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Fecha: 01/Marzo/2022

2.- Calcular Z, transformarla en todas sus formas posibles, y realizar el gráfico pertinente.

$Z = (Z_1)(Z_2)$ $Z_1 = 3+4i$ $Z_2 = -2-2i$

① $Z = (3+4i)(-2-2i)$
$Z = -6-6i-8i-8i^2$ $\quad i^2 = -1$
$Z = -6-6i-8i+8$
$Z = 2-14i$

② $(2, -14)$

③ $r = |z| = \sqrt{a^2+b^2}$
$r = |z| = \sqrt{(2)^2+(-14)^2}$
$r = |z| = \sqrt{4+196}$
$r = |z| = \sqrt{200}$

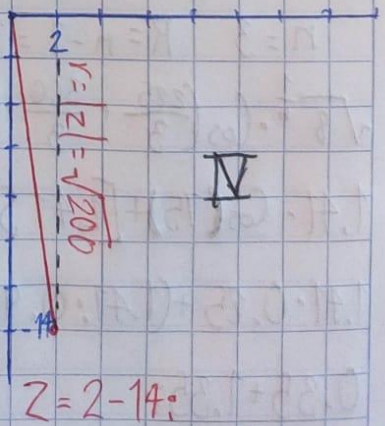
$\theta = \tan^{-1}\frac{b}{a}$
$\theta = \tan^{-1}\frac{-14}{2}$
$\theta = -81.86$
Ajuste $= 360 - 81.86 = 278.14°$
$90 - 81.86 = 8.14$
$8.14 + 90 + 90 + 90 = 278.14°$
$\theta = 278.14°$

④ $Z = r(\cos\theta + i \cdot \operatorname{Sen}\theta)$
$Z = \sqrt{200}(\cos(278.14) + i \cdot \operatorname{Sen}(278.14))$
$Z = \sqrt{200}\ \operatorname{CIS}\ 278.14°$

⑤ $Z = r \angle \theta$
$Z = \sqrt{200} \angle 278.14°$

⑥ $Z = re^{\theta i}$
$Z = \sqrt{200}\, e^{\theta i}$

$\theta_{rad} = \frac{278.14° \pi}{180°} i$
$\theta_{rad} = 1.545\pi i$
$Z = \sqrt{200}\, e^{1.545\pi i}$



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3.- De acuerdo al valor de Z, desarrollar el Teorema de Demoivre, graficar sus resultados y por lo menos exponer un resultado de comprobación.

$$Z=(-2-2i)^3$$

$$r=|z|=\sqrt{a^2+b^2}$$
$$r=|z|=\sqrt{(-2)^2+(-2)^2}$$
$$r=|z|=\sqrt{4+4}$$
$$r=|z|=\sqrt{8}$$

$$\theta=\tan^{-1}\frac{b}{a}$$
$$\theta=\tan^{-1}\frac{-2}{-2}$$
$$\theta=45°$$
Ajuste = $180+45=225°$
$90-45+90+90=225°$
$$\theta=225°$$

$$|z|^{\frac{1}{n}}\cdot\cos\left(\frac{\theta}{n}+\frac{360°}{n}K\right)+\left[|z|^{\frac{1}{n}}\operatorname{Sen}\left(\frac{\theta}{n}+\frac{360°}{n}K\right)\right]i;$$

$n=3 \quad K=n-1=3-1=2 \therefore K=0,1,2$

$$\sqrt{8}^{\frac{1}{n}}\cdot\cos\left[\frac{225}{3}+\frac{360}{3}\cdot 0\right)+\left[\sqrt{8}^{\frac{1}{n}}\operatorname{Sen}\left(\frac{225}{3}+\frac{360}{3}\cdot 0\right)\right]i=$$

$$1.41\cdot\cos(75)+[1.41\operatorname{Sen}(75)]i=$$

$$1.41\cdot 0.25+(1.41\cdot 0.96)i=$$

$$0.35+1.35i$$

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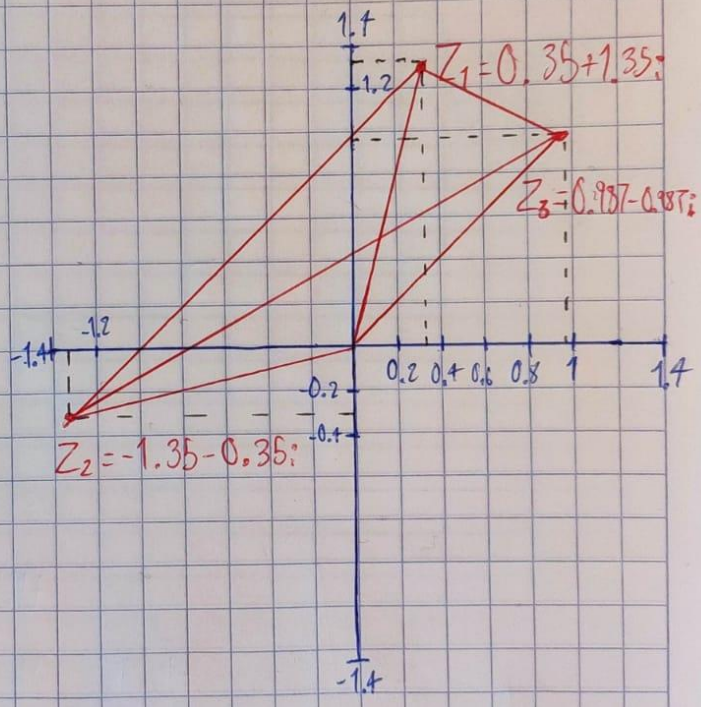
$1.41 \cdot \cos\left(\frac{225}{3} + \frac{360}{3} \cdot 1\right) + \left[1.41 \cdot \operatorname{Sen}\left(\frac{225}{3} + \frac{360}{3} \cdot 1\right)\right] i =$
$1.41 \cdot -0.96 + (1.41 \cdot -0.25) i =$
$-1.35 - 0.35 i$

$1.41 \cdot \cos\left(\frac{225}{3} + \frac{360}{3} \cdot 2\right) + \left[1.41 \cdot \operatorname{Sen}\left(\frac{225}{3} + \frac{360}{3} \cdot 2\right)\right] i =$
$1.41 \cdot 0.70 + (1.41 \cdot -0.70) i =$
$0.987 - 0.987 i$

$Z_1 = 0.35 + 1.35 i$
$Z_2 = -1.35 - 0.35 i$
$Z_3 = 0.987 - 0.987 i$



Comprobación Z_1
$r = |z| = \sqrt{(0.35)^2 + (1.35)^2}$
$r = |z| = \sqrt{0.1225 + 1.8225}$
$r = |z| = \sqrt{1.945}$
$r = |z| = 1.39$
$1.39 \approx 1.41$

Comprobación Z_2
$r = |z| = \sqrt{(-1.35)^2 + (-0.35)^2}$
$r = |z| = \sqrt{1.8225 + 0.1225}$
$r = |z| = \sqrt{1.945}$
$r = |z| = 1.39$
$1.39 \approx 1.41$

Comprobación Z_3
$r = |z| = \sqrt{(0.987)^2 + (-0.987)^2}$
$r = |z| = \sqrt{0.974 + 0.974}$
$r = |z| = \sqrt{1.948}$
$r = |z| = 1.39$
$1.39 \approx 1.41$