**Motion in Two Dimensions**

Force and Acceleration can be represented as both scalars and vectors. Therefore Newton's 2nd law can be used in vector form too.

This naturally means that $F=ma$ works with vectors too.

**Example**

Forces $F\_{1} (4i - 7j)$, and $F\_{2} (-6i + 2j) $and $F\_{3} (4j) $act on a particle of mass 2kg. Find the acceleration of the particle. Find also the magnitude and the bearing of the acceleration.

**Example – Using SUVAT Equations**

A constant force $F$ N acts on a particle of mass 5kg for 8 seconds. The particle is initially at rest and 8 seconds later it has velocity $(12i - 5j) $ms-1. Find $F$.

**Test Your Understanding** *(Textbook)*

 A boat is modelled as a particle of mass 60 kg being acted on by three forces.

$$F\_{1}=\left(\begin{matrix}80\\50 \end{matrix}\right)N,    F\_{2}=\left(\begin{matrix}10p\\20q\end{matrix} \right)N,   F\_{3}=\left(\begin{matrix}-75\\100\end{matrix}\right)N$$

Given that the boat is accelerating at a rate of $\left(\begin{matrix}0.8\\-1.5\end{matrix}\right)$ ms-2, find the values of $p$ and $q$.

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