

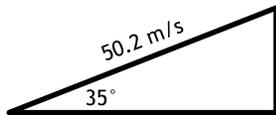
Physics: 2D Motion
The Legend of Kyle Schwarber

Name _____
1 2 3 4 5 6 7 8

During Game 4 of the 2015 NLCS, young Cubs phenom Kyle Schwarber launched a massive home run onto the top of the video board in the right corner of Wrigley Field. To this day, the baseball is still believed to be on top of the board. With no air resistance, how far would the ball fly and how high would it go?

Below, there is a step-by-step guide on how to solve 2D motion problems. Schwarber's dinger is used as the projectile. Pay attention to the steps below to solve the problem.

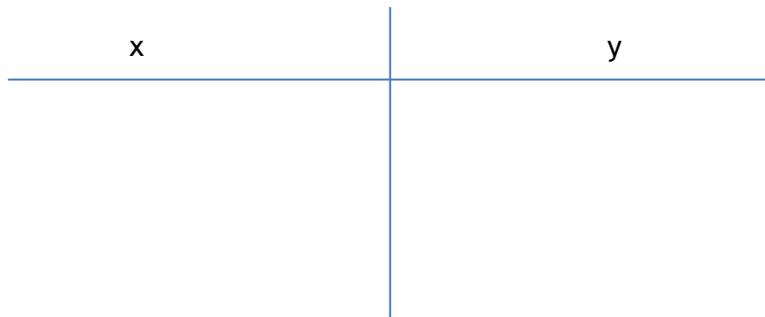
1. According to Statcast, the baseball had a launch velocity of 50.2 m/s at an angle of 35° . Find the horizontal and vertical velocities of the baseball using the triangle below.



$v_x =$

$v_{iy} =$

2. Below, fill in values for the horizontal (x) values and the vertical (y) values you know.



3. Now, draw a picture below and label values you know.



4. Usually, you'll need to solve for the time the ball spends in the air. There are two different ways you can do this, and both should give you the same answer.

Using $v_f = v_i + at$

Using $d_y = v_{iy}t + \frac{1}{2}at^2$

5. Now that you know the hang time, you can fill it into the table on *BOTH* sides. Time is the only value that should be on both sides of the table.

x	y
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6. Next, you can find how high the ball flew. Again, draw a picture below. Is how high the ball flew a horizontal (x) value or a vertical (y) value? Remember to only use values from the same side of the table to solve.

7. Now, do the same thing, but solve for how far the ball flew. Is this an x value or a y value? Remember to only use values from the same side of the table!

8. John Lackey is terrible, and during his warmup, he is playing catch with Yadier Molina, who is a loser. Molina throws the ball with an initial velocity of 25 m/s at an angle of 15° . How far away should John Lackey be so that the ball hits him in his stupid face? Assume his face is at the same level the ball was thrown.