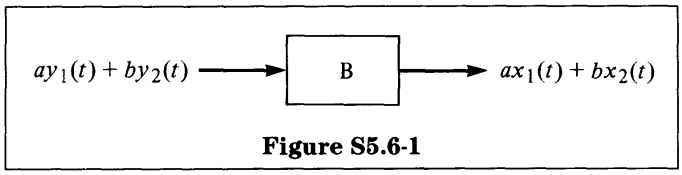

Figure S5.6-1

(b) If $y(t) = y_1(t - \tau)$, then since system A is time-invariant, $x(t) = x_1(t - \tau)$ and also $w(t) = x_1(t - \tau)$.

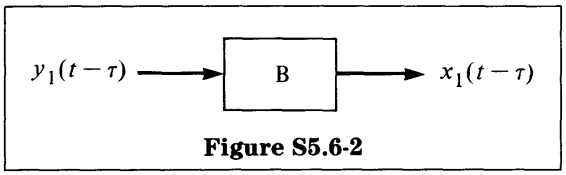

Figure S5.6-2

(c) From the solutions to parts (a) and (b), we see that system B is linear and time-invariant.

S5.7

(a) The following signals are obtained by addition and graphical convolution:

$(x[n] + w[n]) * y[n]$ (see Figure S5.7-1)
$x[n] * y[n] + w[n] * y[n]$ (see Figure S5.7-2)

