1) Find two linearly independent solutions of \( x^2 y'' + x(1-x)y' - (1+3x)y = 0, x > 0. \)

2) Consider \( x^2 y'' + (3x-1)y' + y = 0. \)
   a) Show that the origin is the irregular singular point of the differential equation.
   b) Obtain solutions of the differential equation for large \( x. \)
   Hint: Put \( x = \frac{1}{w}. \)

3) Solve the problem \( y'' + 2y' + y = t, y(0) = -3, y(1) = -1, \) using the Laplace transform method.

4) Solve \( y'' + 4y = \begin{cases} 4t & 0 \leq t \leq 1 \\ 4 & t > 1 \end{cases}, y(0) = 1, y'(0) = 0 \) using the Laplace transform technique.

5) If \( f(t) \) is to be continuous for \( t \geq 0 \) and \( \mathcal{L}^{-1}\left\{ \frac{e^{-3s}}{(s+1)^2} \right\} \) evaluate \( f(2), f(5), f(7). \)