

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

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...)

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

