

# Solutionbank M1

Heinemann Modular Maths for Edexcel AS and A-level

## 8 Momentum

### Exercise B, Question 9

#### Question:

A sphere has mass 7 kg and velocity  $(5\mathbf{i} - 8\mathbf{j}) \text{ m s}^{-1}$ . It collides with a stationary sphere of mass 5 kg. After the collision the 7 kg sphere has velocity  $(2\mathbf{i} - 3\mathbf{j}) \text{ m s}^{-1}$ . Find the velocity of the other sphere after the collision.

#### Solution:

Let the velocity of the other sphere after the collision be  $\mathbf{v}$ .  
Using conservation of momentum

$$7(5\mathbf{i} - 8\mathbf{j}) = 7(2\mathbf{i} - 3\mathbf{j}) + 5\mathbf{v}$$

$$35\mathbf{i} - 56\mathbf{j} = 14\mathbf{i} - 21\mathbf{j} + 5\mathbf{v}$$

$$21\mathbf{i} - 35\mathbf{j} = 5\mathbf{v}$$

$$\therefore \mathbf{v} = 4.2\mathbf{i} - 7\mathbf{j}$$

$$\therefore \text{Velocity was } (4.2\mathbf{i} - 7\mathbf{j}) \text{ m s}^{-1}.$$