Recall

area \( \propto \) \( X \) \( \rightarrow \) slope
area \( \propto \) \( V \) \( \rightarrow \) slope

How about the other way?

\( (V \rightarrow x)? \) look @ \( \vec{V}_x = \frac{\Delta x}{\Delta t} \)

\[ \Delta x = \vec{V}_x \Delta t \]

\[ \text{Area under } V(t) \text{ curve} \]

\[ \cdot \Delta x \text{ is accumulative area under } V(t) \]

\( (a \rightarrow v)? \) look @ \( \vec{a}_x = \frac{\Delta V_x}{\Delta t} \Rightarrow \Delta V_x = \vec{a}_x \Delta t \)

\[ \cdot \Delta V_x \text{ is accumulative area under } a(t) \text{ curve} \]

ex. Drag racing car \( a_x(t) = \text{const.} = 15 \text{ m/s}^2 \) \( \Rightarrow \)
\( V(t) = 0 \)
\( V(t=0) = 0 \)
\( X(t=0) = 0 \)

\[ \Delta x = V_x \Delta t + \frac{1}{2} a_t \Delta t^2 \]

\[ \text{quad. form of } \]

\[ \text{linear form of } y = mx + b \]

\[ V_f = V_i + \vec{a} \Delta t \]
Exercise

I.C. \( V(t=0) = 0 \)
\( X(t=0) = 0 \)

If \( a = \text{const.} \), \( V \) is linear, \( X \) is quadratic

- Speeding up (\( V \) and \( a \) in same direction)
  - \( X(t) \) \( \uparrow \)
  - \( V(t), a(t) \)
  - \( t \)

- Slowing down (\( V \) and \( a \) in opposite directions)
  - \( X(t) \) \( \uparrow \)
  - \( V(t), a(t) \)
  - \( t \)

- \( V(t), a(t) \)

- \( V(t), a(t) \)

- \( V(t), a(t) \)