[IT CookBook] 기초 신호 및 시스템
: 개념과 원리가 한눈에 보이는 200여 개의 풍부한 예제

[연습문제 답안 이용 안내]

Chapter 03 기본적인 신호와 연산

[Quick Review]

[1] *Ans)* ×

[2] *Ans)* 사각 펄스

[3] *Ans)* 계단 함수

[4] *Ans)* ×

[5] *Ans)* 체 거르기

[6] *Ans)* 연속

[7] *Ans)* ×

[8] *Ans)* ×

[9] *Ans)* 같은

[10] *Ans)* 시간축

[11] *Ans)* 진폭 반전

[12] *Ans)* $-\infty < t < \infty$

[13] *Ans)* 크기축

[14] *Ans)* 앞섬

[15] *Ans)* ×

[16] *Ans)* 척도 조절, 이동

[17] *Ans)* 3, 지연

[18] *Ans)* ×

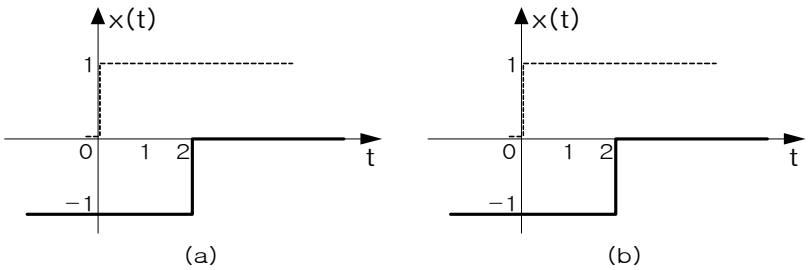
[19] *Ans)* ○

[20] *Ans)* ×

[기초 문제]

3.1

Ans)

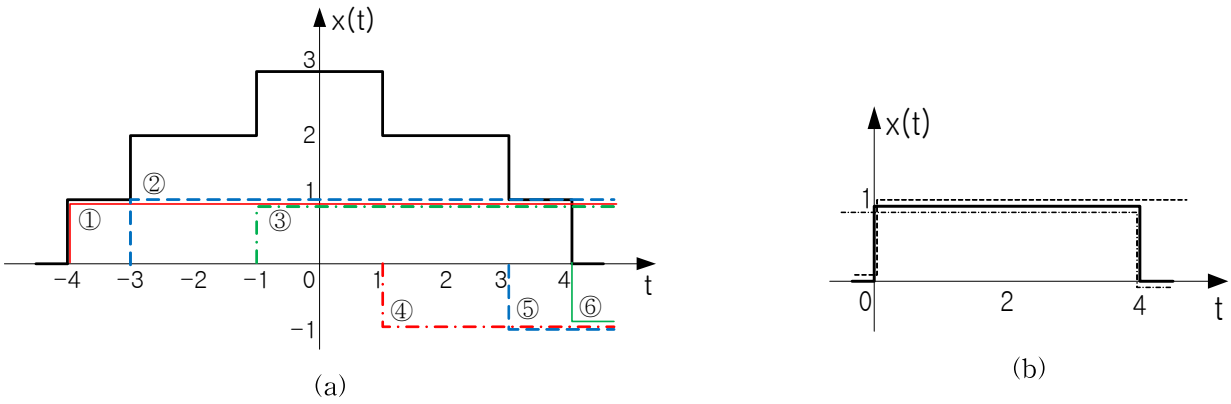


3.2

Ans)

(a) $x(t) = u(t+4) + u(t+3) + u(t+1) - u(t-1) - u(t-3) - u(t-4)$

(b) $x(t) = u(t) - u(t-4)$



3.3

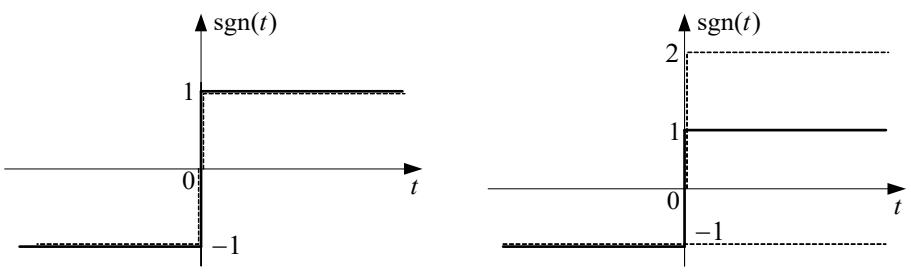
Ans)

