



Punto ② 1000539432

$$w(t) = z(t) r(2(t+k)-6) \quad k = 2(a+1) \quad a=2$$

$$k = 2(2+1) \Rightarrow k = 2(3) \quad k=6$$

$$w(t) = z(t) r(2(t+6)-6)$$

$$2(t+6)-6 = 2t+12-6 = 2t+6$$

$$w(t) = z(t) r(2t+6)$$

$$\text{escalón unitario} \quad r(x) = \begin{cases} 1 & \text{si } x \geq 0 \\ 0 & \text{si } x < 0 \end{cases}$$

$$1 \text{ cuando } 2t+6 \geq 0, \quad t \geq -3$$

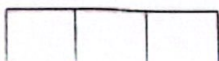
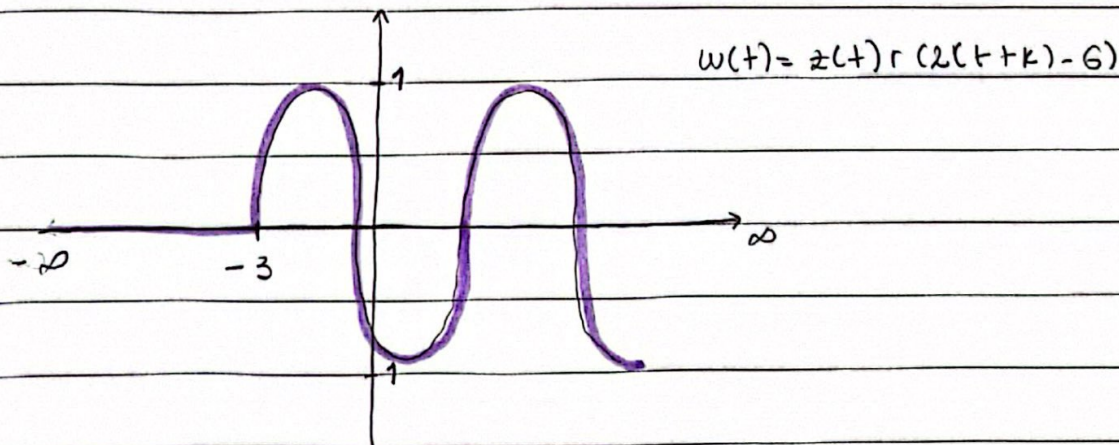
$$0 \text{ cuando } 2t+6 < 0, \quad t < -3$$

$$r(2t+6)=0 \Rightarrow w(t) = z(t) \cdot 0 = 0 \quad \text{para } t < -3$$

$$r(2t+6)=1 \Rightarrow w(t) = z(t) \cdot 1 \quad \text{para } t \geq -3$$

$$\text{Para } t < -3, w(t) = 0$$

Para $t \geq -3$, $w(t)$ toma el valor de $z(t)$, que en este caso la definiremos como una senoidal, $z(t) = \sin(t)$



Punto ③ 1000539432

$$x(t) = 4 \cos(8\pi t + (\pi/4)) + k * \ln(4\pi t) + 5 \quad k = 2(a+1) \quad k = 6$$



$$x(t) = 4 \cos(8\pi t + \pi/4) + 6 \ln(4\pi t) + 5$$

$$\cos(\theta) = \frac{e^{j\theta} + e^{-j\theta}}{2}, \quad \ln(\theta) = \frac{e^{j\theta} - e^{-j\theta}}{2j}$$

$$4 \cos(8\pi t + \pi/4) = 4 \frac{e^{j(8\pi t + \pi/4)} + e^{-j(8\pi t + \pi/4)}}{2} = 2e^{j(8\pi t + \pi/4)} + 2e^{-j(8\pi t + \pi/4)}$$

$$6 \ln(4\pi t) = 6 \frac{e^{j(4\pi t)} - e^{-j(4\pi t)}}{2j} = -3j e^{j(4\pi t)} + 3j e^{-j(4\pi t)}$$

$$x(t) = 2e^{j\pi/4} e^{j8\pi t} + 2e^{-j\pi/4} e^{-j8\pi t} - 3j e^{j4\pi t} + 3j e^{-j4\pi t} + 5$$

$$= 2e^{j\pi/4} \cdot 2\pi \delta(\omega - 8\pi) + 2e^{-j\pi/4} \cdot 2\pi \delta(\omega + 8\pi) - 3j(2\pi) \delta(\omega - 4\pi)$$

$$+ 3j(2\pi) \delta(\omega + 4\pi) + 5 \cdot 2\pi \delta(\omega)$$

$$= 4\pi e^{j\pi/4} \delta(\omega - 8\pi) + 4\pi e^{-j\pi/4} \delta(\omega + 8\pi) - 6\pi j \delta(\omega - 4\pi) + 6\pi j \delta(\omega + 4\pi) + 10\pi \delta(\omega)$$