

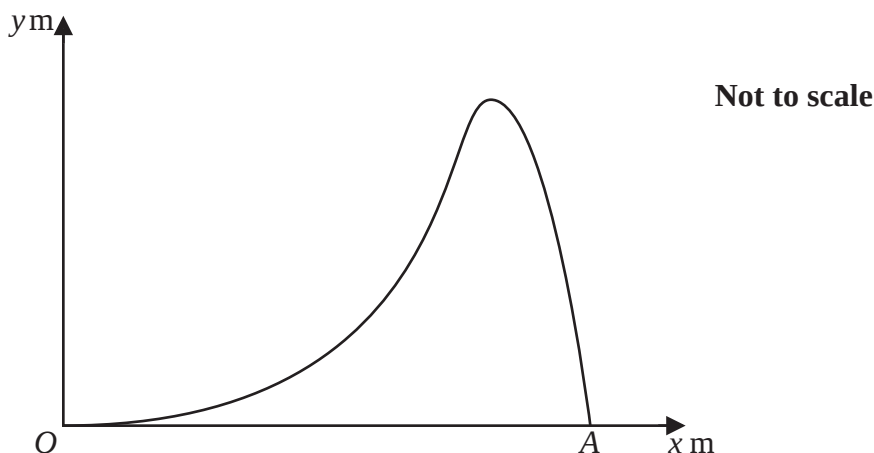


Figure 1

**In this question you must show all stages of your working.
Solutions relying entirely on calculator technology are not acceptable.**

The graph shown in Figure 1 shows the flight path of a model helicopter.

The helicopter travels in a vertical plane above horizontal ground.

The helicopter

- starts its flight from the point on the ground represented by O
- lands on the ground at the point represented by A

The height, y metres, of the helicopter above the ground has been plotted against the horizontal distance, x metres, measured from O .

The flight path of the helicopter is modelled by the curve with parametric equations

$$x = 100\sqrt{t} \quad y = 10\sin\left(\frac{t^2}{4}\right) \quad t \geq 0$$

where t seconds is the time after the helicopter starts its flight.

- Write down, according to the model, the maximum height of the helicopter above the ground.
- Find, according to the model, the horizontal distance the helicopter has travelled when it is 5m above the ground for the **second** time.

(1)

(4)