1. (2) Use Laplace transform methods to solve the differential equation

\[
    f'' + 2f' - 3f = \begin{cases} 
    1, & 0 \leq t < c \\ 
    0, & t \geq c
    \end{cases}
\]  

subject to the initial conditions \( f(0) = f'(0) = 0 \).

2. (3) Use Laplace transform methods to solve the differential equation

\[
    f'' + 2f' - 3f = \begin{cases} 
    0, & 0 \leq t < 1 \\ 
    1, & 1 \leq t < 2 \\ 
    0, & t \geq 2
    \end{cases}
\]  

subject to the initial conditions \( f(0) = f'(0) = 0 \).

3. (3) Use Laplace transform methods to solve the differential equation

\[
    f'' + 2f' - 3f = \delta(t - 1)
\]  

subject to the initial conditions \( f(0) = 0, f'(0) = 1 \). Remember the Laplace transform of the delta function gives \( \mathcal{L}[\delta(t - a)] = e^{-as} \).