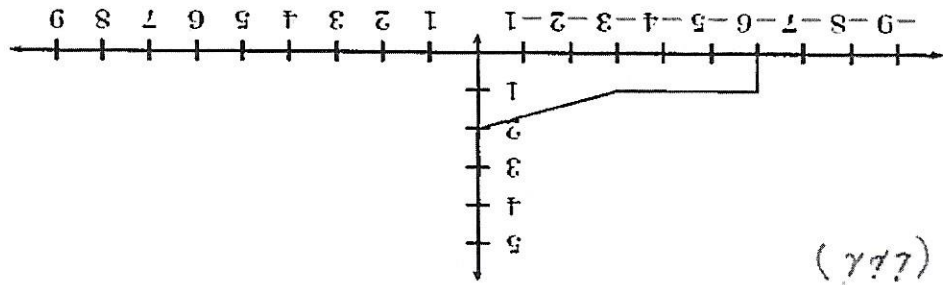
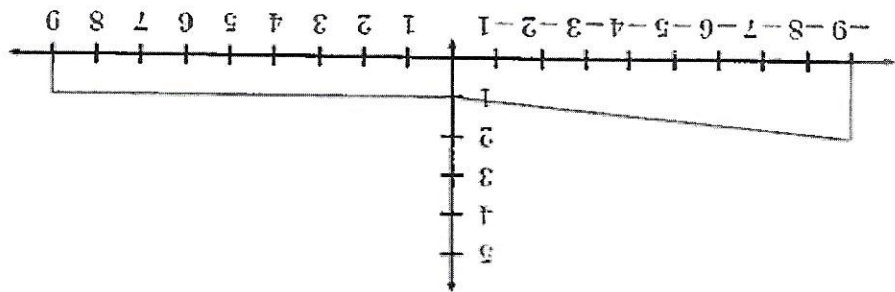


(a)

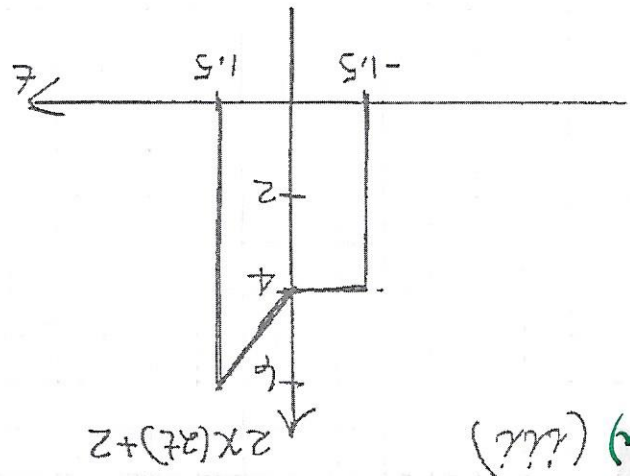
(i)



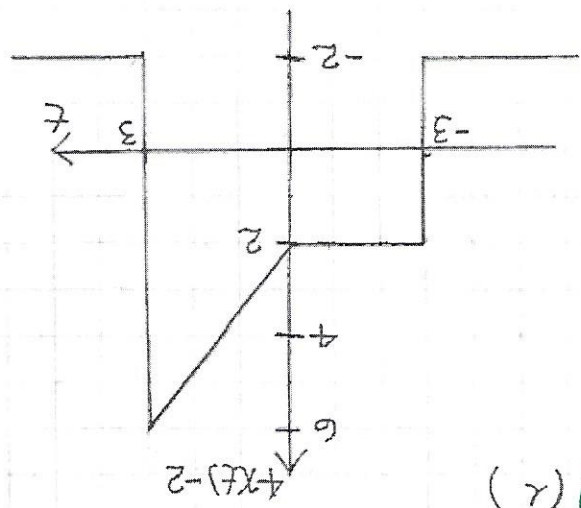
$x(3+t)$



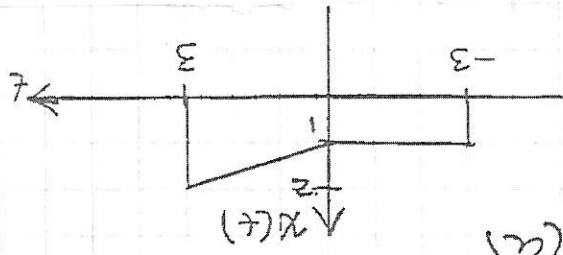
$x(-t/3)$



2.2(a) (iii)

