# Lecture 7: Projectile Motion II

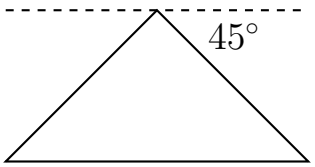
Announcements

- Group Expectations are due at 8pm tonight.
  - Only one submission per group.
  - Fill out the form even if you don't have a group. I will use it to assign you.
- Project Proposal is due on Friday.
  - Not released yet (will be after I form the groups in Canvas).
  - Decide on a topic and a format with your group.
- Make sure you can see your feedback on homework, labs, and Get-Ready assignments!

## L7-1: Archer of the Peak

You (still a long-distance archer) move to the top of the mountain below. The initial speed of your arrow is now 25.0 m/s, and you release it horizontally to the right. Following the steps for solving an A*R*C*S problem, find where the arrow lands.

- *Hint 1:* You will still need to set up separate equations for the $x$- and $y$-directions.
- *Hint 2:* You can also relate the horizontal and vertical distances the arrow moves before striking the ground.




1. Analyze and Represent

1a. **Understand the problem** – identify quantities by symbol and number.
1b. **Identify Assumptions** – identify important simplifications and assumptions.
1c. **Represent physically** – draw and label one or more appropriate diagrams and/or graphs that might help you solve the problem.

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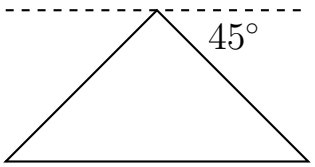


2. Calculate

2a. **Represent principles** – identify relevant concepts, laws, or definitions.
2b. **Find unknown(s) symbolically** – without numbers, find any unknown(s) in terms of symbols representing known quantities.
2c. **Plug in numbers** – plug numbers (with units) into your symbolic answer!

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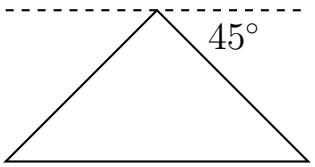


3. Sensemake

3a. **Units** – check that the units of your answer agree with the units you expect
3b. **Numbers** – compare your answer to other numbers in the problem or in the everyday world; if relevant, check the sign or direction.
3c. **Symbols** – use a strategy like covariation or special cases to check that your answer makes physical sense.

## Main Ideas

- We can use the kinematics equations to solve for any quantity of interest when the acceleration is constant.
- Motion in 2 dimensions can be broken down into independent motion in each dimension.