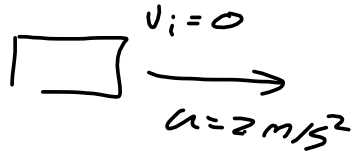
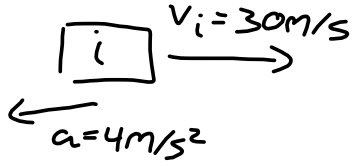
Homework Questions

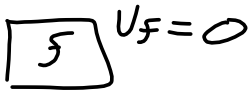
1)



$$v_f = v_i + a\Delta t$$
$$= 0 + (2 m/s^2)(5 s)$$
$$= 10 m/s$$

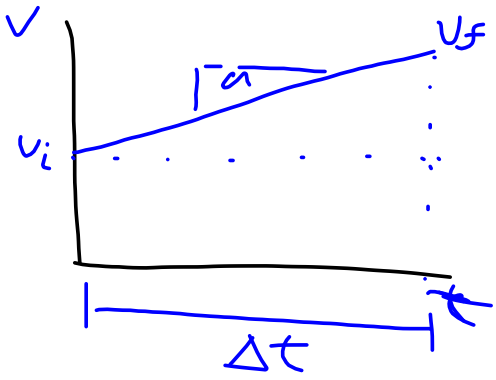
6)





$$v_f = v_i + a\Delta t$$
$$\frac{v_f - v_i}{a} = \frac{a\Delta t}{a}$$
$$\Delta t = \frac{v_f - v_i}{a}$$
$$= \frac{0 - (30 m/s)}{-4 m/s^2}$$
$$= 7.5 s$$

Finding Displacement



$$\Delta d_T = \frac{(v_f - v_i)\Delta t}{2}$$

$$\Delta d_r = v_i \Delta t$$

$$\Delta d = v_i \Delta t + \tfrac{1}{2}(v_f - v_i)\Delta t$$

(2) $$\Delta d = v_i \Delta t + \tfrac{1}{2} a \Delta t^2$$

(1) $$v_f = v_i + a\Delta t$$

$$\Delta t = \frac{v_f - v_i}{a}$$

$$\Delta d = v_i\left(\frac{v_f - v_i}{a}\right) + \tfrac{1}{2}(v_f - v_i)\left(\frac{v_f - v_i}{a}\right)$$

$$= \frac{v_f v_i - v_i^2}{a} + \tfrac{1}{2}\left(\frac{v_f^2 - v_i v_f - v_i v_f + v_i^2}{a}\right)$$

$$= \frac{v_f v_i}{a} - \frac{v_i^2}{a} + \frac{v_f^2}{2a} - \frac{2 v_i v_f}{2a} + \frac{v_i^2}{2a}$$

$$= \frac{v_f^2}{2a} + \frac{v_i^2}{2a} - \frac{2v_i^2}{2a} - \frac{v_i v_f}{a} + \frac{v_i v_f}{a}$$

$$\Delta d \cdot 2a = \left(\frac{v_f^2}{2a} - \frac{v_i^2}{2a}\right) 2a$$

$$2a\Delta d = v_f^2 - v_i^2$$

$$v_i^2 = v_f^2 - 2a\Delta d$$

$$a = \frac{v_f^2 - v_i^2}{2\Delta d}$$

(4) $$v_f^2 = v_i^2 + 2a\Delta d$$

① $\Delta d = v\Delta t$. ③

② $v_f = v_i + a\Delta t$. ④

③ $\Delta d = v_i\Delta t + \frac{1}{2}a\Delta t^2$. ④

④ $v_f^2 = v_i^2 + 2a\Delta d$. ④

Homework

Questions 7-12 on sheet

Just For Thought: If you don't look for patterns, then It will Feel like you have to know a bunch of random things:

$a = \frac{v_f - v_i}{\Delta t}$ $v = \frac{\Delta d}{\Delta t}$ $v_f^2 = v_i^2 + 2a\Delta d$

$\Delta d = v\Delta t$

$v_i = \frac{\Delta d - \frac{1}{2}a\Delta t^2}{\Delta t}$ $v_i = v_f - a\Delta t$ $\Delta t = \frac{\Delta d}{v}$

$a = \frac{v_f^2 - v_i^2}{2\Delta d}$ $\Delta t = \frac{v_f - v_i}{a}$

$a = \frac{\Delta d - v_i\Delta t}{\frac{1}{2}\Delta t^2}$ $v_f = v_i + a\Delta t$ $v_i^2 = v_f^2 - 2a\Delta d$

$\Delta t = \frac{-v_i \pm \sqrt{v_i^2 + 2a\Delta d}}{a}$ $v_i = v_f - a\Delta t$ $\Delta d = \frac{v_f^2 - v_i^2}{2a}$

You CANNOT Memorize Physics