1. Evaluate indefinite integrals and definite integrals. Show your substitution clearly if you use any.

(a) \( \int (x^3 - \sqrt[3]{x}) \, dx \)

(b) \( \int \left(x + \frac{1}{x}\right)^2 \, dx \)
(c) \[ \int \frac{\cos x}{\sin^2 x} \, dx \]

(d) \[ \int xe^{x^2} \, dx \]
(e) \[ \int_0^{\pi/2} (4 \cos x - 3 \sin x) \, dx \] Simplify your answer as much as possible.

(f) \[ \int_1^9 \frac{1}{2x} \, dx \] Simplify your answer as much as possible.
2. Evaluate the integral by interpreting it in terms of area. \textbf{Sketch and shade} the appropriate area. Show your work clearly. Simplify your answer as much as possible.

\[ \int_{0}^{2} (|x| + 1) \, dx \]
3. Find the area of the region enclosed by the $x$-axis, $y$-axis, and the line $x + y = 1$.

(a) Sketch the curves and shade the region. *Mark the intercepts of the curves clearly if there are any.*

(b) Set up, but do NOT evaluate, the integral.

(c) Evaluate the integral in (b) to find the area. *Simplify your answer as much as possible.*
4. For the given Riemann Sum

\[
\lim_{n \to \infty} \sum_{i=1}^{n} e^{2x_i^*} \Delta x_i, \quad 0 \leq x \leq 1
\]

answer the followings.

(a) Express the given Riemann sum as a definite integral.

(b) Sketch and shade the area represented by the given Riemann Sum.

(c) Evaluate the area represented by the given Riemann Sum.
5. Evaluate \( \int_0^{\pi/4} \sin^2 \theta \, d\theta \)