1. Use cylindrical shells to find the volume of the solid generated by revolving the region bounded by the curves $y = e^{3x}$, $y = e^3$ and $x = 0$, about the line $x = -1$.

2. The value of $b > 0$ such that the average value of $f(x) = b^2 x - x^2$ over the interval $[0, b]$ is zero.

3. Evaluate $\int_{0}^{4} xe^{-x} dx$. 

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