



The smooth vertical walls AB and CB are at right angles to each other. A particle P is moving with speed u on a smooth horizontal floor and strikes the wall CB at an angle α . It rebounds at an angle β to the wall CB . The particle then strikes the wall AB and rebounds at an angle γ to that wall (see diagram). The coefficient of restitution between each wall and P is e .

(a) Show that $\tan \beta = e \tan \alpha$. [3]

(b) Express γ in terms of α and explain what this result means about the final direction of motion of P . [4]

As a result of the two impacts the particle loses $\frac{8}{9}$ of its initial kinetic energy.

(c) Given that $\alpha + \beta = 90^\circ$, find the value of e and the value of $\tan \alpha$. [4]