Standard Problems 1. 1D Motion- Analytical Problems. Worksheet

The Model

Analytical problems involving one dimensional motion are problems where the details of the motion are described by equations. Assumptions are:

- Objects are treated as point particles, with only a single, definite position.
- The motion of the object in question can be described exactly by analytical equations of motion. (This sometimes leads to unrealistic values for velocity and/or acceleration when curves have undefined derivatives. These results indicate that the model's assumption is invalid for calculating those particular parameters).
- The motion is strictly along one straight line.

Problem Solving Steps

1) **Organize and plan**
    a. Use diagrams, graphs, or other tools to visualize the situation.
    b. Define all variables clearly, and note down known variables.
    c. Identify what strategies will solve the problem.
2) **Solve**
    a. Integrate or differentiate the equations of motion to get equations for position, acceleration or velocity.
    b. Use known values for position or velocity to find integration constants, if needed.
3) **Reflect**
    a. Do your answers make sense?
    b. Are the units correct?
    c. Did you use any new techniques?
    d. Any other insights?