1. Find the unilateral Z transforms of the following sequences:

(a) \( x[n] = 2 \delta[n] + (0.6)^n u[n] + n u[n] \)

(b) \( x[n] = n (0.1)^n u[n-1] \)

(c) \( x[n] \) as shown in Figure PR-1C. (\( x[n] \) is 0 for all \( n < 0 \) and all \( n > 2 \).)
2. Find the sequences corresponding to the following unilateral Z transforms:

(a) \( X(z) = \frac{1}{z - \frac{1}{2}} \)

(b) \( X(z) = 2z \frac{z - \frac{3}{4}}{(z - \frac{1}{2})(z - 1)} \)

(c) \( X(z) = \frac{z + 1}{z^2 - z + 1} \)

(d) \( X(z) = \frac{z^{-2}}{z - 3} \)
3. Consider the system described by the following difference equation:

\[ y[n] - \frac{1}{4} y[n-1] - \frac{1}{8} y[n-2] = x[n] + \frac{1}{2} x[n-1] \]

(a) Find the transfer function, \( H(z) \), of this system.

(b) Find the impulse response, \( h[n] \), of this system.

(c) Find the system output, \( y[n] \), if the input is \( x[n] = (-1/2)^n u[n] \).

(d) Is this system stable? Causal? Would the inverse system be stable and causal? Justify your answers.