

9. We apply Eq. 4-10 and Eq. 4-16.

(a) Taking the derivative of the position vector with respect to time, we have

$$\vec{v} = \frac{d}{dt} \left(\hat{i} + 4t^2 \hat{j} + t \hat{k} \right) = 8t \hat{j} + \hat{k}$$

in SI units (m/s).

(b) Taking another derivative with respect to time leads to

$$\vec{a} = \frac{d}{dt} \left(8t \hat{j} + \hat{k} \right) = 8 \hat{j}$$

in SI units (m/s²).