

A small ball B is projected with speed 30 m s^{-1} at an angle of 60° above the horizontal from a point O . At time t s after projection the horizontal and vertically upwards displacements of B 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 ball. [4]

(ii) Find the value of x for which OB makes an angle of 45° above the horizontal. [3]