

Actividad 1

Mérida de León Luis Ernesto

$$13 \quad (16i)^{1/8} = \left(\frac{16i}{1+i} \cdot \frac{1-i}{1-i} \right)^{1/8} = \left(\frac{16i(1-i)}{1-i^2} \right)^{1/8} = \left(\frac{16i-16i^2}{1-(-1)} \right)^{1/8} = \left(\frac{16i+16}{2} \right)^{1/8} = \left(\frac{16(i+1)}{2} \right)^{1/8} = (8(i+1))^{1/8}$$

↑
z

$$|z| = \sqrt{8^2 + 8^2} = \sqrt{64+64} = \sqrt{128} = \sqrt{64 \cdot 2} = 8\sqrt{2} = r$$

$m=8 \rightarrow$ Cantidad de iteraciones



$$\tan \theta = \frac{co}{ca} = 1$$

$$\tan \theta = 1$$

$$\theta = \arctan(1) = 45^\circ = 0.25\pi$$

$$180^\circ \rightarrow \pi$$

$$45^\circ \rightarrow$$

$$\text{radianes} = \text{grados} \times \frac{\pi}{180} = 0.25\pi$$

$$z^{1/m} = r^{1/m} \left(\cos \frac{\theta}{m} + i \sin \frac{\theta}{m} \right)$$

$$z^{1/m} = r^{1/m} \left[\cos \frac{\theta + 2k\pi}{m} + i \sin \frac{\theta + 2k\pi}{m} \right]$$

$$k=0 \quad (8+8i)^{1/8} = (8\sqrt{2})^{1/8} \left[\cos \frac{0.25\pi}{8} + i \sin \frac{0.25\pi}{8} \right] = 1.3477 + i(0.1327)$$

$$k=1 \quad (8+8i)^{1/8} = (8\sqrt{2})^{1/8} \left[\cos \frac{0.25\pi + 2(1)\pi}{8} + i \sin \frac{0.25\pi + 2(1)\pi}{8} \right] = 0.8591 + i(1.0468)$$

$$k=2 \quad (8+8i)^{1/8} = (8\sqrt{2})^{1/8} \left[\cos \frac{0.25\pi + 2(2)\pi}{8} + i \sin \frac{0.25\pi + 2(2)\pi}{8} \right] = -0.1327 + i(1.3477)$$

$$k=3 \quad (8+8i)^{1/8} = (8\sqrt{2})^{1/8} \left[\cos \frac{0.25\pi + 2(3)\pi}{8} + i \sin \frac{0.25\pi + 2(3)\pi}{8} \right] = -1.0468 + i(0.8591)$$

$$k=4 \quad (8+8i)^{1/8} = (8\sqrt{2})^{1/8} \left[\cos \frac{0.25\pi + 2(4)\pi}{8} + i \sin \frac{0.25\pi + 2(4)\pi}{8} \right] = -1.3477 - i(0.1327)$$

$$k=5 \quad (8+8i)^{1/8} = (8\sqrt{2})^{1/8} \left[\cos \frac{0.25\pi + 2(5)\pi}{8} + i \sin \frac{0.25\pi + 2(5)\pi}{8} \right] = -0.8591 - i(1.0468)$$

$$k=6 \quad (8+8i)^{1/8} = (8\sqrt{2})^{1/8} \left[\cos \frac{0.25\pi + 2(6)\pi}{8} + i \sin \frac{0.25\pi + 2(6)\pi}{8} \right] = 0.1327 - i(1.3477)$$

$$k=7 \quad (8+8i)^{1/8} = (8\sqrt{2})^{1/8} \left[\cos \frac{0.25\pi + 2(7)\pi}{8} + i \sin \frac{0.25\pi + 2(7)\pi}{8} \right] = 1.0468 - i(0.8591)$$



A = (1.35, 0.13)

B = (0.86, 1.05)

C = (-0.13, 1.35)

D = (-1.05, 0.86)

