Q1 [30+40=70 pts] – Convolution: 
\[ y(t) = x_1(t) \ast x_2(t). \] Sketch \( y(t) \).
\[ z(t) = x_2(t) \ast x_3(t). \] Sketch \( z(t) \).

Q2 [30 pts] – Power Calculations: Consider a wireless channel with a bandwidth of 1 MHz. SNR at the receiver is 6 dB, the AWGN power spectral density is \( N_0 = -174 \) dBm/Hz, and the receiver noise figure is 10 dB. Find the received signal power, \( P_s \), in Watts.

\[
P_N = N_0 + B + F = -174 \text{ dBm/Hz} + 60 \text{ dBHz} + 10 \text{ dB} = -104 \text{ dBm}
\]

\[
\text{SNR} = P_S - P_N
\]

\[
P_S = \text{SNR} + P_N = 6 \text{ dB} - 104 \text{ dBm} = -98 \text{ dBm} = -128 \text{ dBW} = 1.58 \times 10^{-13} \text{ W}
\]