



Particles A and B , of masses m and $3m$ respectively, are connected by a light inextensible string of length a that passes through a fixed smooth ring R . Particle B hangs in equilibrium vertically below the ring. Particle A moves in horizontal circles with speed v . Particles A and B are at the same horizontal level. The angle between AR and BR is θ (see diagram).

- (a) Show that $\cos \theta = \frac{1}{3}$. [2]
- (b) Find an expression for v in terms of a and g . [4]