1. Determine the Laplace transform and the associated region of convergence for each of the following signals :

(a) $x_1(t) = e^{-t} u(t) + e^{-2t} u(t)$

(b) $x_2(t) = -e^{-t} u(-t) + e^{-2t} u(t)$

(c) $x_3(t) = -e^{-t} u(-t) - e^{-2t} u(-t)$

(d) $x_4(t) = \cos(w_0 t) u(t)$

2. Invert each of the following Laplace transforms :

(a) $X_1(s) = \dfrac{s-1}{s^2+3s+2}$, $Re\{s\} > -1$.

(b) $X_2(s) = \dfrac{s-1}{s^2+3s+2}$, $-2 < Re\{s\} < -1$.

(c) $X_3(s) = \dfrac{s-1}{s^2+3s+2}$, $Re\{s\} < -2$.