9. **In this question you must show all stages of your working.**

Solutions relying entirely on calculator technology are not acceptable.

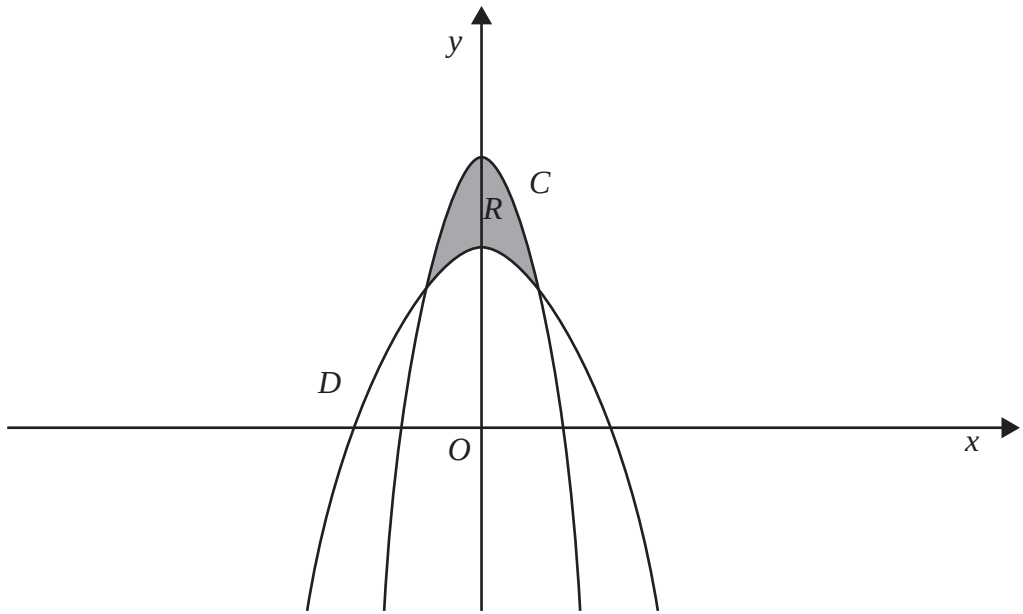

Figure 1

Figure 1 shows a sketch of the curve C with equation $y = 18 - 2x^2$ and the curve D with equation $y = 12 - \frac{1}{2}x^2$

(a) Use algebra to determine the x coordinates of the points of intersection of C and D.

(2)

The region R, shown shaded in Figure 1, is bounded by C and D.

A silver ring is modelled as the volume of revolution formed when R is rotated through 360° about the x-axis.

Given that the units are in mm, and the density of silver is 18 g/cm³

(b) use algebraic integration to determine the total number of complete rings that can be formed from 1kg of silver, according to the model.

(7)