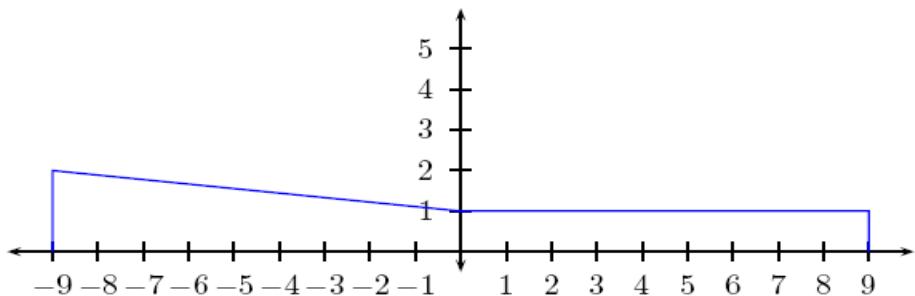


Chapter 1 solutions

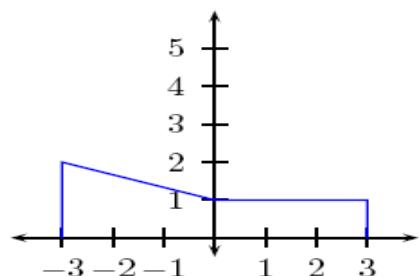
1.1 (a)
(i)

$x(-t/3)$



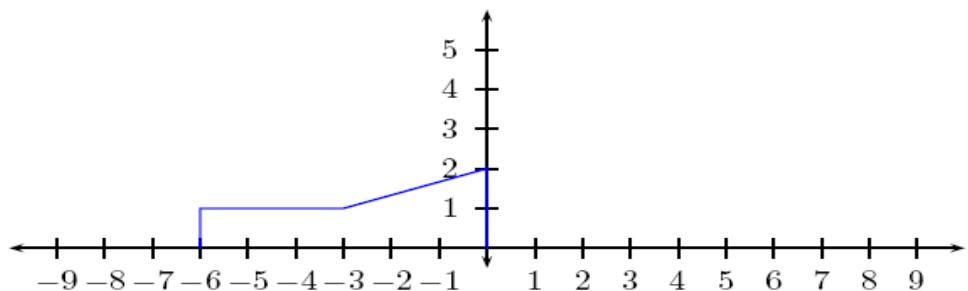
(ii)

$x(-t)$



(iii)

$x(3 + t)$



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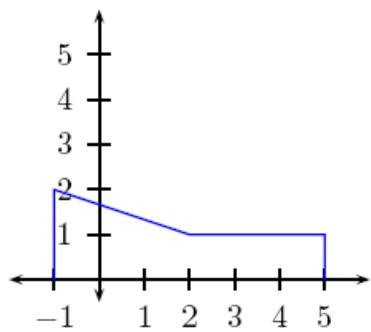
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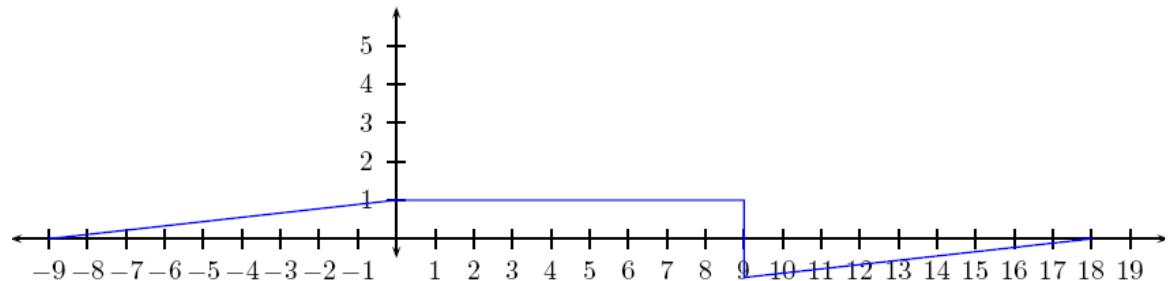
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(iv)

