1. Using the substitution rule to evaluate the following indefinite integral (including the constant $C$ is not required)
\[ \int t \sin(t^2)dt \]

2. Using the substitution rule to evaluate the following definite integral.
\[ \int_1^2 x\sqrt{x-1}dx. \]

3. Find the area of the region enclosed by the given curve (decide whether to integrate with respect to $x$ or $y$).
(1) $y = x, y = x^2$. (2) $x = 2y^2, x + y = 1$.

4. Find the volume of a solid obtained by rotating the region bounded by the given curves about the specified line.
(1) $y = x$ and $y = x^2$ about $y$ axis
(2) $y = x$ and $y = x^2$ about $x = 2$.

5. Compute the arc length exactly, $y = 4x^{3/2} + 1, \quad 1 \leq x \leq 2$. 