Chapter 1: Continuous-Time Signals and Systems

1.1[1] The signals in Figure 1 are zero except as shown.

(a) For the signal $x(t)$ of Figure 1(a), plot

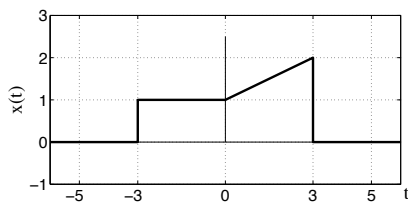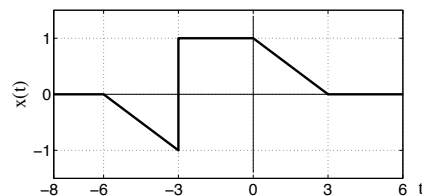|			
(i)	$x(-t/3)$	**(iii)**	$x(3+t)$
(ii)	$x(-t)$	**(iv)**	$x(2-t)$

Verify your result by checking at least two points.

(b) Repeat (a) for the signal $x(t)$ of Figure 1(b)
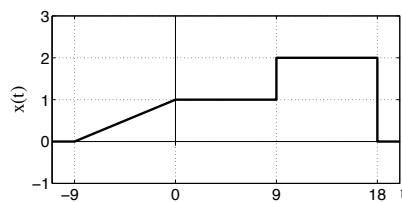
(c) Repeat (a) for the signal $x(t)$ of Figure 1(c)

(a)

(b)

(c)

Figure 1: Three signals

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[1]PPR 2.1 , Phillips, Parr & Riskin: Signals, Systems and Transforms, 4th ed.

1.2[2] The signals in Figure 1 are zero except as shown.

(a) For the signal $x(t)$ of Figure 1(a), plot

    (i) $4x(t) - 2$ **(iii)** $2x(2t) + 2$

    (ii) $2x(t) + 2$ **(iv)** $-4x(t) + 2$

Verify your result by checking at least two points.

(b) Repeat (a) for the signal $x(t)$ of Figure 1(b).

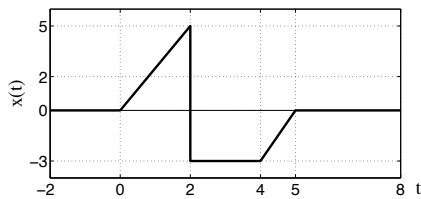(c) Repeat (a) for the signal $x(t)$ of Figure 1(c).

1.3[3] You are given the signals $x(t)$ and $y(t)$ in Figure 2.
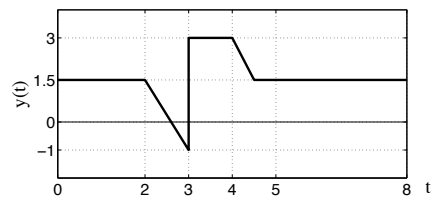
a) Express $y(t)$ as a function of $x(t)$.

b) Verify your result by checking at least three points in time.

c) Express $x(t)$ as a function of $y(t)$.

d) Verify your result of part (c) by checking at least three points in time.

(a) Signal $x(t)$ (b) Signal $y(t)$

Figure 2: Two signals

1.4[4] Given

$$x(t) = 4(t+2)u(t+2) - 4tu(t) - 4u(t-2) - 4(t-4)u(t-4) + 4(t-5)u(t-5)$$

, find and sketch $x(2t - 4)$.

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[2]PPR 2.2
[3]PPR 2.4
[4]PPR 2.5

Chapter 2: Discrete-Time Signals and Systems

2.1[16] Determine which of the following discrete-time functions is different:

(a) $x_1[n] = u[n] + u[-1 - n]$

(b) $x_2[n] = \sum_{k=-\infty}^{\infty} \delta[n - k]$

(c) $x_3[n] = u[n] + u[-n]$

(d) $x_4[n] = u[-n] + u[n - 1]$

2.2[17] The signals in Figure 3 are zero except as shown.

(a) For the signal $x_a[n]$ of Figure 3, plot the following

(i)	$x_a[3n]$		**(iv)**	$x_a[3 - n]$
(ii)	$x_a[-n/3]$		**(v)**	$x_a[n - 3]$
(iii)	$x_a[-n]$		**(vi)**	$x_a[-3 - n]$

(b) Repeat (a) for the signal $x_b[n]$ of Figure 3.

(c) Repeat (a) for the signal $x_c[n]$ of Figure 3.

(d) Repeat (a) for the signal $x_d[n]$ of Figure 3.

2.3[18] The signals in Figure 3 are zero except as shown.

(a) For the signal $x_a[n]$ of Figure 3(a), plot the following

(i)	$2 - 3x_a[n]$		**(iv)**	$3 - x_a[n]$
(ii)	$2x_a[-n]$		**(v)**	$1 + 2x_a[-2 + n]$
(iii)	$3x_a[n - 2]$		**(vi)**	$2x_a[-n] - 4$

(b) Repeat (a) for the signal $x_b[n]$ of Figure 3(b).

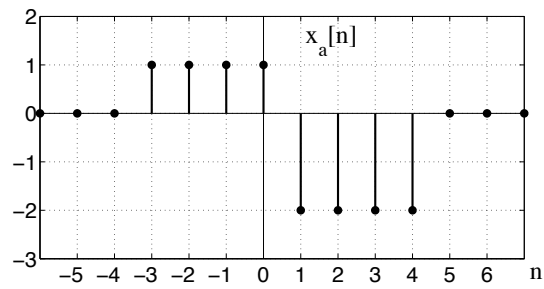(c) Repeat (a) for the signal $x_c[n]$ of Figure 3(c).

(d) Repeat (a) for the signal $x_d[n]$ of Figure 3(d).

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[16]PPR 9.1
[17]PPR 9.2
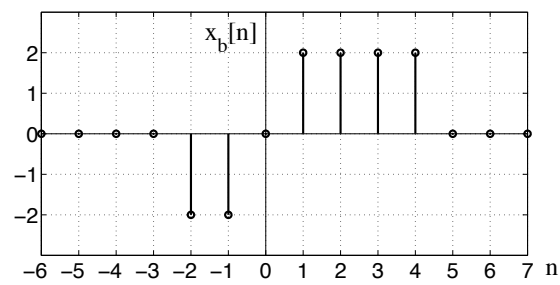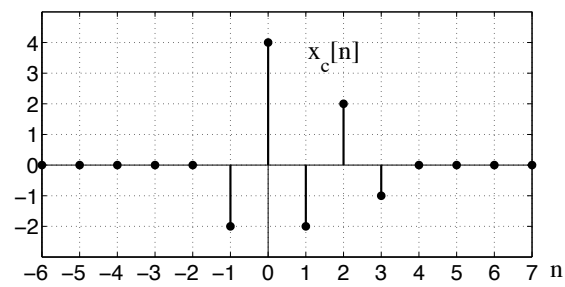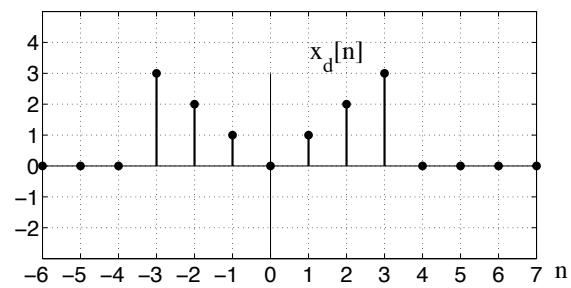[18]PPR 9.3

(a)

(b)

(c)

(d)

Figure 3: Discrete Signals