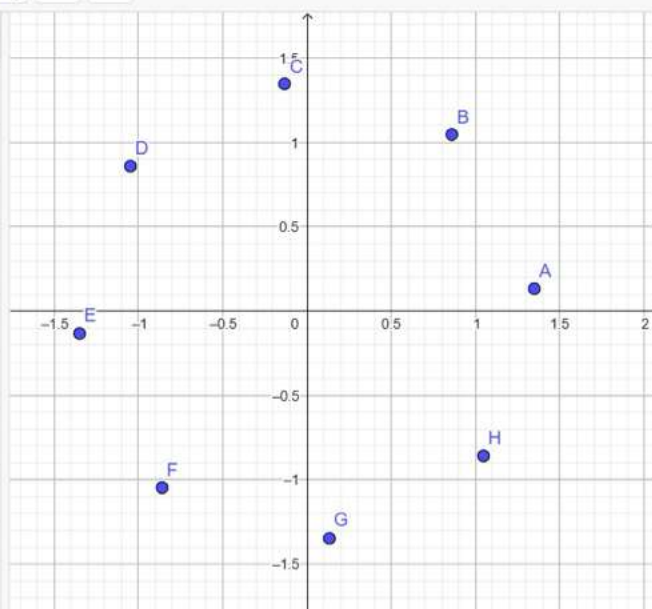
E = (-1.35, -0.13)

F = (-0.86, -1.05)

G = (0.13, -1.35)

H = (1.05, -0.86)

+ Entrada...



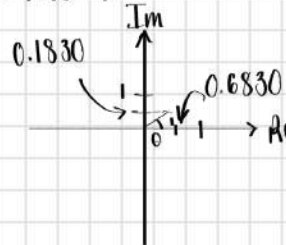
$$14. \left(\frac{1+i}{\sqrt{3}+i} \right)^{1/6} = \left(\frac{1+i}{\sqrt{3}+i} \cdot \frac{\sqrt{3}-i}{\sqrt{3}-i} \right)^{1/6} = \left(\frac{(1+i)(\sqrt{3}-i)}{3-(-1)} \right)^{1/6} = \left(\frac{\sqrt{3}+\sqrt{3}i-i-(-1)^2}{3-(-1)} \right)^{1/6} = \left(\frac{\sqrt{3}+i\sqrt{3}-i-(-1)}{4} \right)^{1/6} = \left(\frac{(\sqrt{3}+1)+i(\sqrt{3}-1)}{4} \right)^{1/6}$$

$$= \left(\left(\frac{\sqrt{3}+1}{4} \right) + i \left(\frac{\sqrt{3}-1}{4} \right) \right)^{1/6}$$

$$|z| = \sqrt{\left(\frac{\sqrt{3}+1}{4} \right)^2 + \left(\frac{\sqrt{3}-1}{4} \right)^2} = \sqrt{0.4665 + 0.0334} = \sqrt{0.4999} = 0.7070 = r$$

$$m=6$$

$$z^{1/m} = r^{1/m} \left[\cos \frac{\theta + 2k\pi}{m} + i \sin \frac{\theta + 2k\pi}{m} \right]$$



