Write final answers on this sheet. Turn in all relevant work on separate sheets. Good luck!

1. [10] Find the general solution to 
\[(x + y - 1)dx + (y - x - 5)dy = 0.\]

2. [10] Find the general solution to 
\[\frac{dy}{dx} + y = e^x y^{-2}.\]

3. [20] Find the general solution to 
\[y'' + 2y' + 2y = 0.\]

4. [10] Given that \(y_1 = \cos(t)\) is a solution to \(y'' - y' + y = \sin(t)\) and \(y_2 = \frac{e^{2t}}{2}\) is a solution to \(y'' - y' + y = e^{2t}\), find a solution to 
\[y'' - y' + y = 5\sin(t) - e^{2t}.\]

5. [10] Find a particular solution to 
\[y'' - 5y' + 6y = te^{2t}.\]

6. [20] Solve the initial value problem 
\[y'' - 2y' + y = (t + 1)e^{-t}, \quad y(0) = 1, y'(0) = 0.\]

7. [20] Use Variation of Parameters to find the general solution to 
\[y'' - 2y' + y = \frac{e^t}{t}\]