

2. A particle P has mass 0.25 kg .

The particle moves on a smooth horizontal surface under the action of two horizontal forces \mathbf{F}_1 and \mathbf{F}_2

Given that $\mathbf{F}_1 = (3\mathbf{i} - 5\mathbf{j})\text{N}$ and $\mathbf{F}_2 = (-6\mathbf{i} + 9\mathbf{j})\text{N}$

(a) find, in terms of \mathbf{i} and \mathbf{j} , the **resultant force** acting on P , (1)

(b) find the **magnitude** of the acceleration of P . (3)

A third horizontal force, \mathbf{F}_3 , is now applied to P .

Under the action of \mathbf{F}_1 , \mathbf{F}_2 and \mathbf{F}_3 , the particle moves with **constant velocity**.

(c) Find \mathbf{F}_3 , giving your answer in terms of \mathbf{i} and \mathbf{j} . (1)