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1. A particle P has mass $3m$ and a particle Q has mass $5m$. The particles are moving towards each other in opposite directions along the same straight line on a smooth horizontal surface. The particles collide directly.

Immediately before the collision the speed of P is ku, where k is a constant, and the speed of Q is $2u$.

Immediately after the collision the speed of P is u and the speed of Q is $3u$.

The direction of motion of Q is reversed by the collision.

(a) Find, in terms of m and u, the magnitude of the impulse exerted on Q by P in the collision.

(2)

(b) Find the two possible values of k.

(5)

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Question 1 continued

Q1

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