$$\frac{\sqrt{3}+1}{4} = 0.6830$$

$$\tan \theta = \frac{y}{x} = \frac{0.1830}{0.6830} = 0.2679$$

$$\theta = \arctan(0.2679) = 15.0005^\circ$$

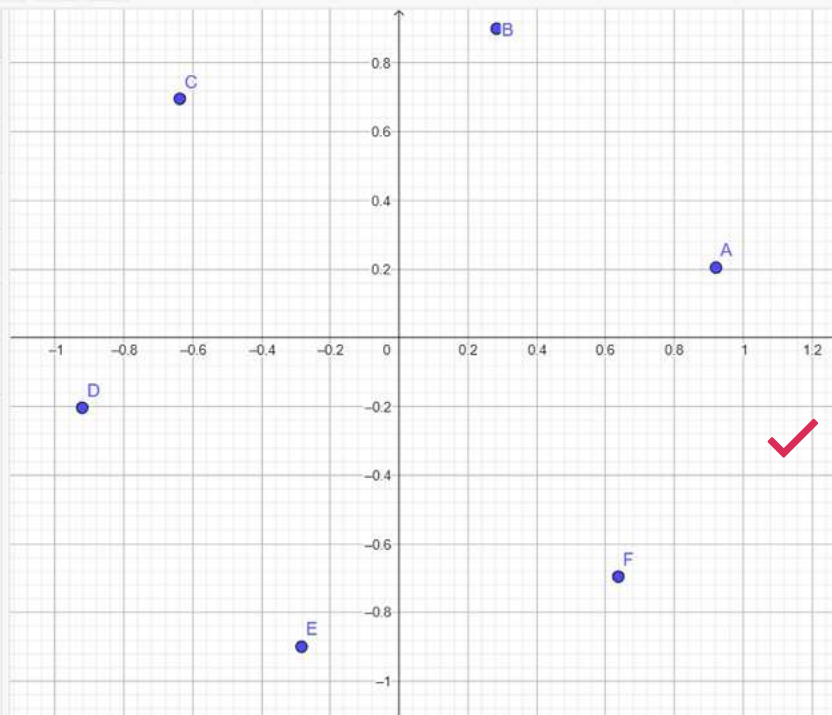
$$180^\circ \rightarrow \pi$$

$$15.0005^\circ \rightarrow 0.4166 \pi$$

- $k=0 \quad \left(\left(\frac{\sqrt{3}+1}{4} \right) + i \left(\frac{\sqrt{3}-1}{4} \right) \right)^{1/6} = 0.7070^{1/6} \left[\cos \frac{0.4166\pi + 2(0)\pi}{6} + i \sin \frac{0.4166\pi + 2(0)\pi}{6} \right] = 0.9214 + i(0.2042)$
- $k=1 \quad \left(\left(\frac{\sqrt{3}+1}{4} \right) + i \left(\frac{\sqrt{3}-1}{4} \right) \right)^{1/6} = 0.7070^{1/6} \left[\cos \frac{0.4166\pi + 2(1)\pi}{6} + i \sin \frac{0.4166\pi + 2(1)\pi}{6} \right] = 0.2838 + i(0.9001)$
- $k=2 \quad \left(\left(\frac{\sqrt{3}+1}{4} \right) + i \left(\frac{\sqrt{3}-1}{4} \right) \right)^{1/6} = 0.7070^{1/6} \left[\cos \frac{0.4166\pi + 2(2)\pi}{6} + i \sin \frac{0.4166\pi + 2(2)\pi}{6} \right] = -0.6376 + i(0.6959)$
- $k=3 \quad \left(\left(\frac{\sqrt{3}+1}{4} \right) + i \left(\frac{\sqrt{3}-1}{4} \right) \right)^{1/6} = 0.7070^{1/6} \left[\cos \frac{0.4166\pi + 2(3)\pi}{6} + i \sin \frac{0.4166\pi + 2(3)\pi}{6} \right] = -0.9214 - i(0.2042)$
- $k=4 \quad \left(\left(\frac{\sqrt{3}+1}{4} \right) + i \left(\frac{\sqrt{3}-1}{4} \right) \right)^{1/6} = 0.7070^{1/6} \left[\cos \frac{0.4166\pi + 2(4)\pi}{6} + i \sin \frac{0.4166\pi + 2(4)\pi}{6} \right] = 0.2838 - i(0.9001)$
- $k=5 \quad \left(\left(\frac{\sqrt{3}+1}{4} \right) + i \left(\frac{\sqrt{3}-1}{4} \right) \right)^{1/6} = 0.7070^{1/6} \left[\cos \frac{0.4166\pi + 2(5)\pi}{6} + i \sin \frac{0.4166\pi + 2(5)\pi}{6} \right] = 0.6376 - i(0.6959)$



	A = (0.92, 0.2)	
	B = (0.28, 0.9)	⋮
	C = (-0.64, 0.7)	⋮
	D = (-0.92, -0.2)	⋮
	E = (-0.28, -0.9)	⋮
	F = (0.64, -0.7)	⋮
+	Entrada...	



