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

A particle Q of mass 0.5 kg is moving on a smooth horizontal surface. Particle Q is moving with velocity $(3\mathbf{i} + \mathbf{j})\,\text{m s}^{-1}$ when it receives an impulse of $(2\mathbf{i} + 5\mathbf{j})\,\text{N s}$.

(a) Find the speed of Q immediately after receiving the impulse.

(4)

As a result of receiving the impulse, the direction of motion of Q is turned through an angle $\theta°$

(b) Find the value of θ

(2)

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Question 2 continued

(Total for Question 2 is 6 marks)