AP Physics B
LAB EXPERIMENT 1: Acceleration of a Cart
Due Date:

Purpose: To determine the acceleration of a cart rolling down an incline by
1) using one or more kinematic equations
2) analyzing a velocity vs. time graph of its motion.

Background:
- kinematic equations for an object moving with constant
  acceleration: $x = x_0 + v_0 t + \frac{1}{2} a t^2$

  $v = v_0 + at$

  $v^2 = v_0{}^2 + 2a(x - x_0)$

  $x = x_0 + \frac{1}{2}(v_0 + v)t$

- angle of incline should be small enough to allow the cart to travel for 3-5 seconds
- accepted value of acceleration for an object on a frictionless incline at an
  angle θ: $a = g\sin\theta$ (where g is the acceleration due to gravity)
- assumptions:
  - friction is negligible

Materials: metal track, dynamic cart, angle indicator, stopwatch, meter stick, etc.

Additional notes:
- You must do some sort of error analysis for this lab (% error)
- Your experimental value of acceleration for part 2 must come from a graph of velocity vs. time.