

a) $-7 + j5$, evaluamos x y y .

$$x = -7$$

$$y = 5$$

usamos la ec. $r^2 = x^2 + y^2$

$$\sqrt{r^2} = \sqrt{(-7)^2 + 5^2} = \sqrt{74}$$

$$r = \sqrt{74}$$

$$\tan \theta = \frac{5}{-7}$$

usando $\tan \theta = \frac{y}{x}$

$$\theta = - \frac{180 \tan^{-1}(\frac{5}{7})}{\pi}$$

$$= \theta = \frac{180 (\pi - \tan^{-1}(\frac{5}{7}))}{\pi}$$

$$= (r, \theta) = \left(\sqrt{74}, \frac{180 (\pi - \tan^{-1}(\frac{5}{7}))}{\pi} \right)$$

$$\approx (8.60233, 144.462^\circ)$$

$$b) 10 - j8$$

$$x = 10$$

$$y = -8$$

$$r^2 = 10^2 + (-8)^2 = 164$$

$$r = \sqrt{164}$$

$$r = 2\sqrt{41}$$

$$\tan \theta = \left(\frac{-8}{10} = -\frac{4}{5} \right)$$

$$\theta = \frac{180 \left(\pi - \tan^{-1} \left(\frac{4}{5} \right) \right)}{\pi}$$

$$\theta = \frac{180 \tan^{-1} \left(\frac{4}{5} \right)}{\pi}$$

$$= (r, \theta) = \left(2\sqrt{41}, \frac{-180 \tan^{-1} \left(\frac{4}{5} \right)}{\pi} \right)$$

$$\approx (12.8062, -38.6598^\circ)$$

$$\approx (12.8062, -0.67471)$$

Represente en Forma rectangular.

$$a) \underline{7} \exp(\underline{-j\pi/4})$$

$$r = 7, \theta = -45^\circ$$

$$x = 4.94975$$

$$x = \frac{7}{\sqrt{2}} \quad y = \frac{-7}{\sqrt{2}}$$

$$y = -4.94975$$

$$z = 7e^{j\pi/4} = r(\cos \alpha + j \sin \alpha)$$

$$7e^{j\pi/4} = 7\left(\cos \frac{\pi}{4} + j \sin \frac{\pi}{4}\right)$$

$$= 7\left(\frac{1}{\sqrt{2}} + j \frac{1}{\sqrt{2}}\right) = 7j\left(\frac{1}{\sqrt{2}}\right) + \frac{7}{\sqrt{2}}$$

$$b) 7 \exp(j7\pi/4)$$

$$z = 7 \exp(j7\pi/4) = r(\cos \alpha + j \sin \alpha)$$

$$7e^{j7\pi/4} = 7\left(\cos \frac{7\pi}{4} + j \sin \frac{7\pi}{4}\right)$$

$$7\left(\frac{1}{\sqrt{2}} + j \frac{-1}{\sqrt{2}}\right) = -7j\left(\frac{1}{\sqrt{2}}\right) + \frac{7}{\sqrt{2}}$$

==

$$\textcircled{b} \quad 15 \exp(j7\pi/2) = r (\cos \alpha + j \sin \alpha)$$

$$z_1 = 15 e^{j7\pi/2} = 15 \left(\cos\left(\frac{7\pi}{2}\right) + j \sin\left(\frac{7\pi}{2}\right) \right)$$

$$= 15 (0 + j(-1))$$

$$= -15j$$



$$\textcircled{b} \quad 15 \exp(j7\pi/2) = 15 (\cos \alpha + j \sin \alpha)$$

$$z_1 = 15 e^{j7\pi/2} = 15 \left(\cos\left(\frac{7\pi}{2}\right) + j \sin\left(\frac{7\pi}{2}\right) \right)$$

$$= 15 (0 + j(-1))$$

$$-15j$$

$$\textcircled{b} \textcircled{a} \quad s^2 + 2s + 100$$

$$s^2 + 2s + 100 = 0$$

$$s^2 + 2s = -100$$

$$\underbrace{s^2 + 2s + 1}_{(s+1)^2} = -100 + 1$$

$$(s+1)^2 = -99$$

$$s+1 = 3j\sqrt{11}$$

$$\boxed{s = 3j\sqrt{11} - 1}$$

$$s+1 = -3j\sqrt{11}$$

$$\boxed{s = -3j\sqrt{11} - 1}$$

$$\textcircled{b} \quad s^2 + 2s + 81$$

$$s^2 + 2s + 81 = 0$$

$$s^2 + 2s + 1 = -80$$

$$(s+1)^2 = -80 \quad \text{+ sacando las Raices.}$$

$$s+1 = 4i\sqrt{5} \quad \text{o} \quad s+1 = -4i\sqrt{5}$$

$$\boxed{s = 4i\sqrt{5} - 1} \quad \text{o} \quad \boxed{s = -4i\sqrt{5} - 1}$$

$$\textcircled{c} \quad s^2 + 9 \quad \text{completando la Raiz.}$$

$$s^2 + 9 = 0$$

$$s^2 = -9$$

$$r \quad r \quad \leftarrow \begin{cases} s = 3i \\ s = -3i \end{cases}$$

$$\textcircled{d} \quad s^2 + 0.8s + 16$$

$$s^2 + 0.8s + 16 = 0$$

$$= s^2 + \frac{4s}{5} + 16 = 0$$

$$s^2 + \frac{4s}{5} = -16 \quad \rightarrow \quad s^2 + \frac{4s}{5} + \frac{4}{25} = -\frac{396}{25}$$

$$\left(s + \frac{2}{5}\right)^2 = -\frac{396}{25} \quad \rightarrow \quad \boxed{s = \frac{1}{5}(-6i)\sqrt{11} - \frac{2}{5}}$$

5) Demuestra que... $(s)(s^*) = |s|^2$.

$$s = \sigma + j\omega \quad s^* = \sigma - j\omega$$

$$ss^* = (\sigma + j\omega)(\sigma - j\omega) = \sigma^2 - \cancel{j\omega} + \cancel{j\omega} - (j\omega)^2 = \sigma^2 + \omega^2$$

3) Realice las sigtes. operaciones.
def. Mag. y Ang. del complejo Resultante.

$$\textcircled{a} (7 - j2)(4 + j8) + 1$$

$$= 45 + 48j$$

$$= \sqrt{45^2 + 48^2} = \underbrace{3\sqrt{481}}_{|x|}$$

$$= \frac{48}{45} = \frac{16}{15} = \arctan\left(\frac{16}{15}\right)$$

$$\theta = \underbrace{46^\circ}$$

$$\textcircled{b} 5 \exp(\pi/4) (1 - j3)^{100} + (3 + j7)^{1/2}$$