Digital Signal Processing Assignment # 4

1. Determine the bi-lateral Z-transforms of the following signals.

   (a) $x(n) = (-3)^n u(-n-2)$

   (b) $x(n) = \begin{cases} 1, & -5 \leq n \leq 5 \\ 0, & \text{otherwise} \end{cases}$.

   (c) $x(n) = \begin{cases} 4^{-n}, & n \geq 1 \\ 2^n, & n < 1 \end{cases}$.

   (d) $x(n) = [2, 1, \underset{\uparrow}{3}, 5, -1, 6]$

2. Use the properties of the Z-transform to find $X(z)$ for the following causal sequences.

   (a) $x(n) = \left[n^2 2^{-n} + (n-1)3^{-n}\right] u(n)$

   (b) $x(n) = 2\exp(-n)\cos(\omega n)u(n)$

3. Find $Y(z)$ by using the following difference equation

$$y(n) - y(n-1) + y(n-2) = 2^{-n}u(n). \tag{1}$$

   $y(-1) = 1$, $y(-2) = 2$