$$x(2-t)$$

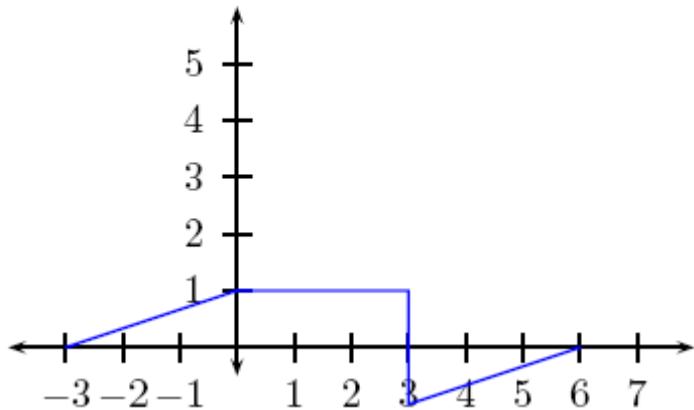


$$x(-t/3)$$



(ii)

$$x(-t)$$



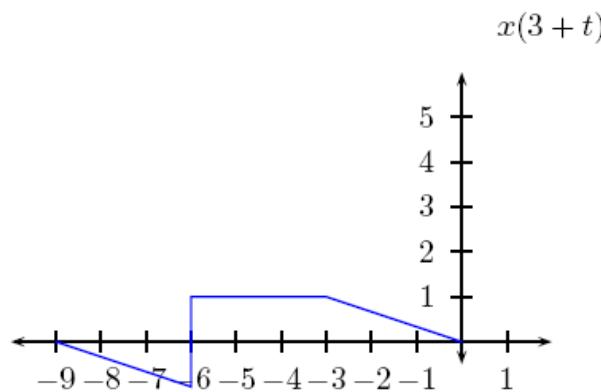
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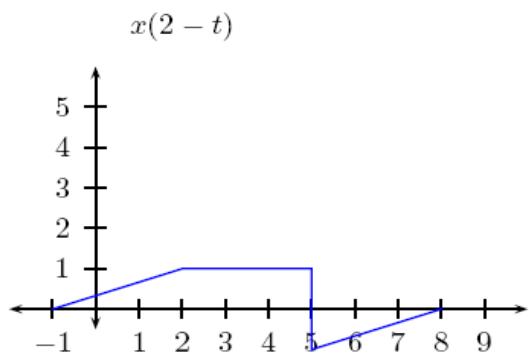
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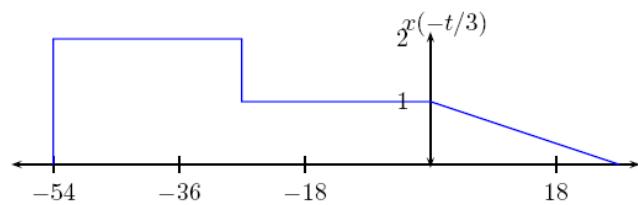
(iii)



(iv)



(c) (i)

