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The diagram shows the line $y = 1$ and part of the curve $y = \dfrac{2}{\sqrt{(x+1)}}$.

(i) Show that the equation $y = \dfrac{2}{\sqrt{(x+1)}}$ can be written in the form $x = \dfrac{4}{y^2} - 1$. [1]

(ii) Find $\displaystyle\int \left(\dfrac{4}{y^2} - 1 \right) dy$. Hence find the area of the shaded region. [5]

(iii) The shaded region is rotated through $360°$ about the **y-axis**. Find the exact value of the volume of revolution obtained. [5]