1. Let $R$ be the finite region bounded by the graphs of $y = 5 + 3e^x$, $y = 8$ and $x = 2$. Set up, but do not evaluate, definite integrals which represent the volumes of the following solids.

(a) The volume of the solid formed when $R$ is revolved around the vertical line $x = 4$. Determine this volume in the following two ways.

i. (2 points) Integrate with respect to $x$.

ii. (2 points) Integrate with respect to $y$. (Use different integrands in parts $i$ and $ii$.)
(b) (3 points) The volume of the solid with base \( \mathbb{R} \) for which the cross-sections perpendicular to the \( x \)-axis are semi-circles.

2. (3 points) Find the average value of the function \( f(x) = \frac{e^{\sqrt{x}}}{\sqrt{x}} \) on the interval \([25, 81]\).