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5. Two forces $\mathbf{F}_1$ and $\mathbf{F}_2$ act on a particle. The resultant of the two forces is $\mathbf{R}$.

Given that $\mathbf{R}$ has the same direction as the vector $(3\mathbf{i} - 2\mathbf{j})$,

(a) find the size of the angle between $\mathbf{R}$ and the vector $\mathbf{j}$.

(2)

Given that $\mathbf{F}_1 = (a\mathbf{i} + 3\mathbf{j})$ N and $\mathbf{F}_2 = (-4\mathbf{i} + b\mathbf{j})$ N,

(b) show that $2a + 3b + 1 = 0$

(4)

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Question 5 continued

Q5

(Total 6 marks)