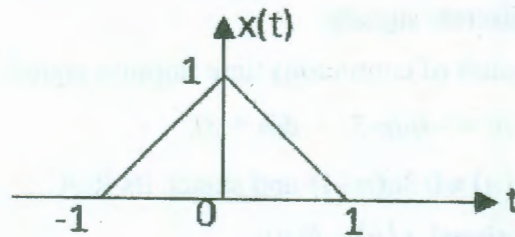
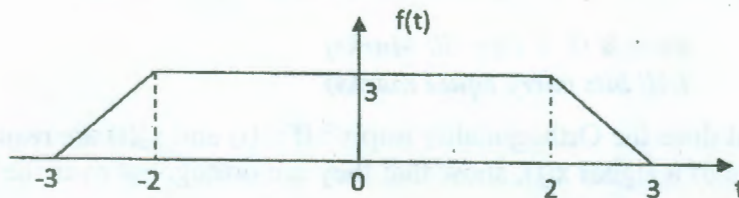


13. a) If $x(s) = (s^2 + 6s + 7) / (s^2 + 3s + 2)$ ROC $\text{Re}(s) \leq 1$, is the Laplace transform of $x(t)$, obtain the inverse Laplace transform.
- b) Consider an LTI system whose response to the input $x(t) = [2e^{-t} - e^{-3t}] u(t)$ is $y(t) = [3e^{-2t} - 3e^{-4t}] u(t)$. Determine the Transfer function and Impulse response of the system.
14. a) Find DTFT of the sequence $x(n)$, where
- $$x(n) = \begin{cases} 2^n & 0 \leq n \leq 3 \\ 1-2^n & 4 \leq n \leq 7 \\ 0 & \text{otherwise} \end{cases}$$
- b) Find Z- transform of the signal $x(n) = 0.3^{|n|}$ and sketch its ROC.
15. a) Find correlation between two signals $x_1(n) = \{1 \ 0 \ 3 \ 4 \ 6\}$ and $x_2(n) = \{2 \ 3 \ 4\}$.
- b) Find convolution between the two signals graphically $x(t) = [u(t) - 2u(t-1) + u(t-2)]$ and $h(t) = 2e^{-t}u(t)$.
16. a) A triangular pulse is shown in the figure below, sketch $x(-3t+2)$.



- b) Find Fourier transform of the signal shown below:



17. Write short notes on any **two** of the following:
- Properties of ROC for discrete time signals
 - Sampling theorem
 - Properties of cross correlation of energy signals.

