Recap: Lecture #2 — Constant Acceleration

(Don't write this down! This is mostly review from the last lecture.)

(1) $v = v_o + a\,t$

(2) $x = x_o + v_o\,t + \frac{1}{2}\,a\,t^2$

(3) $v^2 = v_o^2 + 2a\,(x - x_o)$

$v_2 = v_1 + a\,(t_2 - t_1)$

$v_2 = v_1 + a\,\Delta t$

(1) $v_2 = v_1 + a\,(t_2 - t_1)$

(2) $x_2 = x_1 + v_1\,(t_2 - t_1) + \frac{1}{2}\,a\,(t_2 - t_1)^2$

(3) $v_2^2 = v_1^2 + 2a\,(x_2 - x_1)$

Example

A car, going 27.8 m/s brakes, coming to a halt in after traveling 50 m. What was its acceleration?

$t = 0$	$t = ?$
$x_o = 0$	$x = 50$ m
$v_o = 27.8$ m/s	$v = 0$ m/s !!!

$v^2 - v_o^2 = 2a\,(x - x_o)$

$a = \frac{1}{2}\,(v^2 - v_o^2)\,/\,(x - x_o) = -7.7\ m/s^2$

Recap: Lecture #3 **Lessons from Rocket problem.**

One of the kinematic, constant acceleration equations we used was:

$$x_2 = x_1 + v_1 (t_2 - t_1) + \frac{1}{2} a (t_2 - t_1)^2$$

This relates quantities at time t_1 to quantities at time t_2. It also assume an x-axis.

We used a y-axis, however.
Also, we needed to relate time t_3 to time t_2.
So, we changed notation:

$$y_3 = y_2 + v_2 (t_3 - t_2) + \frac{1}{2} a (t_3 - t_2)^2$$

<u>Message</u>
All of our equations in this class are written in "generic" notation that might not be appropriate for your problem.

Pick a notation that <u>helps</u> you do your job. Then rewrite the equations using it. It doesn't take long and (believe it or not) helps avoid mistakes.