

13. Since $v = \frac{dx}{dt}$ (Eq. 2-4), then $\Delta x = \int v dt$, which corresponds to the area under the v vs t graph. Dividing the total area A into rectangular (base \times height) and triangular ($\frac{1}{2}$ base \times height) areas, we have

$$\begin{aligned} A &= A_{0 < t < 2} + A_{2 < t < 10} + A_{10 < t < 12} + A_{12 < t < 16} \\ &= \frac{1}{2}(2)(8) + (8)(8) + \left((2)(4) + \frac{1}{2}(2)(4) \right) + (4)(4) \end{aligned}$$

with SI units understood. In this way, we obtain $\Delta x = 100$ m.