PROBLEM:

For a particular linear time-invariant system, when the input is

$$x_1[n] = u[n] = \begin{cases} 0 & n < 0 \\ 1 & n \geq 0 \end{cases}$$

the corresponding output is

$$y_1[n] = \delta[n] + 2\delta[n-1] + 3\delta[n-2] + 4u[n-3] = \begin{cases} 0 & n < 0 \\ 1 & n = 0 \\ 2 & n = 1 \\ 3 & n = 2 \\ 4 & n \geq 3 \end{cases}$$

Determine the output when the input is $x_2[n] = \delta[n] = u[n] - u[n-1]$. Give your answer as a formula expressing $y_2[n]$ in terms of known sequences or as an equation for each value of $y_2[n]$ for $-\infty < n < \infty$.