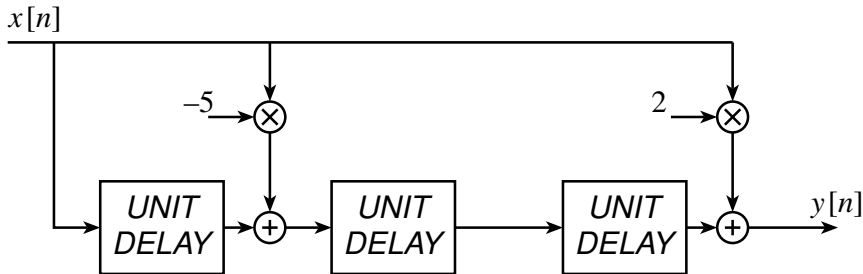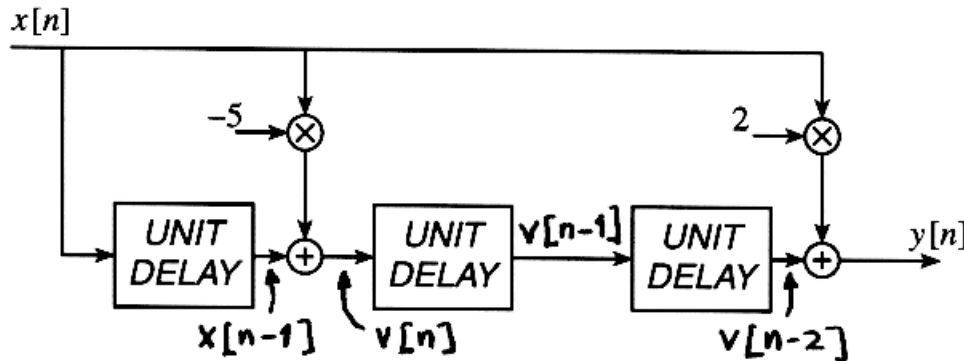## PROBLEM:

The following signal flow graph structure defines a linear time-invariant system:

Write a simple formula for the the difference equation defined by the signal flow graph.

SOLUTION

The following signal flow graph structure defines a linear time-invariant system:

$$x[n]$$

Write a simple formula for the the difference equation defined by the signal flow graph.

Assign variable $v[n]$ to input of unit delay in the middle.

$$v[n] = -5x[n] + x[n-1]$$

$$y[n] = 2x[n] + v[n-2]$$

$$v[n-2] = -5x[n-2] + x[n-3]$$

$$\Rightarrow$$
$$y[n] = 2x[n] - 5x[n-2] + x[n-3]$$

NOTE: this is an FIR Filter of length 4.