

More Practice: Velocity-Time Graphs

Consider the velocity time graph below.

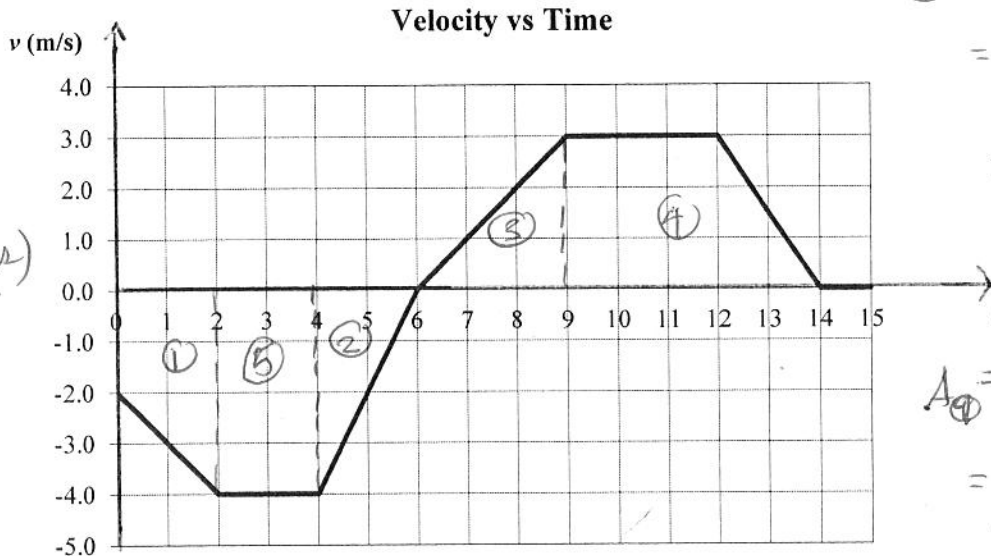
$$A_{\text{⑤}} = b \times h = (2s)(-4m/s) = -8m$$

$$A_{\text{⑩}} = \frac{(B+b)h}{2} = \frac{(-2m/s + 4m/s)(2s)}{2} = -6m$$

$$A_{\text{②}} = \frac{b \times h}{2} = \frac{2s \times -4m/s}{2} = -4m$$

$$A_{\text{③}} = \frac{b \times h}{2} = \frac{3s \times 3m/s}{2} = 4.5m$$

$$A_{\text{④}} = \frac{(B+b)h}{2} = \frac{(5s + 3s)(3m/s)}{2} = 12m$$



- What is the acceleration at 13.0 s? (12s, 3m/s) and (14s, 0m/s)  
 $\vec{a} = \text{slope} = \frac{0m/s - 3m/s}{14s - 12s} = \frac{-3m/s}{2s} = \boxed{-1.5 m/s^2}$
- What is the acceleration at 3.0 s?  
 $\boxed{0m/s^2}$  (constant velocity)
- What is the average acceleration from 5.0 s to 8.0 s?  
 $\vec{a}_{av} = \frac{\vec{v}_f - \vec{v}_i}{\Delta t} = \frac{2m/s - (-2m/s)}{3s} = \frac{4m/s}{3s} = \boxed{1.33 m/s^2}$
- What is the velocity at 7.0 s?  
 $\boxed{1.0 m/s}$
- What is the velocity at 11.0 s?  
 $\boxed{3.0 m/s}$
- What is the displacement from 0.0 s to 9.0 s?  
 $\Delta \vec{d} = -8m + (-6m) + (-4m) + 4.5m = \boxed{-13.5m}$
- What is the average speed from 0.0 s to 9.0 s?  
 $\text{Speed}_{av} = \frac{8m + 6m + 4m + 4.5m}{9.0s} = \boxed{2.5 m/s}$
- What is the distance covered from 4.0 s to 14.0 s?  
 $\text{distance} = 4m + 4.5m + 12m = \boxed{20.5m}$
- What is the average velocity from 4.0 s to 14.0 s?  
 $\vec{v}_{ave} = \frac{\text{displacement}}{\Delta t} = \frac{-4m + 4.5m + 12m}{10s} = \frac{12.5}{10s} = \boxed{1.25 m/s}$