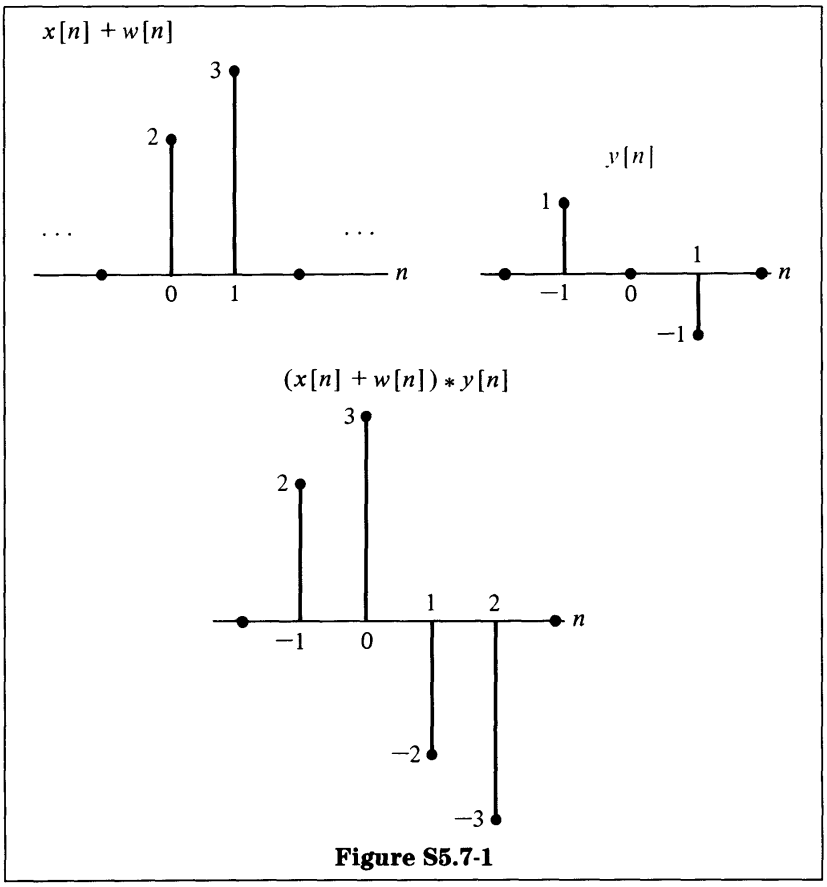

Figure S5.7-1

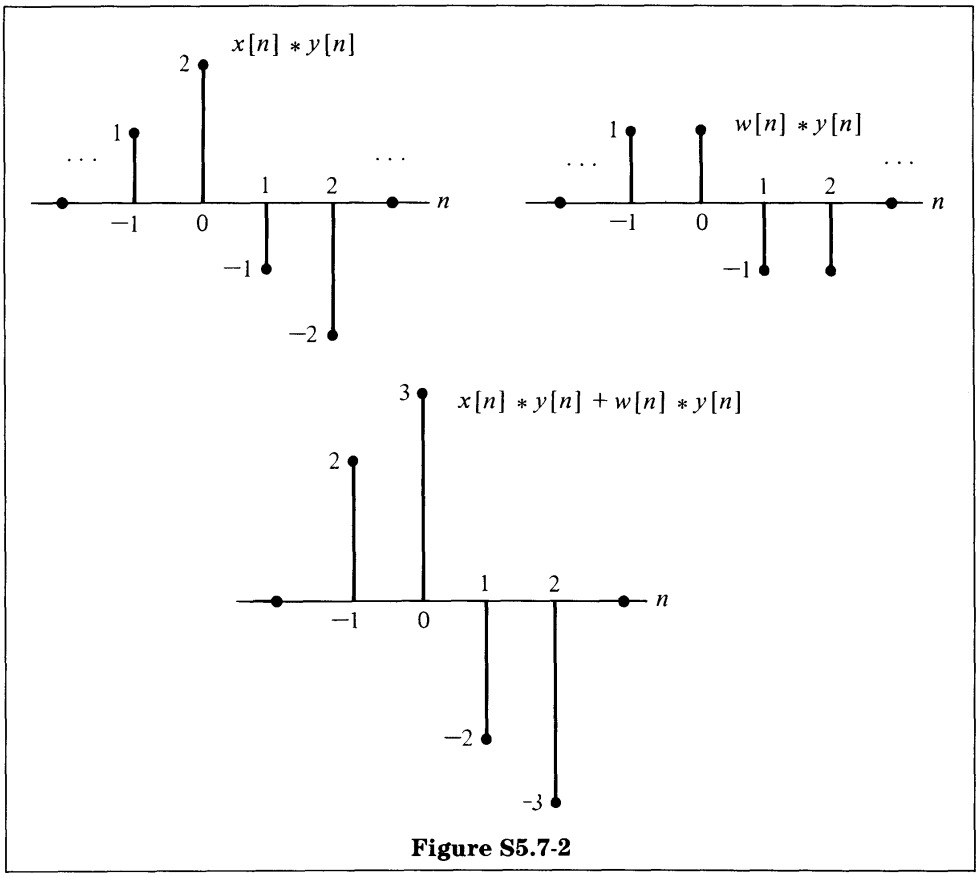

Figure S5.7-2

Therefore, the distributive property $(x + w) * y = x * y + w * y$ is verified.

(b) Figure S5.7-3 shows the required convolutions and multiplications.

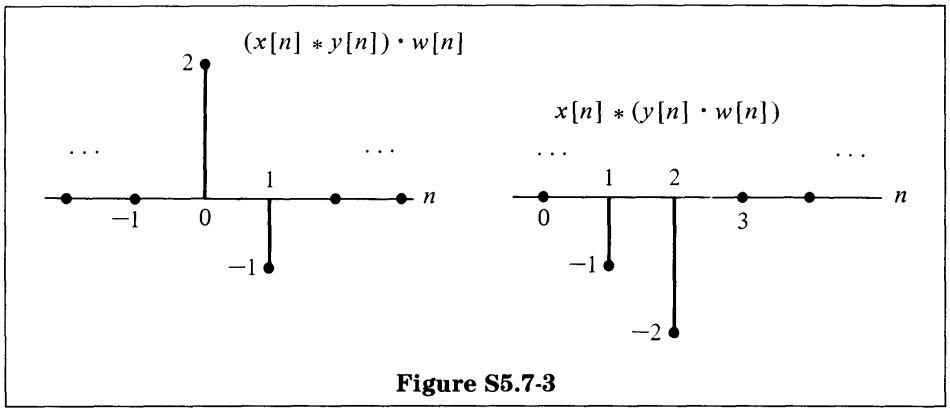

Figure S5.7-3

Note, therefore, that $(x[n] * y[n]) \cdot w[n] \neq x[n] * (y[n] \cdot w[n])$.