PRACTICE QUESTIONS:

Integration Questions

1. Evaluate the definite integral of $f(x) = xe^x$ from 0 to 2.
2. Determine the area enclosed by the function

   $$g(x) = x^3 - 4x$$

   and the x-axis in the interval $[-2,2]$.

3. Solve the integral

   $$\int (x^4 - 2x^2 + 5)dx$$

4. Compute the definite integral

   $$\int_1^3 (e^x - x^2)dx$$

5. Evaluate the double integral

   $$\int_0^2 \int_1^3 (xy)\, dx\, dy$$

Partial Derivative Questions

6. Compute the first-order partial derivatives of

   $$h(x,y) = x^2e^y + \sin(xy)$$

7. Find the second-order partial derivatives of

   $$f(x,y) = \ln(x^2 + y^2)$$

8. Verify whether the mixed partial derivatives

   $$g(x,y) = x^3y^2 + e^{x+y}$$

   satisfy $g_{xy} = g_{yx}$

9. Compute the first-order partial derivatives of

$$f(x, y) = xe^{xy} + y^3$$

10. Compute the second-order partial derivatives of

$$g(x, y) = x^4y + \cos(xy)$$