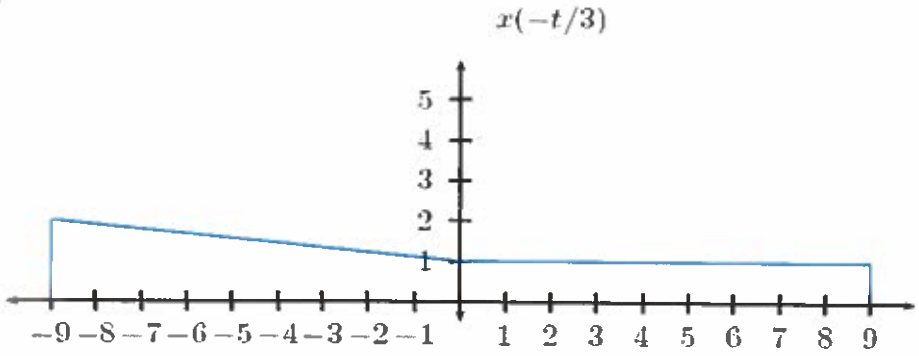
Chapter 2 solutions

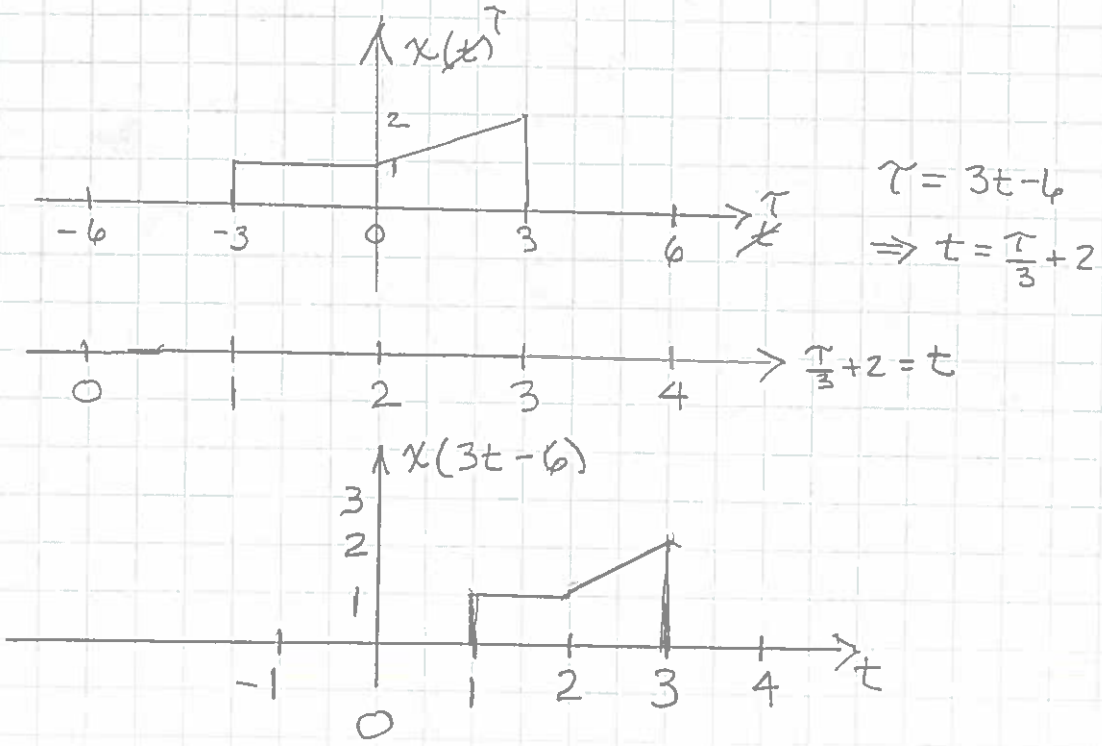
Problem 2.1

(a)

(i)

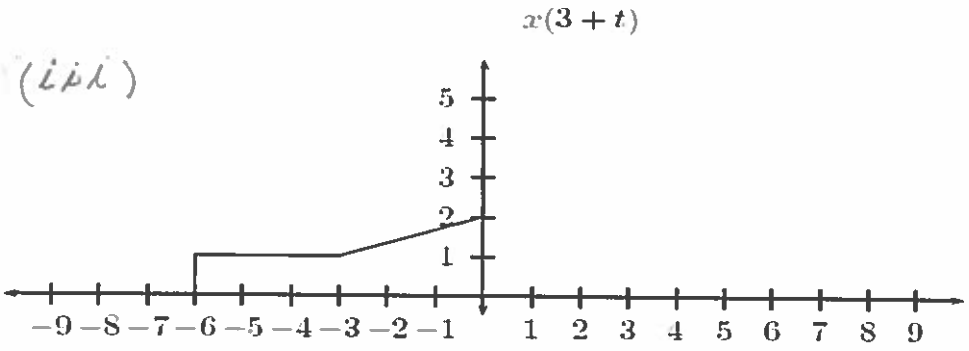


(ii)

