共十題，每題拾分。

1. Find the area of the region enclosed by the parabola \( y = 2 - x^2 \) and the line \( y = -x \).

2. Evaluate \( \int_{-1}^{1} 3x^2\sqrt{x^3+1} \, dx \).

3. Evaluate \( \int_{0}^{\pi/4} \sqrt{1+\cos(4x)} \, dx \).

4. Find the volume of the solid of revolution formed by revolving the region bounded by the graph of \( x = e^{-y^2} \) and the \( y \)-axis \((0 \leq y \leq 1)\) about the \( x \)-axis.

5. Find \( \int \frac{5x^2 + 20x + 6}{x^3 + 2x^2 + x} \, dx \).

6. Find \( \int_{0}^{\pi/2} \cos^4(x) \, dx \).

7. If \( f \) has \( n \) derivatives at \( c \), then the polynomial
   \[
   P_n(x) = f(c) + f'(c)(x-c) + \frac{f''(c)}{2!}(x-c)^2 + \ldots + \frac{f^{(n)}(c)}{n!}(x-c)^n
   \]
   is called the \( n \)th Taylor polynomial for \( f \) at \( c \). Find the Taylor polynomials \( P_0, P_1, P_2, P_3, \) and \( P_4 \) for \( f(x) = \ln x \) centered at \( c = 1 \).

8. Evaluate \( \int_{0}^{2} \int_{0}^{x+y} e^{x}(y+2z) \, dz \, dy \).

9. Find \( \frac{\partial w}{\partial s} \) and \( \frac{\partial w}{\partial t} \) when \( s = 1 \) and \( t = 2\pi \) for the function given by
   \[ w = xy + yz + xz \]
   where \( x = s \cos(t), \ y = s \sin(t), \) and \( z = t \).

10. Find the relative extrema of \( f(x, y) = -x^3 + 4xy - 2y^2 + 1 \).