A particle is projected from a point O on horizontal ground. The initial components of the velocity of the particle are $10\,\text{m s}^{-1}$ horizontally and $15\,\text{m s}^{-1}$ vertically. At time t s after projection, the horizontal and vertically upwards displacements of the particle from O are x m and y m respectively.

(i) Express x and y in terms of t, and hence find the equation of the trajectory of the particle. [4]

The horizontal ground is at the top of a vertical cliff. The point O is at a distance d m from the edge of the cliff. The particle is projected towards the edge of the cliff and does not strike the ground before it passes over the edge of the cliff.

(ii) Show that d is less than 30. [2]

(iii) Find the value of x when the particle is 14 m below the level of O. [2]