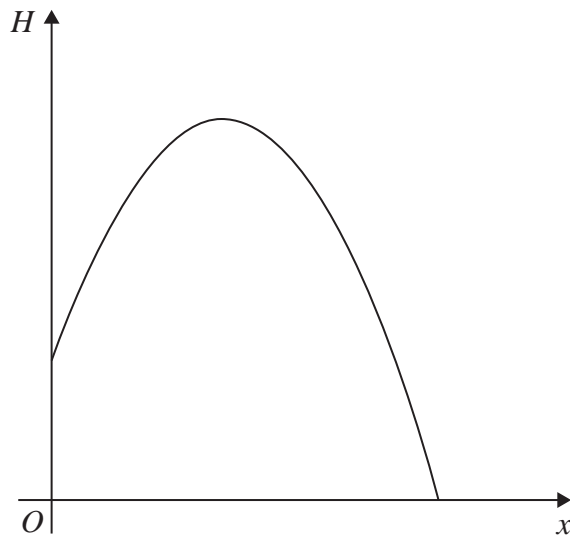


10.



**Figure 4**

Figure 4 shows the path of a ball after it has been thrown until it first hits the ground.

- $H$  metres is the vertical height of the ball above the ground
- $x$  metres is the horizontal distance travelled by the ball

The ball is modelled as a particle travelling in a vertical plane above horizontal ground.

The ball

- is thrown from a height of 2.1 m above the ground
- reaches a maximum height of 5.6 m above the ground, at a horizontal distance of 2.5 m from where it was thrown

Given that  $H$  is modelled as a **quadratic** function in  $x$

(a) find  $H$  in terms of  $x$

(3)

(b) Use the model to determine whether the ball travels more than 5.5 m horizontally before it first hits the ground.

(2)

(c) The possible effects of wind or air resistance are two limitations of the model. Give one other limitation of this model.

(1)