# Projectile Motion

Type III Problems

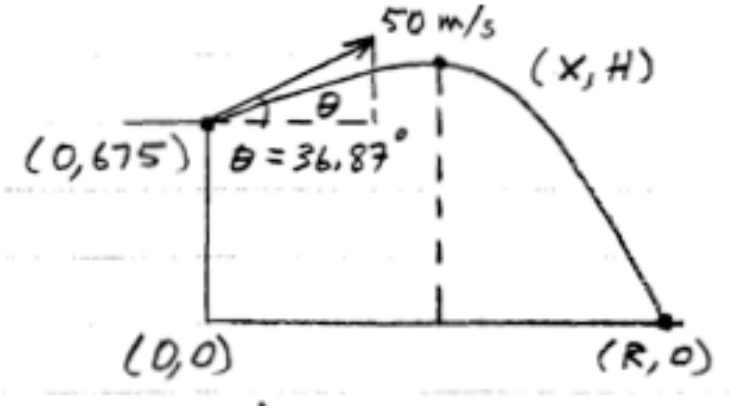
Key: x and y motion are **independent!**

- Recipe:

1. Draw a diagram
2. Put the origin on the ground
3. Make an x and y chart. Include appropriate subscripts (i.e. $v_{y0}$, $a_y$, etc.)
4. Pick the appropriate equations and solve.

*Note: With zero acceleration in the x-direction, only one of our formulas will be helpful:

**Ex 2:** Justin throws a basketball at 50 m/s at $36.9^0$ from atop a gymnasium whose elevation is 675 m. Find:




A. Total time airborne

B. Range

C. Time to maximum elevation

D. Location of maximum elevation

**Ex 3:** A soccer ball is kicked at 23 m/s at an angle of $60^0$ above the horizontal. It bounces off a building 17 m away.

A) At what height does it strike the building?

B) What is the ball's maximum height? (Assume the building does not get in the way).