1. (4) Find the inverse Laplace transform for each of the following functions:

(a) \( \frac{s}{s^2 + 2s + 3} \)

(b) \( \left( \frac{e^{-2s}}{s^2 + s + 2} \right) \left( \frac{2}{s^2 - 1} \right) \).

2. (4) Compute the following function values. Note: \( f * g \) denotes the convolution of \( f \) with \( g \).

(a) \( f * g(3) \), where \( f(t) = 3u(t - 2)t \) and \( g(t) = t^2 + 1 \). Note: \( u(t) \) denotes the Heaviside function.

(b) \( f * g(2\pi) \), where \( f(t) = \sin(t) \) and \( g(t) = \cos(t) \).

3. (2) Solve the following initial value problem.

\[
\frac{d^2 y}{dt^2} + \frac{dy}{dt} + y = \delta(t - 2) , \quad y(0) = -1 , \quad y'(0) = 1 .
\]