1. Express the given function using window and step functions and then compute its Laplace transform.

\[ g(t) = \begin{cases} 
0, & t \in [0, 2), \\
 t + 1, & t \in [2, \infty). 
\end{cases} \]

2. Solve the given initial value problem using the method of Laplace transforms.

\[ y'' + y = u(t - 3), \quad y(0) = 0, \quad y'(0) = 1. \]

3. Use the convolution theorem to compute

\[ \mathcal{L}^{-1}\left\{ \frac{1}{(s^2 + 4)^2} \right\}. \]

4. Solve the integro-differential equation for \( y(t) \):

\[ y'(t) - 2 \int_0^t e^{t-\tau} y(\tau) d\tau = t, \quad y(0) = 2. \]