**Answer on Question 56256, Physics, Mechanics, Relativity**

**Question:**

Given two vectors $\vec{a} = 4\hat{\imath} - 3\hat{\jmath} + 2\hat{k}$, $\vec{b} = \hat{\imath} + 2\hat{\jmath} - \hat{k}$, calculate $\vec{a} \cdot \vec{b}$.

a) 2

b) $-4$

c) $-2$

d) 4

**Solution:**

By the definitition of the dot product of two vectors $\vec{a}$ and $\vec{b}$ we have:

$$\vec{a} \cdot \vec{b} = a_1 b_1 + a_2 b_2 + a_3 b_3 = \left(4\hat{\imath} - 3\hat{\jmath} + 2\hat{k}\right) \cdot \left(\hat{\imath} + 2\hat{\jmath} - \hat{k}\right)$$
$$= 4 \cdot 1 + (-3) \cdot 2 + 2 \cdot (-1) = 4 - 6 - 2 = -4.$$

**Answer:**

b) $-4$