27/Sep/2025

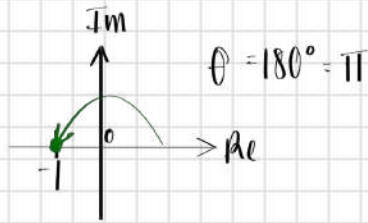
$$17. z^4 + 1 = 0 \rightarrow z^4 = -1 + 0i = z = (-1 + 0i)^{1/4}$$

$$\downarrow$$

$$w$$

$$|w| = \sqrt{(-1)^2 + (0)^2} = \sqrt{1} = 1 = r$$

$$m=4$$



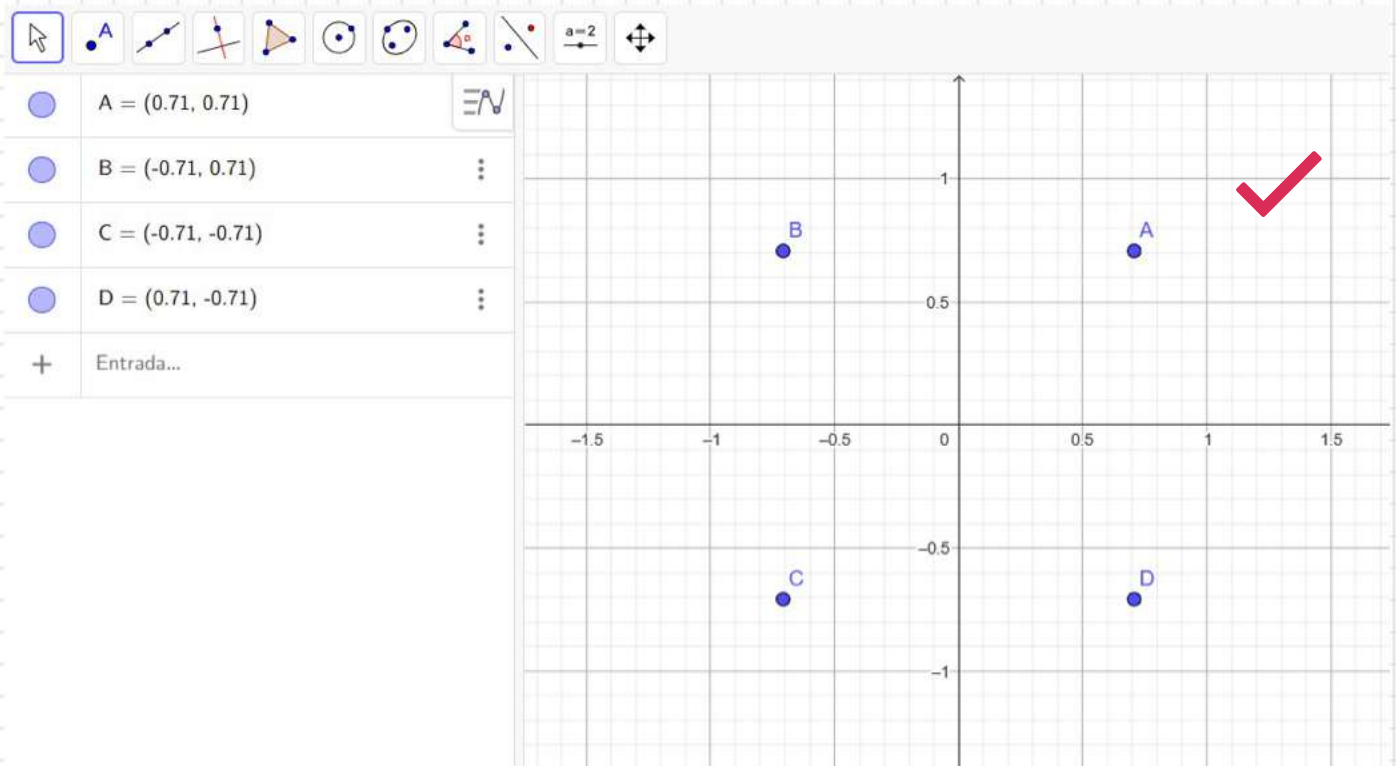
$$z_k = r^{1/m} \left[\cos \frac{\theta + 2k\pi}{m} + i \sin \frac{\theta + 2k\pi}{m} \right]$$

$$k=0 \quad z_0 = (1)^{1/4} \left[\cos \frac{\pi + 2(0)\pi}{4} + i \sin \frac{\pi + 2(0)\pi}{4} \right] = \left[\cos \frac{\pi}{4} + i \sin \frac{\pi}{4} \right] = 0.7071 + i(0.7071)$$

