

25. The velocity of the object is

$$\vec{v} = \frac{d\vec{r}}{dt} = \frac{d}{dt} \left((3500 - 160t)\hat{i} + 2700\hat{j} + 300\hat{k} \right) = -160\hat{i} \text{ m/s} .$$

(a) The linear momentum is

$$\vec{p} = m\vec{v} = (250)(-160\hat{i}) = -4.0 \times 10^4 \hat{i} \text{ kg}\cdot\text{m/s} .$$

(b) The object is moving west (our $-\hat{i}$ direction).

(c) Since the value of \vec{p} does not change with time, the net force exerted on the object is zero, by Eq. 9-23.