

Solutions

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

2.1

- $\langle t^2, 3t \rangle + \vec{C}$

2.2

- $\vec{v}(t) = \langle C_1, -10t + C_2 \rangle; \vec{v}(0) = \langle 5, 0 \rangle \Rightarrow C_1 = 5, C_2 = 0; \vec{v}(t) = \langle 5, -10t \rangle$

2.3

- $\langle [t]_0^2, [t^2]_0^2 \rangle = \langle 2, 4 \rangle$

3.1 A

- integrate each component separately

3.2

(a)

- $\vec{v}(t) = \langle 3t^2 + C_1, 2t + C_2 \rangle; \vec{v}(0) = \langle 0, 1 \rangle \Rightarrow C_1 = 0, C_2 = 1; \vec{v}(t) = \langle 3t^2, 2t + 1 \rangle$

(b)

- $\vec{v}(1) = \langle 3, 3 \rangle$

3.3

- $\vec{r}(t) = \langle t^2 + C_1, \sin t + C_2 \rangle; \vec{r}(0) = \langle 1, 0 \rangle \Rightarrow C_1 = 1, C_2 = 0; \vec{r}(t) = \langle t^2 + 1, \sin t \rangle$