ECE 301 Homework Assignment 4

1. For the system described by the difference equation

\[ y[n] + 5y[n - 1] + 6y[n - 2] = x[n - 1] + 4x[n - 2] \]  

(a) Find the unit impulse response \( h[n] \).

(b) Find the zero state response corresponding to the input

\[ x[n] = u[n] - u[n - 3]. \]  

Indicate which properties of the convolution sum you use at each step and simplify your result as much as possible.

2. For the system described by the differential equation

\[ (D^2 + 5D + 6)y(t) = (D + 4)x(t) \]  

(a) Find the impulse response \( h(t) \).

(b) Find the transfer function \( H(s) \).

(c) Find the zero state response corresponding to the input

\[ x(t) = e^{-3t}[u(t) - u(t - 2)]. \]  

Simplify your result as much as possible.