(a) $x(t) = -[u(t+1) - u(t)] + t[u(t) - u(t-2)]$

(b) $x(t) = (t+1)u(t+1) - t\,u(t) - (t-1)u(t-1) + 2(t-3)u(t-3) - (t-4)u(t-4)$

3.4

Ans) $sgn(t) = u(t) - u(-t) = 2u(t) - 1$



3.5

Ans)

(a) $\int_{-\infty}^{\infty}(t^2-3t+2)\delta(t-2)dt=0$

(b) $\int_{-\infty}^{\infty}\cos(3(t+2))\delta(2t+4)dt=1$

3.6

Ans)

(a) $x(t)=4\cos(\pi t-\frac{\pi}{3})$

(b) $x(t)=2\sqrt{2}\cos(\pi t-\frac{\pi}{4})$

3.7

Ans)

(a) $x(t)=2e^{-2t}\cos(2t)$

(b) $x(t)=2\sqrt{2}e^{-3t}(\cos(2t+\frac{\pi}{4})+j\sin(2t+\frac{\pi}{4}))$

(c) $x(t)=e^{-t}(\cos(t)-j\sin(t))$

3.8

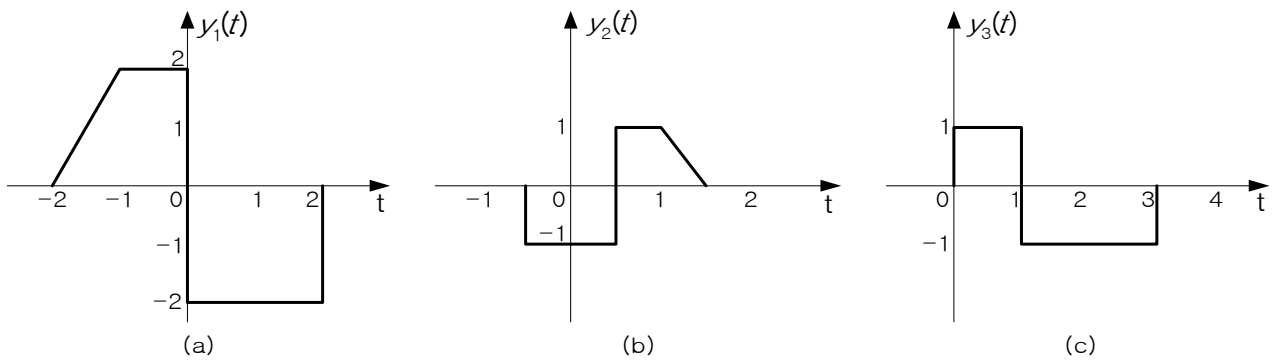
Ans)

(a) $x(t)=e^{j(\pi t+\frac{\pi}{4})}$

(b) $x(t)=e^{-(2+j\pi)t}$

3.9

Ans)



3.10

Ans)

(a) $x(t)=u(t)-u(t-1)+u(t-2)$

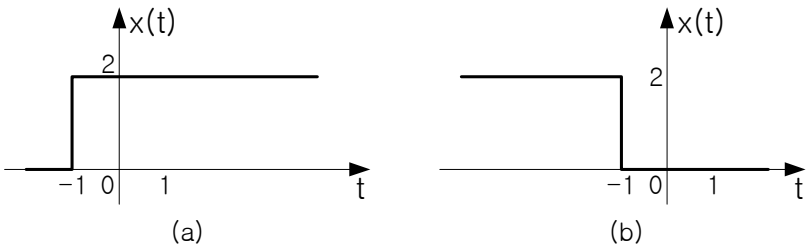
(b) $y(t) = u(-t) - u(t) + 2u(t-2) - 2u(t-4)$

(c) $y(t) = 2x(-(t-4)/2) - 1$

[응용 문제]