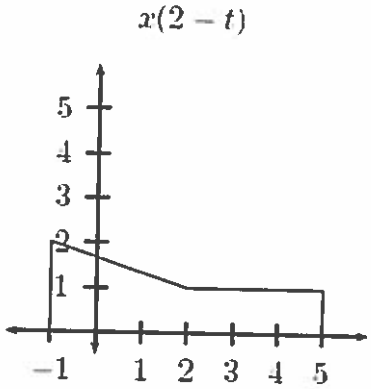


PROBLEM 2.16(a) continued

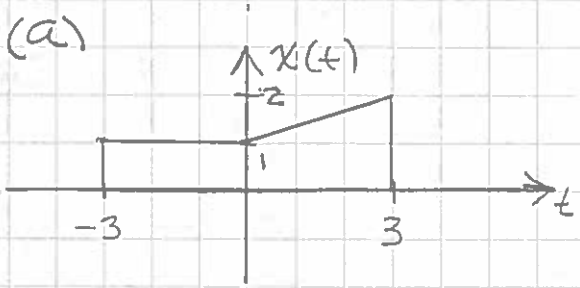
(iii)



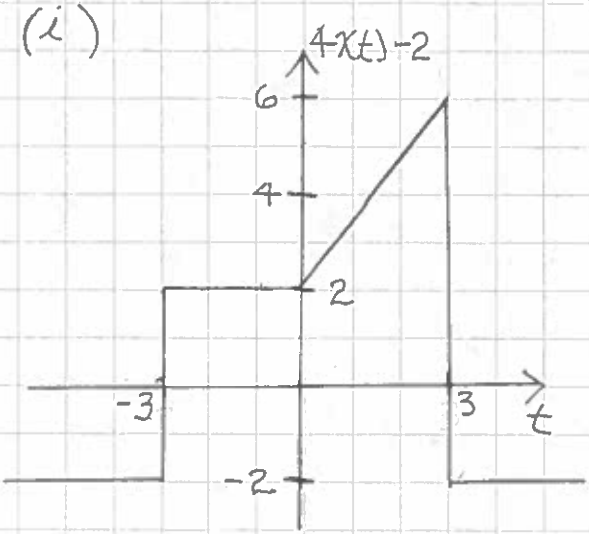
(iv)



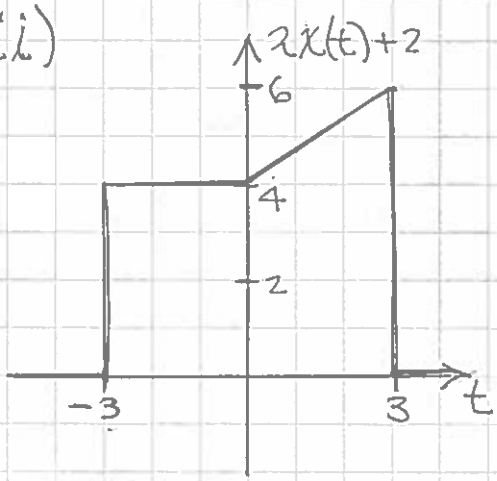
PROBLEM 2.2 (a)



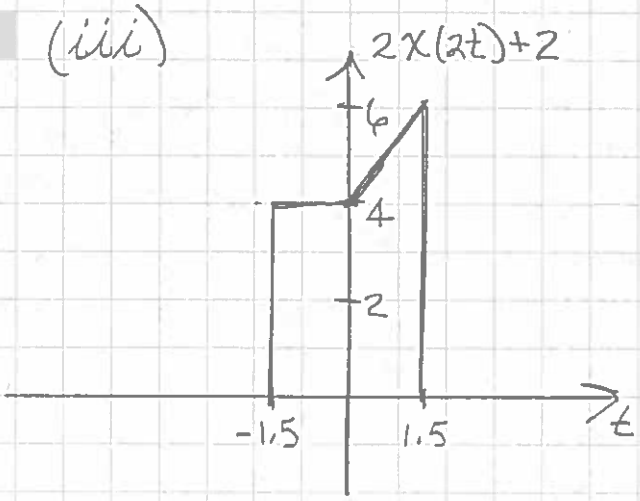
(i)



