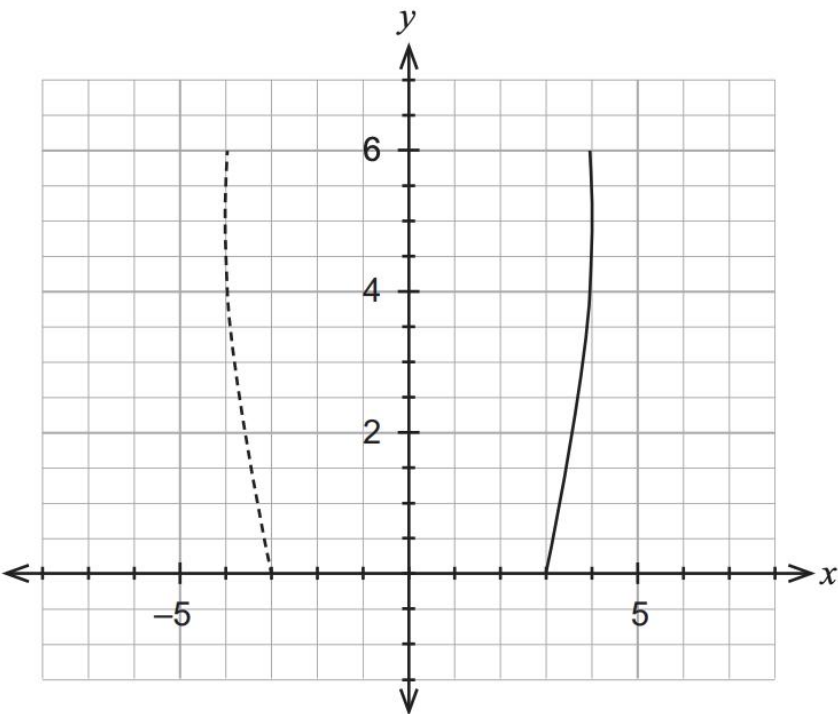## Question 9 (4 marks)

The shape of a small wine glass is modelled by revolving the curve $\sin\left(\dfrac{y}{\pi}\right) = x - 3$ about the y axis, where $0 \le y \le 6$. All dimensions are in centimetres.

Calculate, correct to the nearest 0.01 cm, the depth of wine in the glass if it is to contain 80% of its maximum volume.