

17. $x = 9.75 + 1.5t^3$

a) $v_{\text{avg}} = ?$ $t = 2\text{ s}$ to $t = 3\text{ s}$

$$v_{\text{avg}} = \frac{\Delta x}{\Delta t} = \frac{56.25 - 21.75}{1\text{ s}} \quad (28.5\text{ cm/s})$$

b) $v(2) = ?$ $v = \frac{dx}{dt} = 4.5t^2$

$$v(2) = 4.5(2)^2 = (18\text{ cm/s})$$

c) $v(3) = 4.5(3)^2 = (40.5\text{ cm/s})$

d) $v(2.5) = ?$

$$v(2.5) = 4.5 (2.5)^2 = 28.125 \text{ cm/s}$$

e) $v = ?$ when midway between $x(2)$ and $x(3)$

$$x(2) = 21.75 \text{ cm} \quad x(3) = 50.25 \text{ cm}$$

so, at $x = 36$

$$36 = 9.75 + 1.5t^3$$

$$t = 2.596 \text{ s} \quad v(2.596) = 30.3 \text{ cm/s}$$