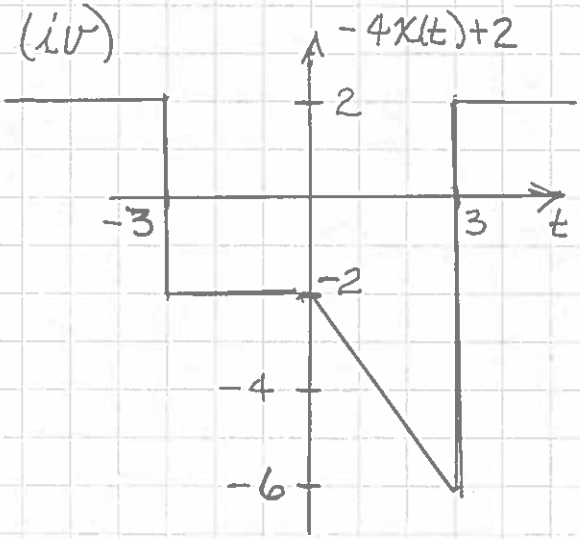
(ii)



(iii)



(iv)



Problem 2.3

2.3

(a) $y(t) = x\left[\left[-2(-2t+2)\right] + (2)\right]$

$x_1(t) = -2t + 2$

$x_2(t) = x(-2t+2)$

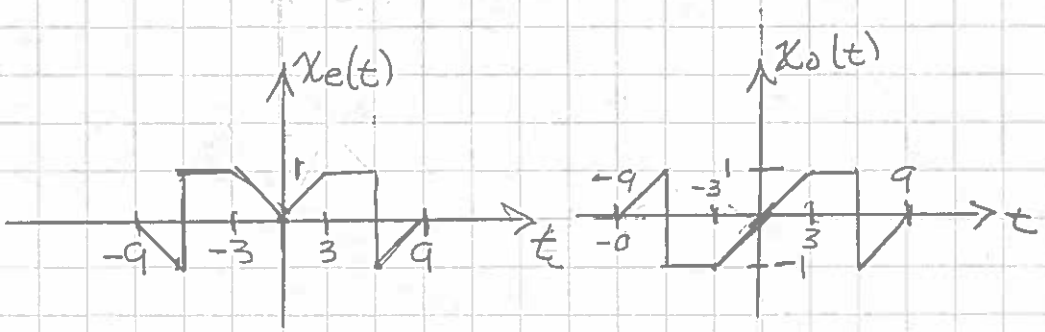
(b)

t	$y(t)$	$-2t+2$
-0.5	2	3
-1	2	4
1	-2	0

Problem 2.5

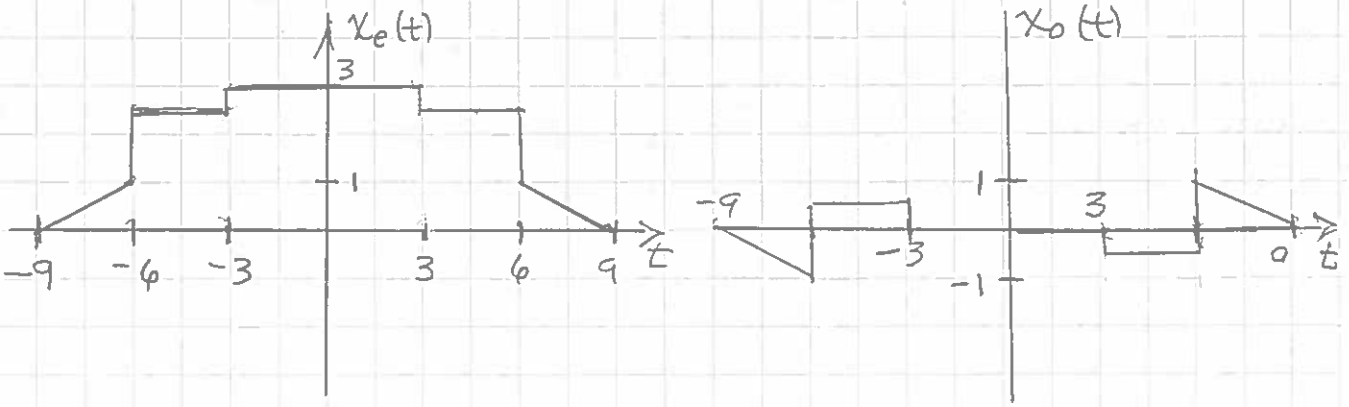
(b)

t	$x(t)$	$x(-t)$	$x_e(t)$	$x_o(t)$
>9	0	0	0	0
6^+	-2	0	-1	-1
6^-	2	0	1	1
3	2	0	1	1
0	0	0	0	0
-3	0	2	1	-1
-6^+	0	-2	-1	1

