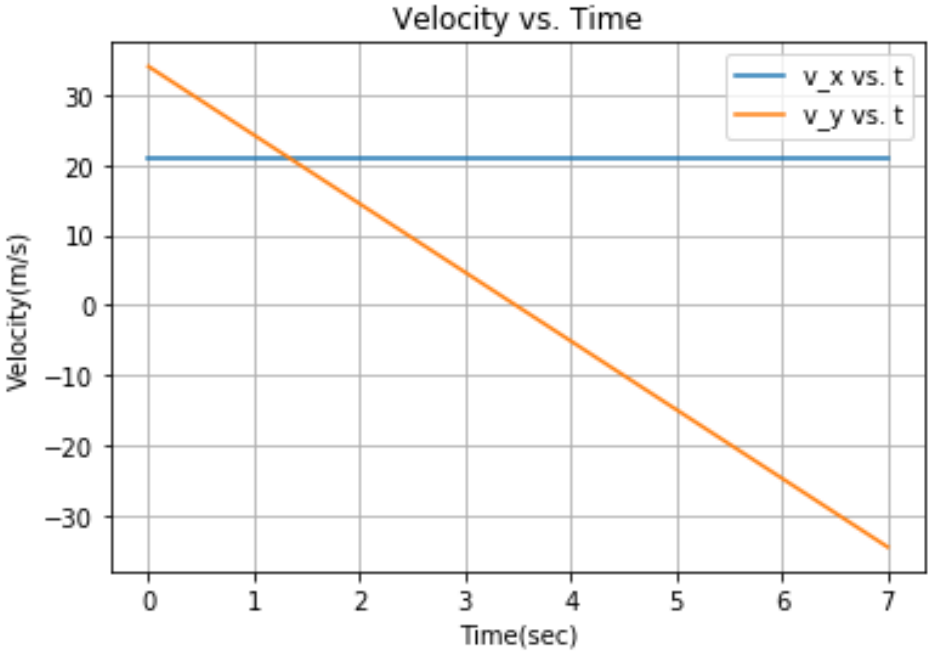
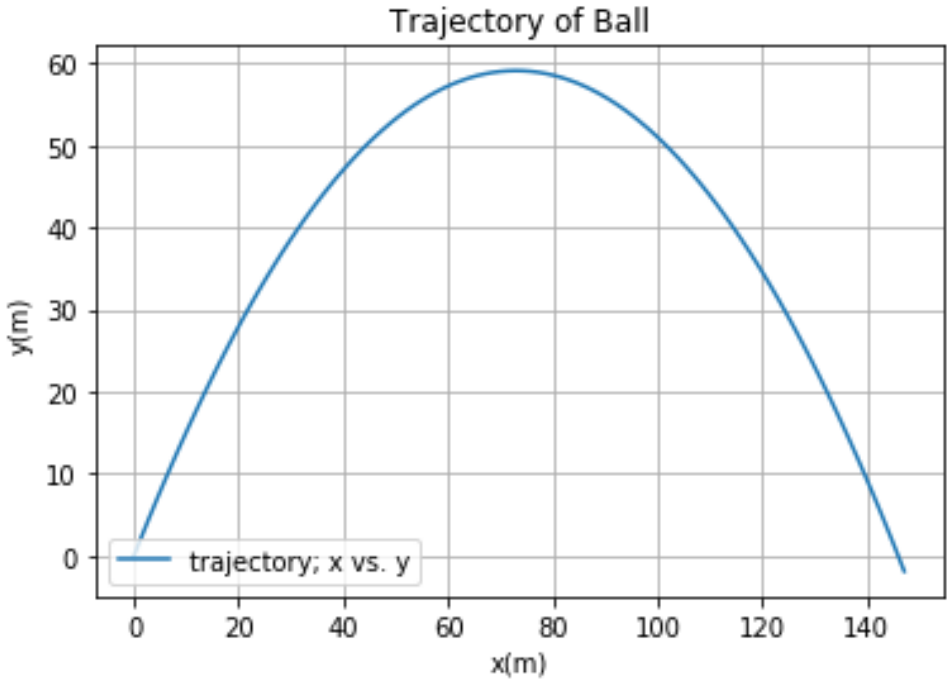
Physics 251
Homework 3: Problem 3



In this figure, I graphed both the x and y component of position with respect to time. We notice that the x component is just a linear function, because in the x direction the projectile (in this case the ball) is being thrown and not coming back to where it started. On the other hand, the y-component is a parabola facing downwards because in the y direction the ball is being thrown up from zero and coming back to zero due to gravity of course.



In this figure, I graphed the both the x and y component of velocity with respect to time. One observation we can make is that both these functions are derivatives of the previous position function. In projectile motion, the x component of velocity is constant because there are no horizontal forces acting on the ball thus there is 0 acceleration. The y component of the velocity is a linear function with negative slope because the projectiles velocity decreases as it goes up due to gravitational force (and other factors) and after it crosses 0 its speed increases with a negative direction change thus a negative velocity.



In this figure, I graphed x with respect to y. This graph shows me the trajectory of the ball, this is what the ball looks like when it's flying through the air it reaches a max of height of about 60 meters and gets to about 150 meters far.