A smooth horizontal surface has two fixed points O and A which are 0.8 m apart. A particle P of mass 0.25 kg is projected with velocity 3 m s^{-1} horizontally from A in the direction away from O. The velocity of P is v m s^{-1} when the displacement of P from O is x m. A force of magnitude kv^2x^{-2} N opposes the motion of P.

(i) Show that $v\dfrac{\mathrm{d}v}{\mathrm{d}x} = -4kv^2x^{-2}$. [1]

(ii) Express v in terms of k and x. [5]