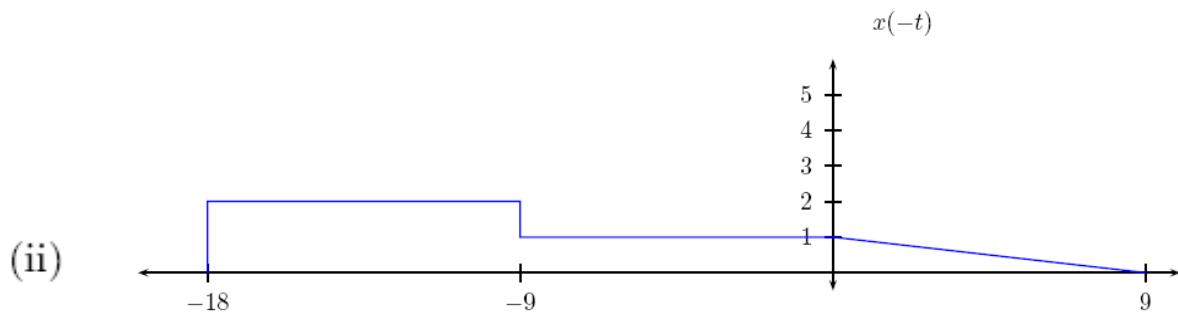


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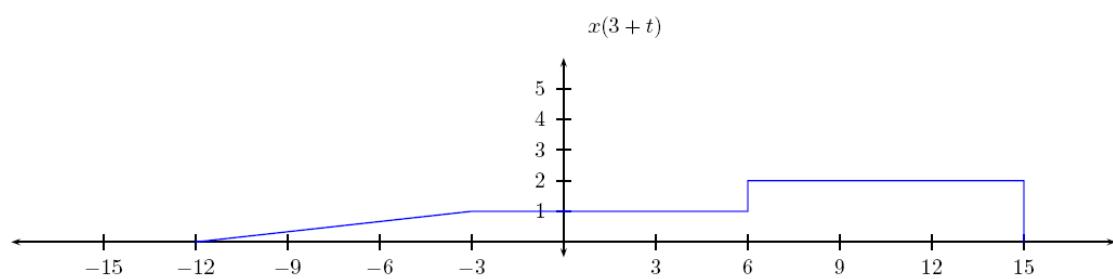
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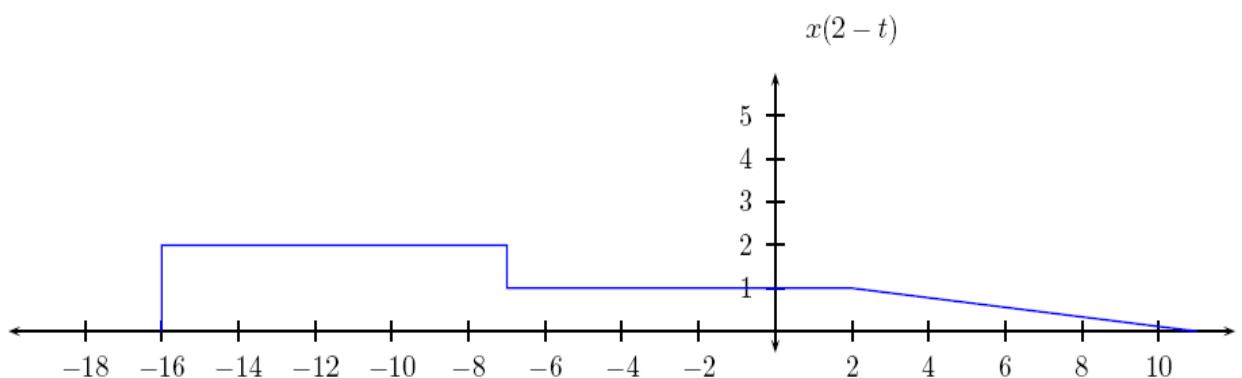
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(iii)



(iv)



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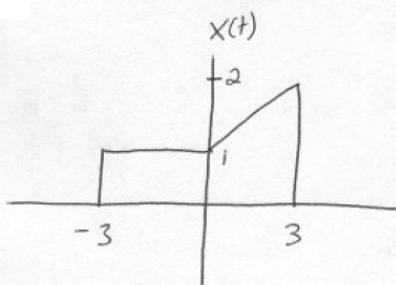
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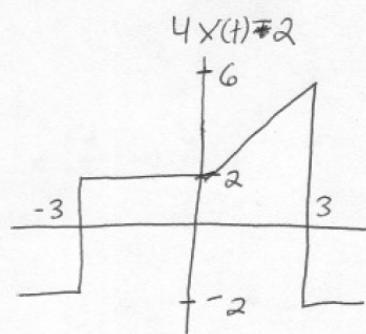
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1.2

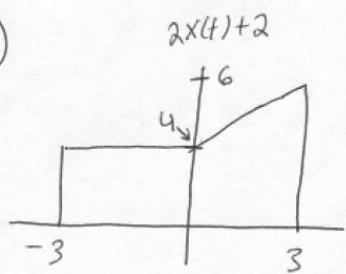
(a)



