



Two uniform smooth spheres A and B of equal radii each have mass m . The two spheres are each moving with speed u on a horizontal surface when they collide. Immediately before the collision, A 's direction of motion makes an angle α with the line of centres, and B 's direction of motion makes an angle β with the line of centres (see diagram). The coefficient of restitution between the spheres is $\frac{1}{3}$ and $2 \cos \beta = \cos \alpha$.

- (a) Show that the direction of motion of A after the collision is perpendicular to the line of centres. [4]

The total kinetic energy of the spheres after the collision is $\frac{3}{4}mu^2$.

- (b) Find the value of α . [4]