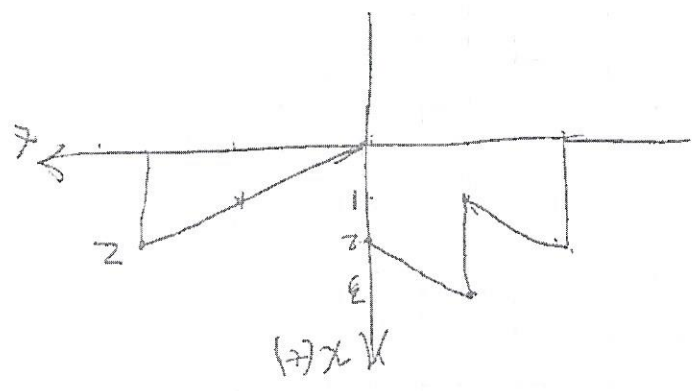


2.2(a) (ii)

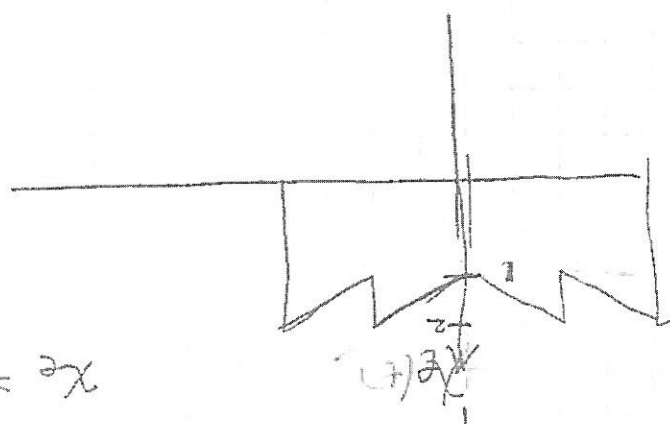


PROBLEM 2.2 (a)

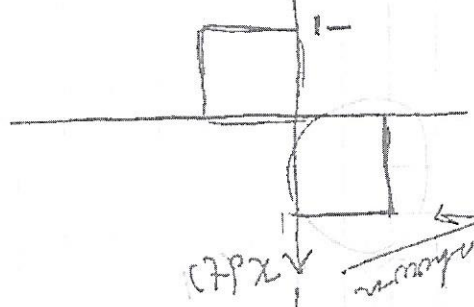
(2)



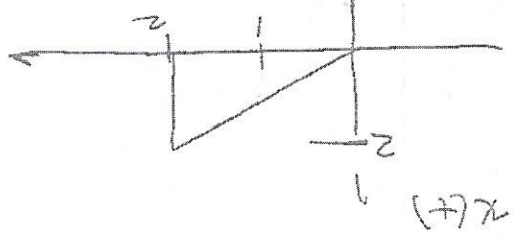
$$x(t) = x_0(t) + x_e(t)$$



$$x_e = x(t) + x(-t)$$



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





(a) $\cos(\theta + \phi) = \text{Re}\{e^{j(\theta + \phi)}\} = \text{Re}\{e^{j\theta} e^{j\phi}\}$
 $= \text{Re}\{(\cos\theta + j\sin\theta)(\cos\phi + j\sin\phi)\}$
 $= \text{Re}\{\cos\theta\cos\phi + j\sin\theta\cos\phi + j\cos\theta\sin\phi - \sin\theta\sin\phi\}$
 $= \cos\theta\cos\phi - \sin\theta\sin\phi$

(b) $\sin(\theta + \phi) = \text{Im}\{e^{j(\theta + \phi)}\} = \text{Im}\{e^{j\theta} e^{j\phi}\}$
 $= \text{Im}\{(\cos\theta + j\sin\theta)(\cos\phi + j\sin\phi)\}$
 $= \text{Im}\{\cos\theta\cos\phi + j\sin\theta\cos\phi + j\cos\theta\sin\phi - \sin\theta\sin\phi\}$
 $= \cos\theta\sin\phi + \sin\theta\cos\phi$

(c) $\cos\theta\cos\phi = \text{Re}\left\{e^{j\theta} e^{j\phi} + e^{-j\theta} e^{-j\phi}\right\} = \text{Re}\left\{\frac{e^{j(\theta + \phi)} + e^{j(\theta - \phi)}}{2}\right\}$
 $= \text{Re}\left\{\frac{e^{j(\theta + \phi)}}{2} + \frac{e^{j(\theta - \phi)}}{2}\right\} = \frac{\cos(\theta + \phi)}{2} + \frac{\cos(\theta - \phi)}{2}$

(d) $\sin\theta\cos\phi = \text{Im}\left\{e^{j\theta} e^{j\phi} + e^{-j\theta} e^{-j\phi}\right\} = \text{Im}\left\{\frac{e^{j(\theta + \phi)} + e^{j(\theta - \phi)}}{2}\right\}$
 $= \frac{1}{2}[\sin(\theta + \phi) + \sin(\theta - \phi)]$

PROBLEM 2.23



$x(t) = 3u(t+3) - u(t) + 3u(t-3) - 5u(t-6)$

