

Solutions

Each answer shows the steps, then the **result**.

2.1

- $\int_0^3 6t \, dt = [3t^2]_0^3 = 27$

2.2

- $v(t) = 4t + C$; $v(0) = C = 1$, so $v(t) = 4t + 1$

2.3

- $v = 0$ at $2t - 6 = 0$, i.e. $t = 3$

3.1 B

- total distance is $\int |v| \, dt$

3.2

(a)

- $\int_0^3 (3t^2 - 12) \, dt = [t^3 - 12t]_0^3 = 27 - 36 = -9 \text{ m}$

(b)

- $v = 0$: $3t^2 = 12 \Rightarrow t = 2$

3.3

(a)

- $\int_0^5 (t - 3) \, dt = [\frac{t^2}{2} - 3t]_0^5 = 12.5 - 15 = -2.5$

(b)

- $v < 0$ on $[0, 3)$, $v > 0$ on $(3, 5]$; distance = $|\int_0^3| + \int_3^5 = |-4.5| + 2 = 6.5$