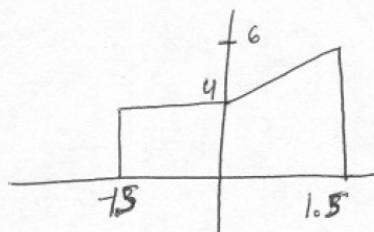
i)



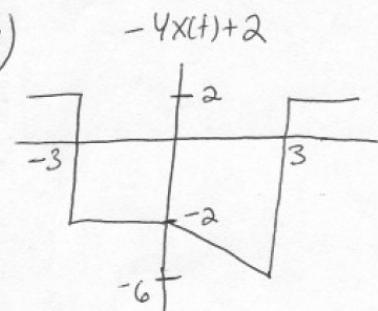
ii)



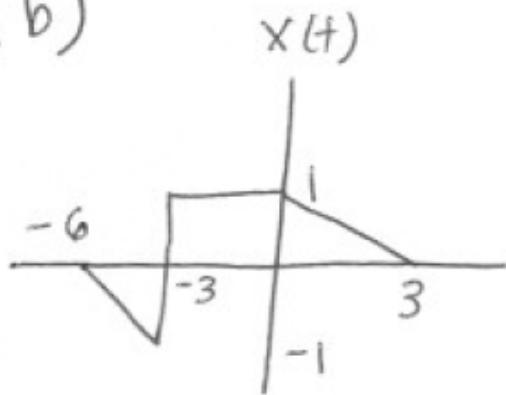
iii)



iv)

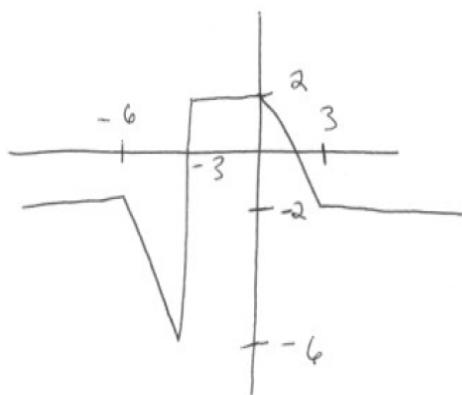


(b)

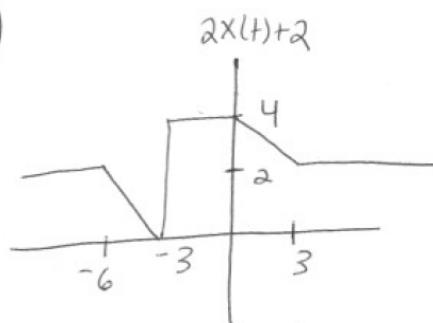


i)

$$4x(t)-2$$

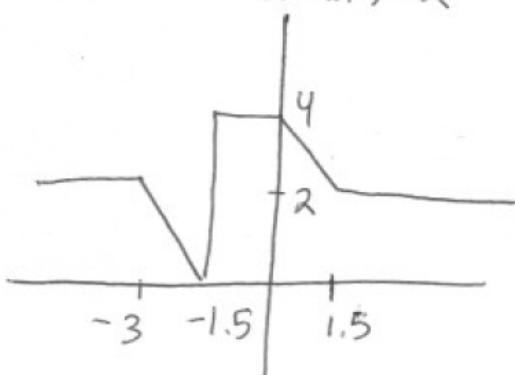


ii)



