13   **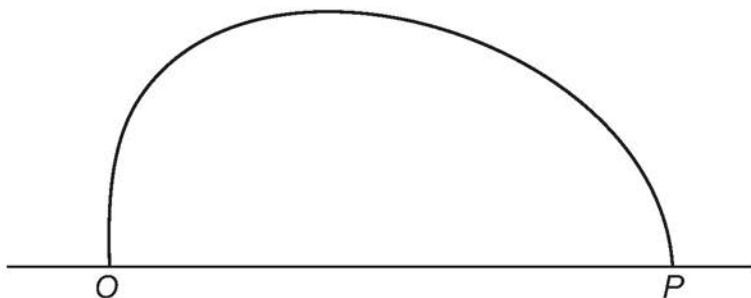Figure 2** shows the approximate shape of the vertical cross section of the entrance to a cave. The cave has a horizontal floor.

The entrance to the cave joins the floor at the points O and P.

Figure 2

Garry models the shape of the cross section of the entrance to the cave using the equation

$$x^2 + y^2 = a\sqrt{x} - y$$

where a is a constant, and x and y are the horizontal and vertical distances respectively, in metres, measured from O.

13 (a)   The distance OP is 16 metres.

Find the value of a that Garry should use in the model.

[2 marks]

13 (b)   Show that the maximum height of the cave above OP is approximately 10.5 metres.

[6 marks]

13 (c)   Suggest one limitation of the model Garry has used.

[1 mark]