

5.)  $m = 1 \text{ kg}$     $x = 2t^2 + 3t$     $y = t^2 + 2$     $z = 2t + 1$     $\vec{r} = (x, y, z)$

a.)  $\vec{v}(t) = ?$     $\vec{a}(t) = ?$    b.)  $P(t) = ?$    c.)  $P_1(0, 2, 1)$     $P_2(5, 3, 3)$

$$\vec{v} = \frac{d\vec{r}}{dt}$$

$$\vec{a} = \frac{d\vec{v}}{dt}$$

$$P = \vec{F} \cdot \vec{v}$$

$$\vec{F}_e = m\vec{a}$$

$$W = \int_{t_1}^{t_2} P dt$$

$$W = ?$$

$$W = \int_{P_1}^{P_2} \vec{F} \cdot d\vec{r}$$

a.)

$$\vec{v} = \frac{d\vec{r}}{dt} = \left( \frac{dx}{dt}, \frac{dy}{dt}, \frac{dz}{dt} \right)$$

$\underbrace{\quad}_{v_x}$     $\underbrace{\quad}_{v_y}$     $\underbrace{\quad}_{v_z}$

$$\vec{a} = \frac{d\vec{v}}{dt} = \left( \frac{dv_x}{dt}, \frac{dv_y}{dt}, \frac{dv_z}{dt} \right)$$

b.)  $P = \vec{F} \cdot \vec{v} = m\vec{a} \cdot \vec{v} = m(a_x v_x + a_y v_y + a_z v_z)$

c.)  $P_1 \rightarrow t_1$     $P_2 \rightarrow t_2$

$$W = \int_{t_1}^{t_2} P dt$$

másik megoldás (mivel az erő homogén...)

$$W = \int_{P_1}^{P_2} \vec{F} \cdot d\vec{r} = \vec{F} \cdot \Delta\vec{r}$$

