

An object that was at $x = 2.0\text{m}$ at $t = 0.0\text{s}$ moves according to the velocity vs time expression: $v(t) = 20 - 0.5t^2$

Determine the position at $t = 10.0\text{s}$

$$X(10) = ? \quad X(0) = 2\text{m}$$
$$v(t) = 20 - 0.5t^2$$

$$\Delta x = \int_{t_0}^{t_1} v(t) dt$$

$$X_{10} - X_0 = \int_0^{10} (20 - 0.5t^2) dt$$

$$X_{10} - 2 = \left(20t - \frac{0.5t^3}{3} \right) \Big|_0^{10}$$

$$X_{10} - 2 = \left[20(10) - \frac{0.5(10)^3}{3} \right] - \left[20(0) - \frac{0.5(0)^3}{3} \right]$$

$$X_{10} - 2 = 33.33$$

$$X_{10} = 35.33\text{m}$$

↑ don't need
to show