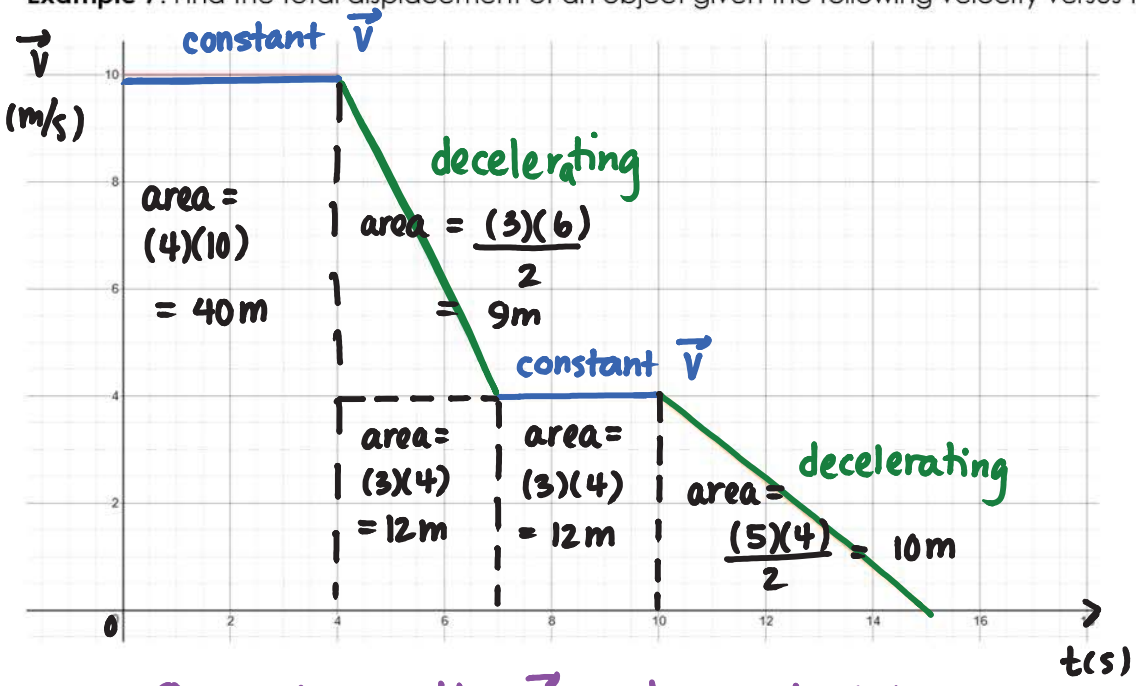
E: Non-Uniform Velocity: Graphing d vs t and v vs t cont.

So far, we have learned that the slope of a velocity versus time graph represents acceleration.

We can also find the area under a velocity versus time graph. The area represents the **displacement** of the object.

Example 7: Find the total displacement of an object given the following velocity versus time graph.



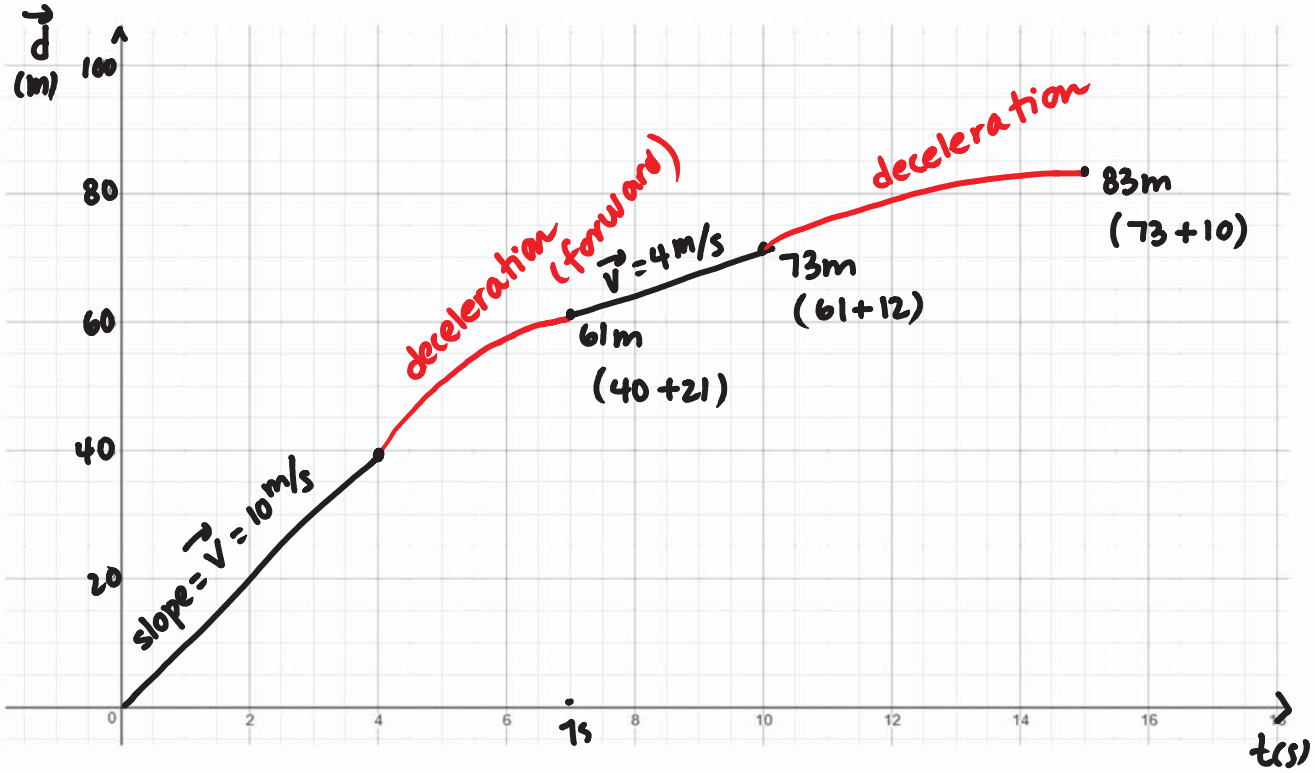
① Break up the $\vec{v}$ vs t graph into sections
② calc. area of each section
③ to calc. total $\vec{d}$ → add all the areas together

$\vec{d} = 40 + 9 + 12 + 12 + 10$

$\vec{d} = 83m$

★ all areas were positive values which means all displacements were positive.
→ object was moving forward the whole time.

Example 8: Using the information from Example 7 to create a displacement versus time graph.



Using the displacements calculated for each time interval, create $\vec{d}$ vs t graph.

$0 \rightarrow 4s$: $\vec{d} = 40m$ constant $\vec{v} = 10^{m}/_{s}$ (slope)

$4s \rightarrow 7s$: $\vec{d} = 12m + 9m = 21m$ deceleration

$7s \rightarrow 10s$: $\vec{d} = 12m$ constant $\vec{v} = 4^{m}/_{s}$ (slope)

$10s \rightarrow 15s$: $\vec{d} = 10m$ deceleration