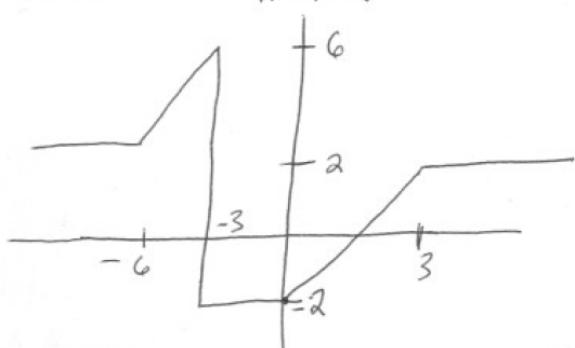
iii)

$$2x(2t)+2$$



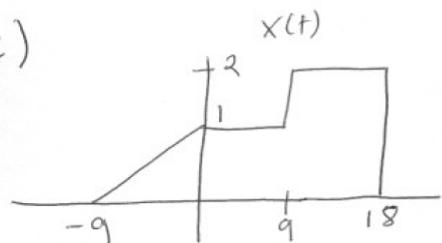
iv)

$$-4x(t)+2$$



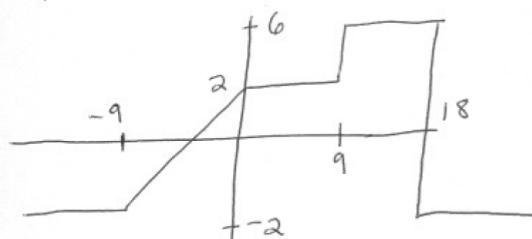
1.2

(c)

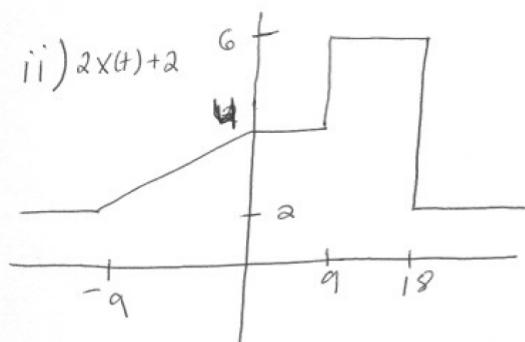


i)

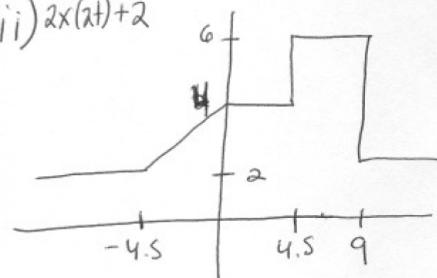
$$4x(t) - 2$$



$$ii) 2x(t) + 2$$

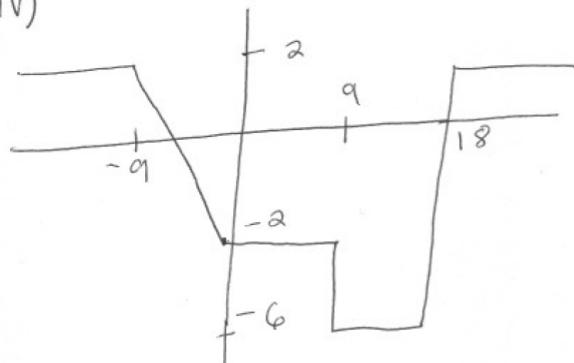


$$iii) 2x(2t) + 2$$



iv)

$$-4x(t) + 2$$



1.3

(a) $y(t) = -0.5(x(2t - 4)) + 1.5$

	t	y(t)	2t-4	$-0.5(x(2t-4))+1.5$
(b)	2	1.5	0	1.5
	3	-1	2	-1
	4.5	1.5	5	1.5

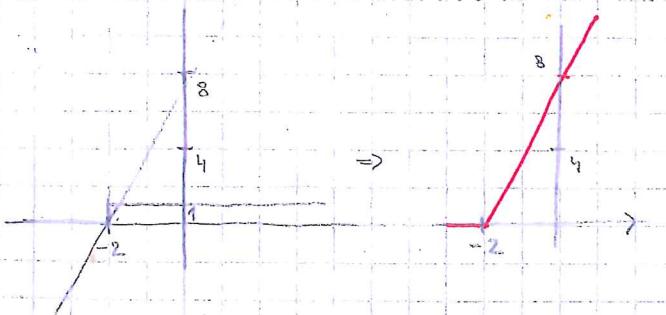
(c) $x(t) = -2y(\frac{t+4}{2}) + 3$

	t	x(t)	$\frac{t+4}{2}$	$-2y(\frac{t+4}{2}) + 3$
(d)	0	0	2	0
	4	-3	4	-3
	5	0	4.5	0

