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

A particle P of mass 2 kg is moving on a smooth horizontal plane with velocity $4\mathbf{i}\,\text{m s}^{-1}$

The particle receives a horizontal impulse of magnitude $\sqrt{29}$ Ns.

Immediately **after** receiving the impulse, the velocity of P is $(3\mathbf{i} + \lambda\mathbf{j})\,\text{m s}^{-1}$, where λ is a positive constant.

(a) Find the value of λ

(4)

(b) Find the size of the angle between the direction of motion of P immediately **before** receiving the impulse and the direction of the impulse.

(3)

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Question 2 continued

(Total for Question 2 is 7 marks)