

**DIRECTIONS** To receive full credit, you must provide complete legible solutions to the following problems in the space provided. Transfer all your answers to the space provided on the test paper

Find the general solution of the given differential equation, then give the largest interval over which the general solution is defined.. And determine whether there are any transient terms in the general solution.

a.  $y' + y = e^{3x}$

b.  $x^2 y' + xy = 3$

2. Solve the given initial-value problem. Give the largest interval  $I$  over which the solution is defined.

a.  $xy' + y = e^x, y(1) = 5$

b.  $x(x + 1)y' + xy = 1, y(e) = 1$