

A force $\vec{F} = 3\mathbf{i} + 4\mathbf{j}$ newton is applied on a body of mass 2 kg. Calculate the magnitude and direction of the acceleration in the body

Solution.

We know from Newton's Second Law $\vec{F} = m \cdot \vec{a}$

$$\text{Acceleration vector: } \vec{a} = \frac{\vec{F}}{m} \quad \vec{a} = \frac{3\mathbf{i} + 4\mathbf{j}}{2} = 1.5\mathbf{i} + 2\mathbf{j}$$

$$\text{Magnitude } a = |\vec{a}| = \sqrt{1.5^2 + 2^2} = \sqrt{2.25 + 4} = \sqrt{6.25} = 2.5 \frac{m}{s^2}$$

Answer: Acceleration vector $\vec{a} = 1.5\mathbf{i} + 2\mathbf{j}$. Magnitude $a = 2.5 \frac{m}{s^2}$

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