Standard Problems 3. Projectile Motion

The Model

Projectile motion problems are problems in which an object flies through the air with no forces acting on it except gravity. Assumptions are:

- Objects are treated as point particles, with only a single, definite position.
- Air resistance is negligible.
- Objects are not propelled by rockets, motors, or anything else.

Given the above assumptions, the following will be true:

- The vertical acceleration will always be g, in the downwards direction.
- There is no acceleration in the horizontal direction.

Problem Solving Steps

1) Organize and plan
   a) Use diagrams, graphs, or other tools to visualize the situation. Label key instants in time clearly.
   b) Define all variables clearly, using subscripts to denote the time and the object referred to. Note down known variables.
   c) Find vector components of any quantities with both x and y components.
2) Solve
   a) Write down applicable constant velocity/accel. equations in the x and y directions separately.
   b) Use what is known to solve for what is unknown, connecting the two directions of motion using the shared time.
3) Reflect
   a) Do your answers make sense?
   b) Are the units correct?
   c) Did you use any new techniques?
   d) Any other insights?