Kinematics Review

Constant Velocity

$v = \frac{\Delta d}{\Delta t}$ (if not constant then $v_{ave} = \frac{\Delta d}{\Delta t}$)

Constant Acceleration

$a = \frac{\Delta v}{\Delta t}$ ($\Delta v = v_2 - v_1$)

$v_{ave} = \frac{\Delta d}{\Delta t}$ ($v_{ave} = \frac{v_1 + v_2}{2}$)

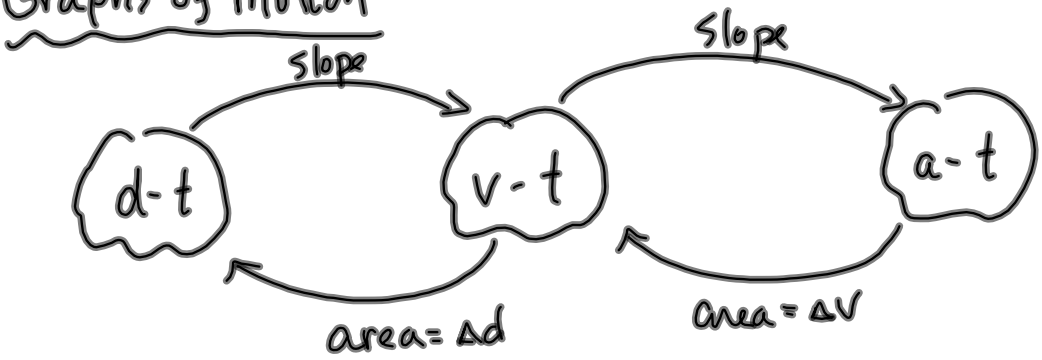
Maybe Useful:

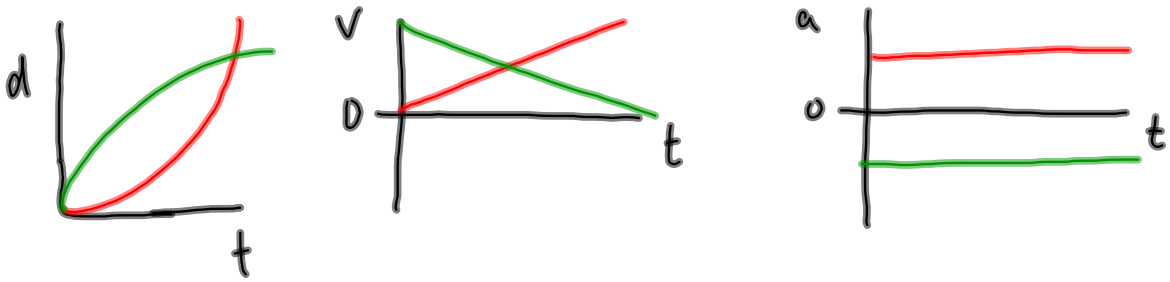
$\Delta d = v_1 \Delta t + \frac{1}{2} a (\Delta t)^2$

$\Delta d = v_2 \Delta t - \frac{1}{2} a (\Delta t)^2$

$v_2^2 = v_1^2 + 2a\Delta d$

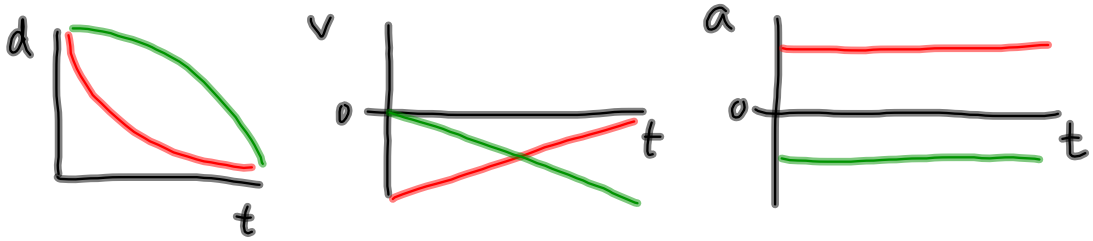
Graphs of Motion





- going away speeding up steadily

- going away slowing down steadily

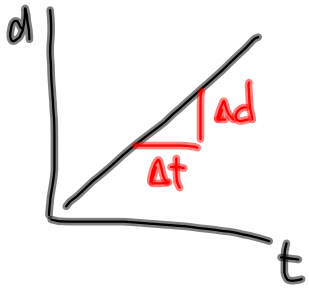


- going towards slowing down steadily

- going towards speeding up steadily

Constant / Average / Instantaneous Velocity

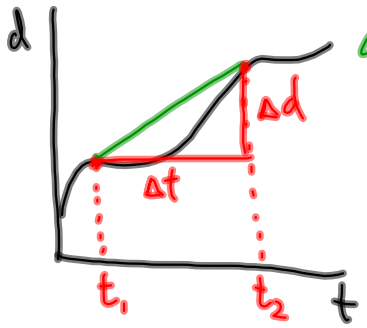
Constant:



← slope is constant
∴ velocity is constant.

$\text{slope} = v = \frac{\Delta d}{\Delta t}$

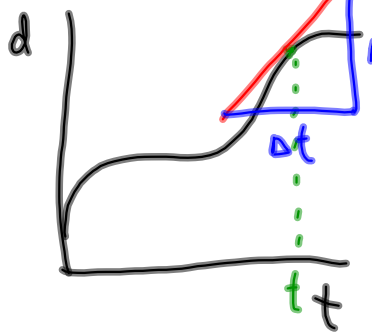
Average:



← slope of the line between t_1 and t_2 is the average velocity

$v_{ave} = \frac{\Delta d}{\Delta t}$

Instantaneous Velocity:



draw a tangent at time t.

$v_{inst} = \frac{\Delta d}{\Delta t}$

(slope of the tangent)