# Math 240 - Assignment 10

Name _____

November 13, 2025

Score _____

Show all work to receive full credit. Supply explanations when necessary. This assignment is due November 18.

1. Use Laplace transform techniques to solve the initial value problem. You may use technology to compute any required partial fraction decompositions.

$$y'' - 3y' + 2y = \cos t, \quad y(0) = 0,\ y'(0) = -1$$

2. Use Laplace transform techniques to solve the initial value problem. You may use technology to compute any required partial fraction decompositions.

$$y'' - 4y = 4t - 8e^{-2t}, \quad y(0) = 0,\ y'(0) = 5$$

3. Use Laplace transform techniques to solve the initial value problem. You may use technology to compute any required partial fraction decompositions.

$$y'' - 6y' + 9y = t^2 e^{3t}, \quad y(0) = 2,\ y'(0) = 6$$

4. Use Laplace transform techniques to solve. You may use technology to compute any required partial fraction decompositions.

$$y'' + 4y' + 4y = t^3 e^{-2t}; \quad y(0) = 5,\ y'(0) = -10$$

5. Use Laplace transforms to solve the system of equations. Do not use technology.

$$x' = -x + y, \quad x(0) = 0$$

$$y' = 2x, \quad y(0) = 1$$

6. Use Laplace transforms to solve the initial value problem. Do not use technology.

$$x''' + x'' - 6x' = e^{4t}; \quad x(0) = 0,\ x'(0) = 1,\ x''(0) = 1$$