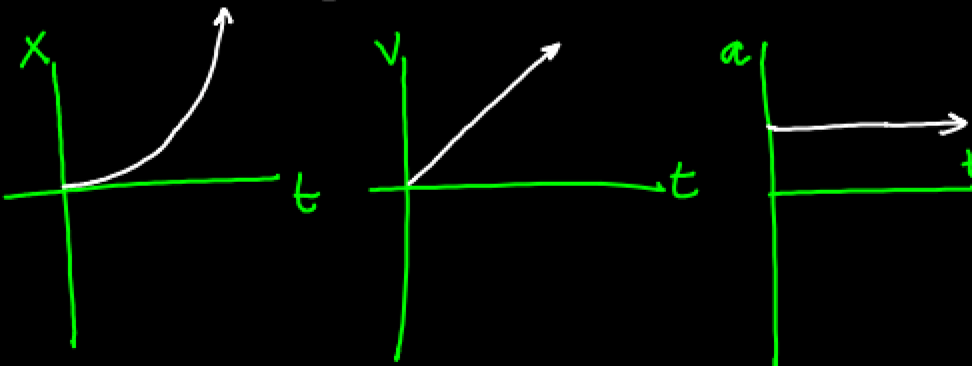
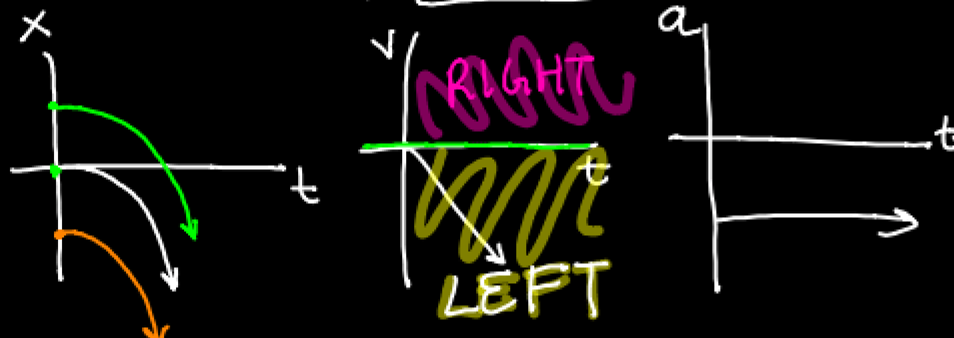
Bellwork

Draw: x vs. t, v vs. t, a vs. t graphs for an object moving **RIGHT** and speeding up at a constant rate.



SAME, BUT **LEFT**



4 Equations

1. $\vec{a} = \frac{\vec{V}_f - \vec{V}_i}{\Delta t}$ (no displacement $\Delta\vec{x}$)

2. $\Delta\vec{x} = \left(\frac{\vec{V}_i + \vec{V}_f}{2}\right)\Delta t$ (no acceleration $\vec{a}$)

3. $\Delta\vec{x} = V_i\Delta t + \frac{1}{2}\vec{a}(\Delta t)^2$

   (no V_f)

4. $V_f^2 = V_i^2 + 2\vec{a}(\Delta\vec{x})$

   (no Δt)

1.

$V_i = 0\,\frac{m}{s}$ $\quad$ $V_f = 30\,\frac{m}{s}$

$a = 2.25\,\frac{m}{s^2}$ $\quad$ $\Delta t = ?$

$\Delta x = ?$ $\quad$ $a = \frac{V_f - V_i}{\Delta t}$

* Solve for Δt

b. Want $\Delta\vec{x}$

have: $\vec{a}, \vec{V}_i, \vec{V}_f$

$$\vec{V}_f^2 = \vec{V}_i^2 + 2\vec{a}\,\Delta\vec{x}$$

$$\left(30\,\frac{m}{s}\right)^2 = 0^2 + 2\left(2.25\,\frac{m}{s^2}\right)(\Delta\vec{x})$$

$$\frac{900\,\frac{m^2}{s^2}}{4.50\,\frac{m}{s^2}} = \frac{4.50\,\frac{m}{s^2}(\Delta\vec{x})}{4.50\,\frac{m}{s^2}}$$

$$\boxed{200\,m = \Delta\vec{x}}$$

#1 a) 13.3 s

b) 200 m

#2 $-3.04 \frac{m}{s^2}$

#3 a) $169 \frac{m}{s^2}$

b) 0.15 s