7. [8 points] Let S be the solid whose base is the region bounded by the graph of the curve $y = \frac{1}{\sqrt{x(1+a\ln(x))}}$ (for some positive constant $a > 0$), the x-axis, the lines $x = 1$ and $x = e$. The cross-sections of S perpendicular to the x-axis are squares. Find the exact volume of S. Show all your work to receive full credit.