## Pre-Lab Practice: Projectile Motion

Review the Textbook:

- PHYS 1401: Serway \& Vuille: Sec. 3.3-3.4.
- PHYS 2425: Serway \& Jewett: Sec. 4.1-4.3.
- https://www.webassign.net/question assets/ncsucalcphysmechl3/percent error/m anual.html

A ball is fired horizontally from a launcher that is 2.42 m above the floor. The experimental range of the shot was measured to be 1.68 m .

1. What was the total time of the flight?
(0.70 s)
2. What was the initial speed of the ball?
( $2.40 \mathrm{~m} / \mathrm{s}$ )
3. If the theoretical range for the same shot was predicted to be 2.72 m , calculate the $\%$ Error. Use the theoretical range as the reference value.
(38\%)

A ball is fired from a launcher with an initial speed is $7.00 \mathrm{~m} / \mathrm{s}$ at a $30^{\circ}$ angle from the horizontal. The point of firing is 2.42 m above the floor.
4. What is the horizontal component of the ball's initial velocity? ( $6.06 \mathrm{~m} / \mathrm{s}$ )
5. What is the vertical component of the ball's initial velocity? ( $3.5 \mathrm{~m} / \mathrm{s}$ )
6. What was the total time of the flight?
(1.145 s)
7. What is the predicted range of the shot?
( 6.94 m)
8. How much time did it take a ball to reach to the top point of the trajectory? (Hint: what is so special about the vertical component of the velocity at that point?)
( 0.3571 s )
9. What was the maximum height of the trajectory? (3.044m)

