Differential Equations
Linear Equations with Variable Coefficients

1. Find the general solution of the given differential equation.

$$y' + 5y = x + e^{-3x}$$

2. Find the general solution of the given differential equation.

$$y' - 4y = x^2 e^{4x}$$

3. Find the general solution of the given differential equation.

$$y' + \frac{1}{x} y = 2\cos(4x)$$

4. Find the general solution of the given differential equation.

$$y' - 5y = 4e^{x}$$

5. Find the general solution of the given differential equation.

$$xy' + 3y = \sin x, \quad x > 0$$

6. Find the general solution of the given differential equation.

$$y' + 3x^2 y = 3x^2 e^{-x^3}$$

7. Find the general solution of the given differential equation.

$$4y' + y = 5x$$

8. Find the general solution of the given differential equation.

$$y' + y = \sin(2x)$$

9. Find the general solution of the given differential equation.

$$y' - y = 9xe^{9x}$$

10. Find the general solution of the given differential equation.

$$(y - x\sin x^2)dx + xdy = 0$$

11. Find the solution of the given initial value problem.

$$y' + 4y = xe^{-4x}, \quad y(1) = 0$$