1) CALCULAR LA FORMA BINOMICA

$$z_0 = \frac{Sen(1-i)}{\sqrt{1-i}}$$

Solución:

$$* \ Sen(1-i) = \frac{e^{i(1-i)} - e^{-i(1-i)}}{2i} =$$

$$= \frac{1}{2i}\left(\underbrace{e^{i}\cdot e^{1}}_{A} - \underbrace{e^{-1}\cdot e^{-i}}_{B}\right)$$

$$* \ e^{1}\cdot e^{i} = e^{1}\{\cos(1) + iSen(1)\} = 1,47 + i2,29$$

$$* \ e^{-1}\cdot e^{-i} = e^{-1}\{\cos(-1) + iSen(-1)\} = 0,2 - i0,31$$

ENTONCES:

$$* \ \frac{1}{2i}\left(1,47 + i2,29 - 0,2 + i\,0,31\right)$$

$$= \frac{1}{2i}*\frac{i}{i}\left(1,27 + i2,6\right) = -i0,5\left(1,27 + i2,6\right)$$

$$= +1,3 - 0,64i$$

POR LO TANTO:

$$z_0 = \frac{+1,3 - 0,64i}{\sqrt{1-i}} = \frac{1,45\angle -26,06^\circ}{\sqrt{1,41\angle -45^\circ}} =$$

$$z_0 = \frac{1,45\angle -26,06^\circ}{\sqrt{1,41}\angle -45/2} = 1,22\angle -3,56^\circ$$

$$\boxed{z_0 = 1,21 - i\,0,075}$$

2) CALCULAR FORMA POLAR DE:

$$z_0 = e^{3(-1+i)} + i^{27}$$

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Solución:

$$e^{3(-1+i)} = e^{-3}\cdot e^{3i} = e^{-3}\{\cos(3) + iSen3\}$$

$$= -0,05 + i0,007$$

$$i^{27} = i^{3} = -i \ ; \rightarrow 27 \,|\, 4 \quad 3 \quad 6$$

ENTONCES:

$$z_0 = -0,005 + i0,007 - i =$$

$$z_0 = -0,05 - i0,99 = 0,994\angle -92,84^\circ$$

3) CALCULAR EL VALOR DE K, PARA QUE $Im\{f(z)\} = 0$

$$f(z) = \frac{z + K}{\bar{z}}$$

Solución:

$$f(z) = \frac{X + iY + K}{X - iY} * \frac{X + iY}{X + iY} =$$

$$f(z) = \frac{X^2 - Y^2 + KX}{X^2 + Y^2} + i\,\frac{YX + YX + KY}{X^2 + Y^2}$$

$$Im\{f(z)\} = 0$$

$$\frac{2YX + KY}{X^2 + Y^2} = 0 \Rightarrow 2YX + KY = 0$$

$$\Rightarrow K = -\frac{2\cancel{Y}X}{\cancel{Y}} = -2X$$

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