$$k=1 \quad z_1 = (1)^{1/4} \left[\cos \frac{\pi + 2(1)\pi}{4} + i \sin \frac{\pi + 2(1)\pi}{4} \right] = \left[\cos \frac{3\pi}{4} + i \sin \frac{3\pi}{4} \right] = -0.7071 + i(0.7071)$$

$$k=2 \quad z_2 = (1)^{1/4} \left[\cos \frac{\pi + 2(2)\pi}{4} + i \sin \frac{\pi + 2(2)\pi}{4} \right] = \left[\cos \frac{5\pi}{4} + i \sin \frac{5\pi}{4} \right] = -0.7071 - i(0.7071)$$

$$k=3 \quad z_3 = (1)^{1/4} \left[\cos \frac{\pi + 2(3)\pi}{4} + i \sin \frac{\pi + 2(3)\pi}{4} \right] = \left[\cos \frac{7\pi}{4} + i \sin \frac{7\pi}{4} \right] = 0.7071 - i(0.7071)$$



27/sep/2025

18. $z^2 - 8z + 16 = 8i$

Considerando que: $8i = (2+2i)^2$

$$z^2 - 8z + 16 = (2+2i)^2$$

$$(z-4)(z-4) = (2+2i)^2$$

$$(z-4)^2 = (2+2i)^2$$

$$\sqrt{(z-4)^2} = \sqrt{(2+2i)^2}$$

$$\pm(z-4) = \pm(2+2i)$$

$$z = 4 \pm (2+2i)$$

$$z_1 = 4 + 2 + 2i$$

$$z_1 = 6 + 2i$$

$$z_2 = 4 - 2 - 2i$$

$$z_2 = 2 - 2i$$

$$\pm(z-4) = \pm(2+2i)$$

$$+ \rightarrow z-4 = -2-2i \leftarrow -$$

$$z = 4 - 2 - 2i = 2 - 2i$$

$$+ \rightarrow z-4 = 2+2i \leftarrow +$$

$$z = 6+2i$$

$$- \rightarrow z+4 = -2-2i \leftarrow -$$

$$-z = -6-2i$$

$$6+2i = z$$

$$- \rightarrow -z+4 = 2+2i \leftarrow +$$

$$4-2-2i = z$$

$$2-2i = z$$

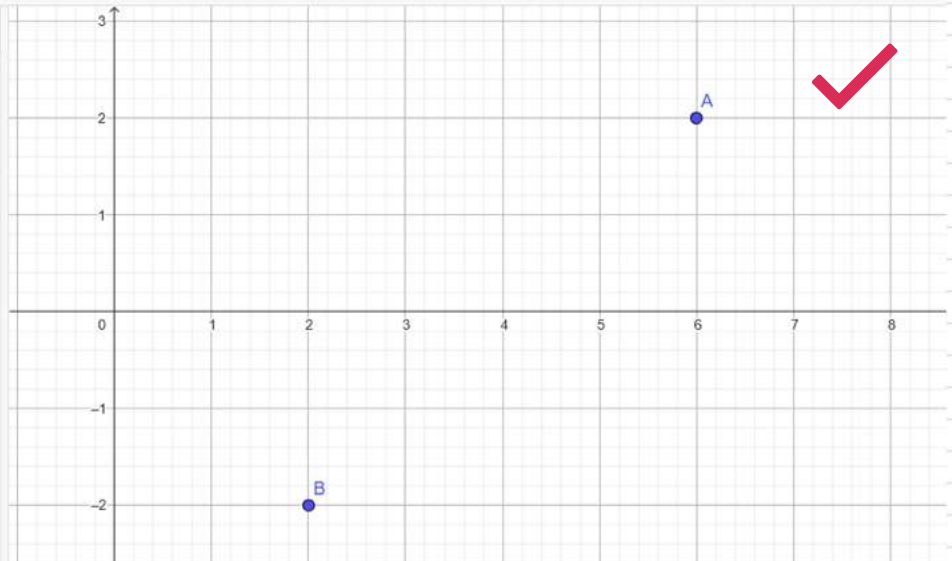
No es necesario establecer \pm en ambos lados. Porque siempre se llega a las mismas soluciones



A = (6, 2)

B = (2, -2)

+ Entrada...



Revisado

Jazmín A. Juárez R