Kingdom of Saudi Arabia
Ministry of Education
College of Computer
Department of Computer Engineering

Course Code and Name : Differential Equations MATH218
Final Exam
472 Date: 7-6-2026 Duration: 2hour

Student Name:	**Student ID:**

1. Find the differential operator that annihilates $xe^{2x} + x^2 \sin(2x)$.

2. Solve the differential equation $2x^2y'' + 3xy' + y = 0$.

3. Solve the homogeneous differential equation $(x - 3y)dx + xdy = 0$.

4. Solve $L[2t^4 + \sinh(3t) - \frac{1}{3}]$.

5. Write the solution of the equation $x'' + 2x' = 0$ with initial value problem $x(0) = 2, x'(0) = 1$.

6. Solve

(a) $L^{-1}\left[\frac{2}{s^4} + \frac{5}{s+2}\right]$ (b) $L^{-1}\left[\frac{2s+3}{s^2+3}\right]$

7. Solve the differential equation by undetermined coefficients $y'' - 2y' = xe^x + 5\cos(x)$.

8. Solve using Laplace Transform

$\frac{dy}{dt} + y = e^{-4t},\ y(0) = 2.$