1.4 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 $y(t) = x(2t-4)$

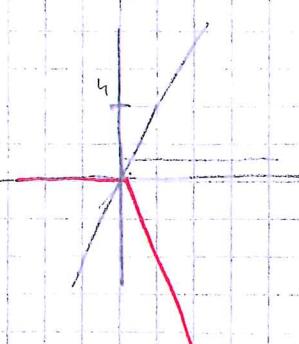
① $4(t+2)u(t+2)$

$$u(t+2) = \begin{cases} 1 & t+2 \geq 0 \Rightarrow t \geq -2 \\ 0 & t < -2 \end{cases}$$



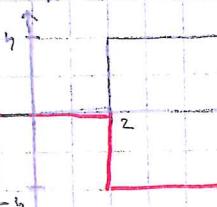
②

$$-4tu(t)$$

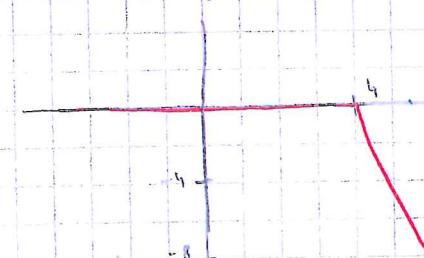


③ $-4u(t-2)$

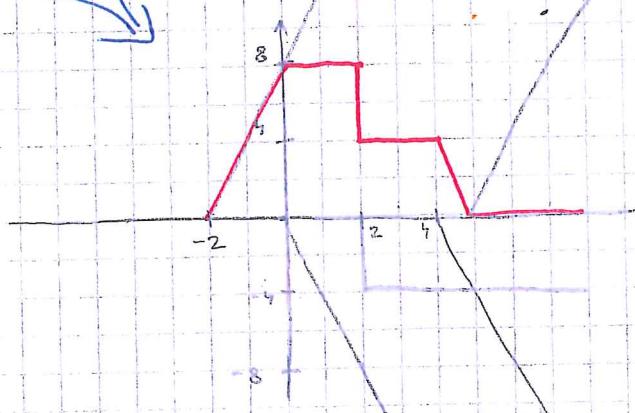
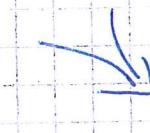
$$t-2 \geq 0 \Rightarrow t \geq 2$$



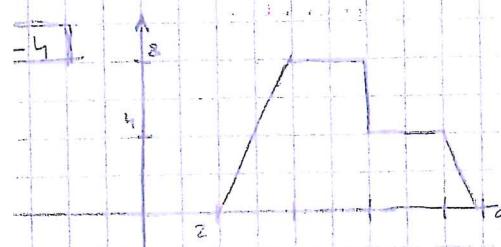
④ $-4(t-4)u(t-4)$



⑤ $4(t-5)u(t-5)$

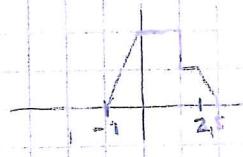


∴ $y(t) = x(2t-4)$

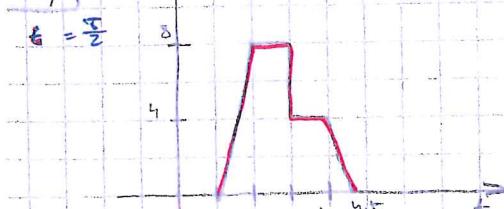


∴ $y(t) = \begin{cases} 0 & t < 0 \\ 8 & 0 \leq t < 2 \\ 8-4t & 2 \leq t < 4 \\ 0 & t \geq 4 \end{cases}$

$2t-4 \geq 0$



\therefore



$$y(t=1) = x(2 \cdot 1 - 4) = x(-2) = 0$$

$$y(4) = x(2 \cdot 4 - 4) = x(4) = 4$$