

### 9.1

(a)

$$\frac{2}{1 + 0.8z^{-1}}$$

(b)

$$\frac{3}{1 - \frac{1}{3}z^{-1}} + \frac{3}{1 + \frac{1}{3}z^{-1}}$$

(c)

$$-1 + z^{-1}$$

### 9.2

(a)

$$0.8^n u[n] + 0.8^{n-2} u[n-2]$$

(b)

$$0.8e^{j\frac{\pi}{3}n} + 0.8e^{-j\frac{\pi}{3}n}$$

(c)

$$-(0.6)0.6^n u[n] + 0.6^{n-1} u[n-1]$$

### 9.3

(a)

$$\begin{aligned} y[n] - 0.4y[n-1] &= x[n] + x[n-1] \\ Y(z) - 0.4Y(z)z^{-1} &= X(z) + X(z)z^{-1} \\ Y(z)(1 - 0.4z^{-1}) &= X(z)(1 + z^{-1}) \\ H(z) &= \frac{1 + z^{-1}}{1 - 0.4z^{-1}} \end{aligned}$$

(b)

$$H(z) = \frac{1 - z^{-1}}{1 + 0.75z^{-1}}$$

(c)

$$H(z) = \frac{1 + z^{-2}}{1 + 0.25z^{-2}}$$

(d)

$$H(z) = X(z) \left( 1 + \frac{3}{4}z^{-1} - \frac{1}{4}z^{-2} \right)$$

### 9.4

(a)

$$\frac{1}{1 - z^{-1}} - \frac{z^{-6}}{1 - z^{-1}}$$

(b)

$$\frac{1}{1 - \frac{1}{3}z^{-1}} + \frac{1}{1 + \frac{1}{3}z^{-1}}$$

(c)

$$0.5^n u[n] - 0.5^{n-2} u[n-2]$$

(e)

$$= \delta - 2\delta[n-2] + 3\delta[n-4] - 4\delta[n-6] + 5\delta[n-8]$$

**9.5**

(a)

(b)

$$X(z) = 1 + z^{-2}$$

$$Y(z) = 1 + 0.5z^{-1}$$

(c)

$$0.5^n u[n] + 0.5^{n-2} u[n-2]$$

**9.6**

1

2

3

4

5

6 N

7 L

8