PROBLEM:

$$x[n] \longrightarrow \boxed{\begin{array}{c} \text{FIR FILTER} \\ \{b_k\} \end{array}} \longrightarrow y[n]$$
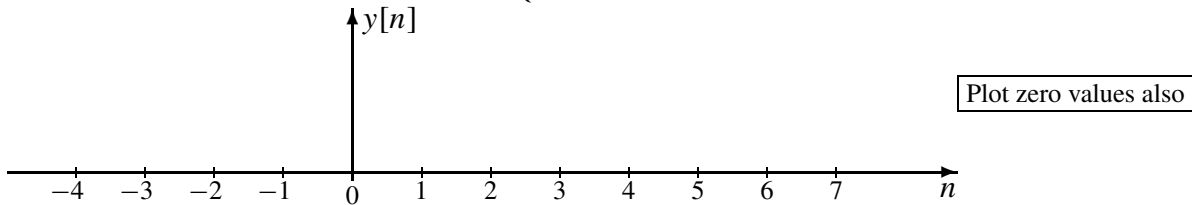
(a) If the filter coefficients of an FIR filter are $\{b_k\} = \{0, 2, 3, 2\}$, make a $\boxed{\text{plot}}$ of the output when the input is the unit step signal: $x[n] = u[n] = \begin{cases} 0 & \text{for } n < 0 \\ 1 & \text{for } n \geq 0 \end{cases}$

$\uparrow y[n]$

$\boxed{\text{Plot zero values also}}$

$-4 \quad -3 \quad -2 \quad -1 \quad \underset{0}{|} \quad 1 \quad 2 \quad 3 \quad 4 \quad 5 \quad 6 \quad 7 \qquad n$

(b) Suppose that the frequency response of a different FIR filter is

$$\mathcal{H}(\hat{\omega}) = \frac{\sin(9\hat{\omega}/2)}{\sin(\frac{1}{2}\hat{\omega})} e^{-j9\hat{\omega}}$$

If the input signal is $\quad x[n] = 3 + 2\cos(0.2\pi n + 0.3\pi) \quad$ for $-\infty < n < \infty$, determine a simple mathematical expression for the output signal $y[n]$.

$\boxed{y[n] =}$