

A particle has momentum given by

$$\vec{p}(t) = (4.00t^3 + 7.21) \vec{i}. \text{ What is the}$$

net external force acting on the particle

at $t = 2.00\text{s}$?

Solution:

$$\int \vec{F}(t) dt = \vec{p}(t)$$

$$\begin{aligned} \vec{F}(t) &= \frac{d\vec{p}(t)}{dt} \\ &= (12.00t^2) \vec{i} \end{aligned}$$

$$\vec{F}(2.00\text{s}) = 12.00(2.00\text{s})^2 \vec{i}$$

$$\boxed{= 48\text{ N } \vec{i}}$$