

1. Solve the exact equation as

$$(x^2 + 3xy^2)dx + (3x^2y + y^3)dy = 0 \quad (25\%)$$

2. Find the inverse transform of the function $\ln\left(1 + \frac{\omega^2}{s^2}\right)$ (25%)

3. Solve the boundary value problem (25%)

$$y'' + y = 0, y(0) = 3, y(\pi) = 3$$

4. Please find the inverse of matrix A (25%)

$$A = \begin{bmatrix} -1 & 1 & 2 \\ 3 & -1 & 1 \\ -1 & 3 & 4 \end{bmatrix}$$