3. [*In this question* **i** *and* **j** *are horizontal perpendicular unit vectors.*]

A particle P of mass 2 kg is at rest on a smooth horizontal plane.

Two horizontal forces, $\mathbf{F}_1$ N and $\mathbf{F}_2$ N, are applied to P, causing P to move with acceleration $(4\mathbf{i} - \mathbf{j})\ \text{m s}^{-2}$

(a) Find the magnitude of the acceleration of P.

(2)

(b) Find, in the form $(a\mathbf{i} + b\mathbf{j})$ N, the resultant of $\mathbf{F}_1$ N and $\mathbf{F}_2$ N.

(2)

Given that $\mathbf{F}_1 = (2c - 1)\mathbf{i} + (c + 1)\mathbf{j}$, where c is a constant,

(c) find $\mathbf{F}_2$ in terms of **i**, **j** and c, fully simplifying your answer.

(2)