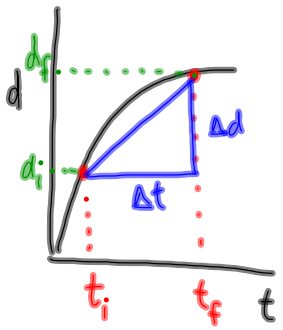
Constant/Average/Instantaneous Velocity

Constant

- the velocity is constant
- slope tells you the direction + speed (velocity)

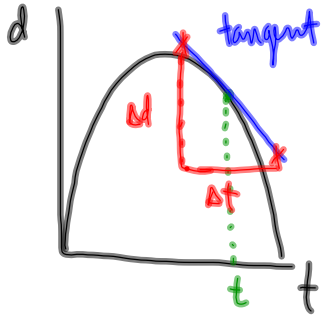
$\text{slope} = v = \frac{\Delta d}{\Delta t}$ $\left(\Delta d = d_f - d_i,\ \Delta t = t_f - t_i\right)$



slope = the average velocity

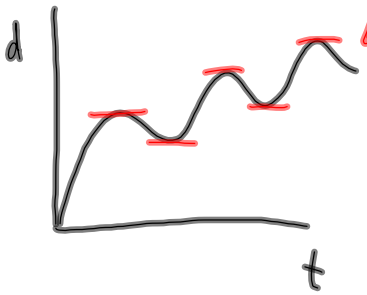
(find the slope between two times on the graph)

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



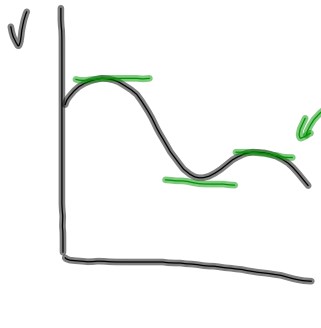
slope of the tangent => instantaneous velocity

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



← slope of tangent is zero, so the instantaneous velocity is zero

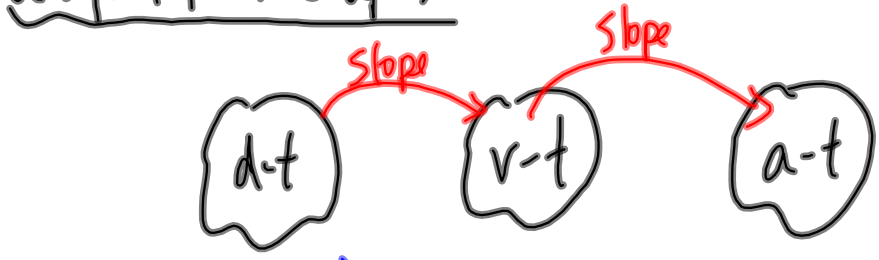
(when the object changes dir)

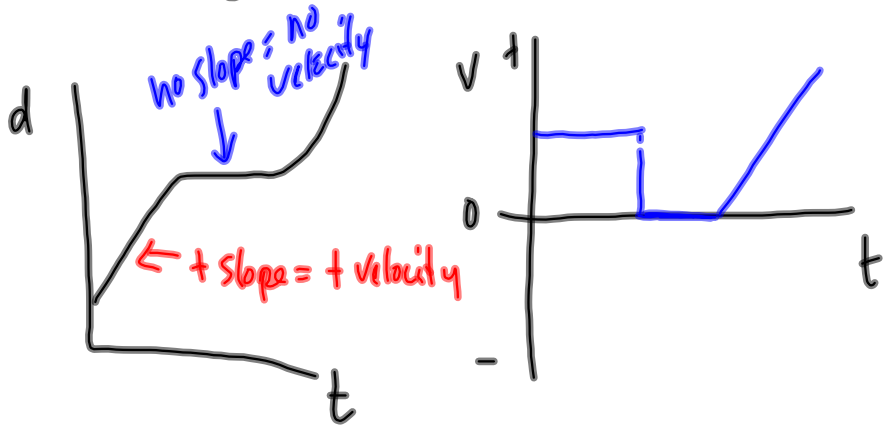


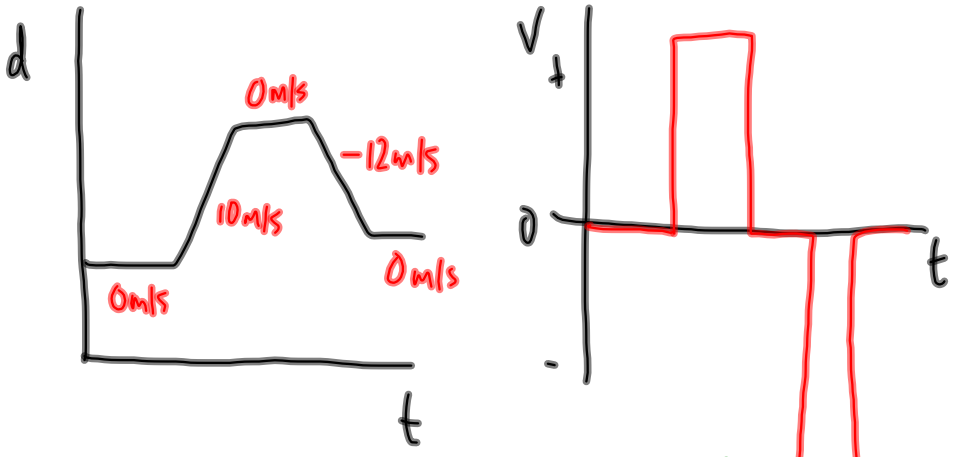
← the acceleration is zero

(when the object switches from speeding up to slowing down

d-t | v-t | a-t Graphs







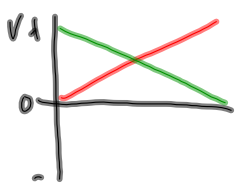
speed ← distance

$V = \frac{\Delta d}{\Delta t}$

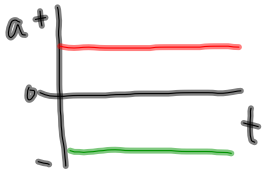
velocity ← displacement

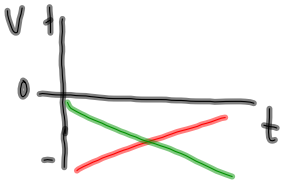
$\vec{V} = \frac{\Delta \vec{d}}{\Delta t}$

$\vec{a} = \frac{\Delta \vec{V}}{\Delta t}$ ← use the vector notation if you're given directions

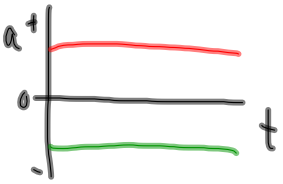


→ going away | speeding up (+ acc)
+ +
→ going away | slowing down (- acc)
+ −

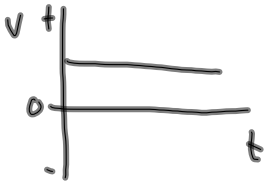




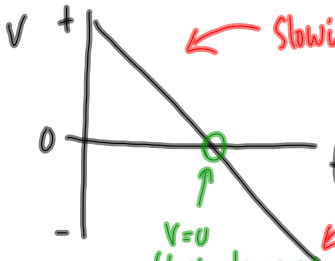
→ going toward | slowing down (+ acc)
− −
→ going toward | speeding up (- acc)
− +



← Slope tells the direction
+ slope ⇒ going away
− slope ⇒ going toward.



← the section of the graph tells direction
+ section ⇒ going away
− section ⇒ going toward.



← Slowing down going away

← speeding up going toward