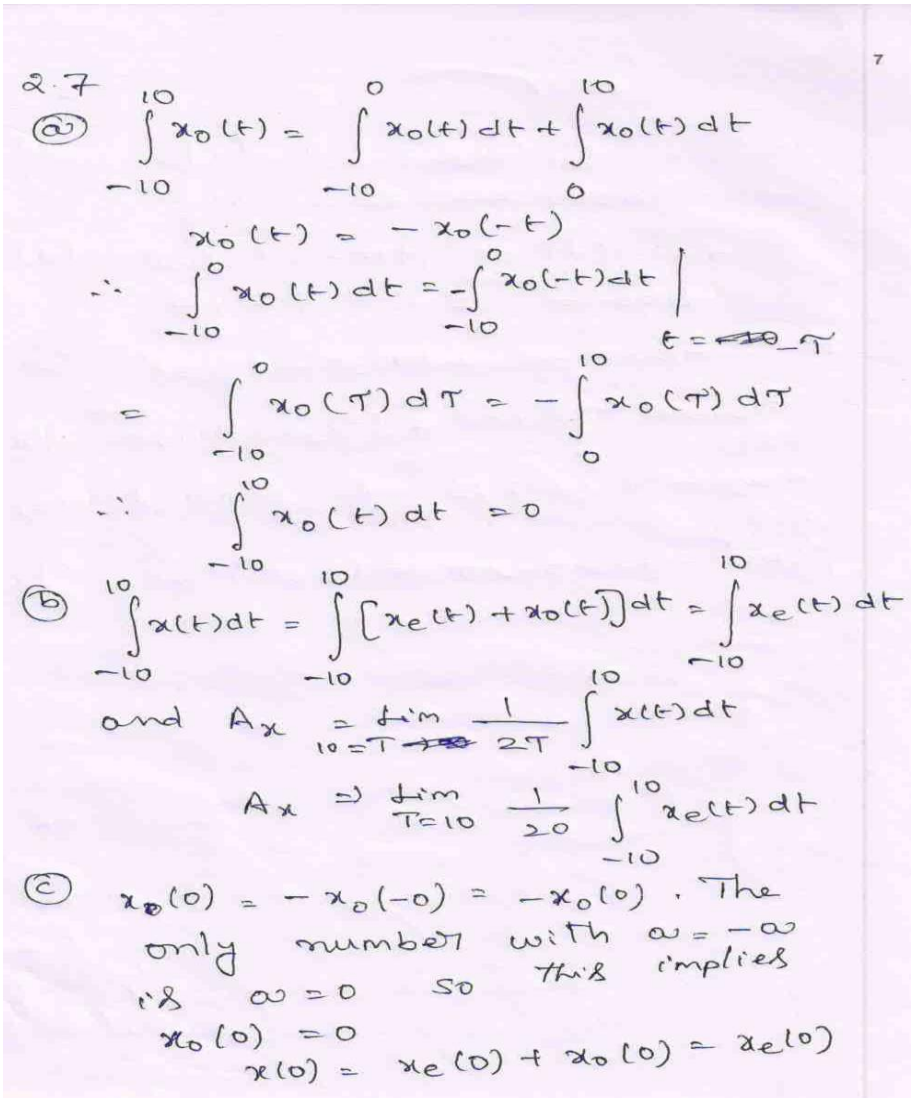


(c)

t	$x(t)$	$x(-t)$	$x_e(t)$	$x_o(t)$
≥ 9	0	0	0	0
6^+	2	0	1	1
6^-	2	3	2.5	-0.5
3^-	3	3	3	0
0	3	3	3	0
-3^+	3	3	3	0
-6^+	3	2	2.5	0.5
-6^-	0	2	1	-1



Problem 2.7



2.7

(a) $\int_{-10}^{10} x_0(t) = \int_{-10}^{0} x_0(t)\,dt + \int_{0}^{10} x_0(t)\,dt$

$x_0(t) = -x_0(-t)$

$\therefore \int_{-10}^{0} x_0(t)\,dt = -\int_{-10}^{0} x_0(-t)\,dt$ | $t = -T$

$= \int_{-10}^{0} x_0(T)\,dT = -\int_{0}^{10} x_0(T)\,dT$

$\therefore \int_{-10}^{10} x_0(t)\,dt = 0$

(b) $\int_{-10}^{10} x(t)\,dt = \int_{-10}^{10} [x_e(t) + x_0(t)]\,dt = \int_{-10}^{10} x_e(t)\,dt$

and $A_x = \lim_{10=T} \frac{1}{2T} \int_{-10}^{10} x(t)\,dt$

$A_x \Rightarrow \lim_{T=10} \frac{1}{20} \int_{-10}^{10} x_e(t)\,dt$

(c) $x_0(0) = -x_0(-0) = -x_0(0)$. The only number with $\omega = -\omega$ is $\omega = 0$ so this implies $x_0(0) = 0$

$x(0) = x_e(0) + x_0(0) = x_e(0)$