6. (13 points) Let \( a \) and \( b \) be positive numbers. The region bounded by the positive \( y \)-axis, the positive \( x \)-axis, the vertical line \( x = b \) and the curve \( y = e^{-ax} \) is revolved about the \( x \)-axis.

(a) (6 pts.) Find the volume of the resulting solid. (Yes, your answer will involve \( a \) and \( b \).)

(b) (7 pts.) Suppose we let \( b \to \infty \), creating a solid with an infinitely long neck. Does this solid have finite volume? If so, find it (showing step-by-step work.) If not, explain why not.