

6.77

Datos

$$m = 4 \text{ kg}$$

$$x(t) = \alpha t^2 + \beta t^3$$

$$\alpha = 0.2 \text{ m/s}^2$$

$$\beta = 0.02 \text{ m/s}^3$$

$$v(4) = ?$$

$$F(4) = ?$$

$$W = ?$$

$$\text{Como } v = \frac{dx}{dt};$$

$$v = 2\alpha t + 3\beta t^2$$

$$v(4) = (2)(0.2)(4) + (3)(0.02)(4)^2$$

$$v(4) = 1.6 + 0.96 = 2.56 \text{ m/s}$$

Como $\vec{F} = m \cdot \vec{a}$, debemos determinar a :

$$a = \frac{dv}{dt} = 2\alpha + 6\beta t, \text{ evaluada para } 4\text{s}$$

$$a(4) = 2(0.2) + 6(0.02)(4) = 0.4 + 0.48 = 0.88 \text{ m/s}^2$$

$$F = (4)(0.88) = 3.52 \text{ N}$$

$$W = \int \vec{F} \cdot d\vec{x} \quad \text{!} \quad W = \Delta E_c$$

$$W = E_{cf} - E_{ci} = \frac{m v(4)^2}{2} - \frac{m v(0)^2}{2} = \frac{(4)(2.56)^2}{2}$$

$$W_f = 13.1 \text{ J}$$