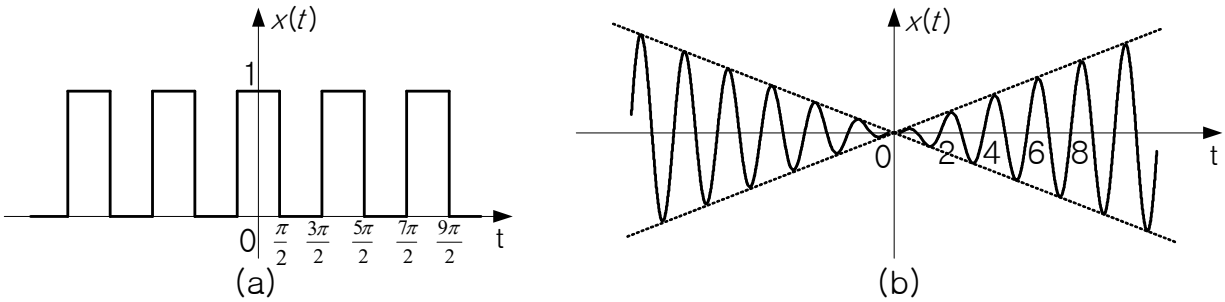
3.11

Ans)



3.12

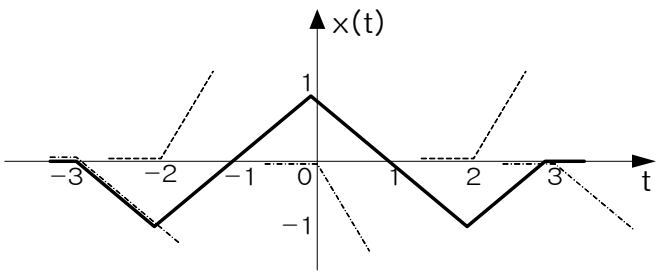
Ans)



3.13

Ans) $x(t) = -(t+3)(u(t+3)-u(t+2)) + (t+1)(u(t+2)-u(t))$
$-(t-1)(u(t)-u(t-2)) + (t-3)(u(t-2)-u(t-3))$

$= -r(t+3) + 2r(t+2) - 2r(t) + 2r(t-2) - r(t-3)$



3.14

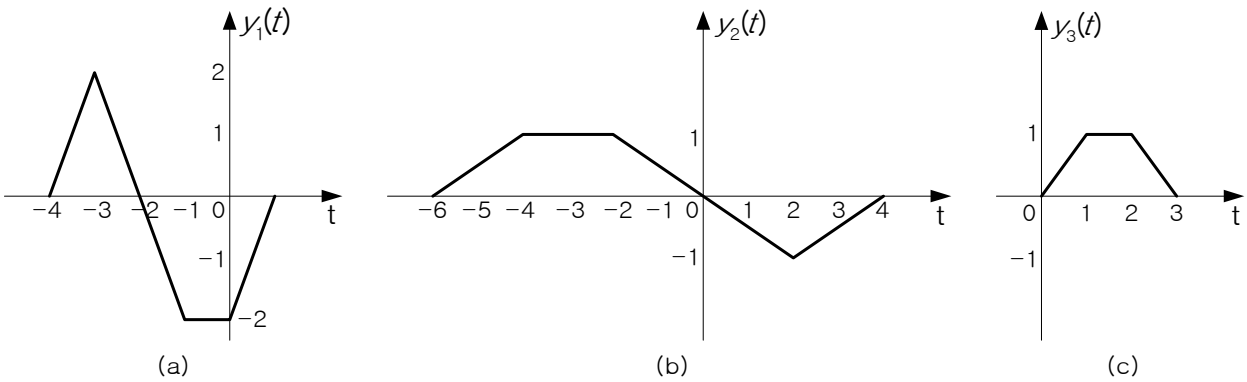
Ans)

(a) $\int_{-\infty}^{\infty}\left(\delta(t)\cos(t)+\delta\left(t-\frac{\pi}{2}\right)\sin(t)\right)dt=2$

(b) $\int_{-\infty}^{\infty}(\cos(t))u\left(t-\frac{\pi}{4}\right)\delta(t)dt=0$

3.15

Ans)



(a) (b) (c)