1. Find all solutions: \( \frac{dy}{dx} = \frac{4x + y}{x + 4y} \)

2. Find all solutions: \( \frac{dy}{dx} - \frac{y}{x} = x^3 y^2 \)

3. Find the solution: \( \frac{dy}{dx} = \frac{\sin x - \sin y}{e^y + x \cos y} \), \( y(1) = 1 \)

4. Determine the integrating factor \( m(x) \) or \( m(y) \) to find all the solutions:

\[ y^2 \, dx + (3xy + \sin y) \, dy = 0 \]

5. Find the solution to the initial value problem:

\[ y'' + 3y' + 2y = e^t \sin t, \quad y(0) = 1, \quad y'(0) = -1. \]

6. Find the solution to the initial value problem:

\[ y'' + 7y' = t^2, \quad y(0) = 1, \quad y'(0) = 0. \]

7. Determine the form of a particular solution; do not evaluate the coefficients!

\[ y'' + 6y' + 9y = e^{-t} + (t^2 + 1)e^{-3t} + 7e^{-t} \sin t \]