1. Apply the Laplace transform to the initial value problem

$$y'' + 3y' = 7, \qquad y(0) = 1, y'(0) = -3$$

   to express $Y(s) = \mathscr{L}\{y(t)\}$ in the form $Y(s) = \frac{P(s)}{Q(s)}$; for example, (1) below is of this form.
   Do not find the inverse Laplace transform.

2. Applying the Laplace transform to the initial value problem

$$y'' - 6y' + 9y = e^{2t}, \qquad y(0) = 3, y'(0) = 4$$

   gives the following

$$Y(s) = \frac{3s^2 - 20s + 29}{(s-2)(s^2 - 6s + 9)}. \tag{1}$$

   Determine $y(t) = \mathscr{L}^{-1}\{Y(s)\}$, the solution to the given initial value problem.

3. Use the method of Laplace Transforms to solve the following initial value problems.

(a) $y'' + 4y = 4t^2 - 4t + 10,$ $y(0) = 0, y'(0) = 3$

(b) $y'' - 4y' + 5y = 4e^{3t},$ $y(0) = 2, y'(0) = 7$