CÁLCULO DE EJERCICIOS

Transforme a su forma polar:

Fórmula de radio $\boldsymbol{r = \pm\sqrt{x^2 + y^2}}$

Fórmula del ángulo $\boldsymbol{\theta = \tan^{-1}\left(\frac{y}{x}\right)}$

$\boldsymbol{a)\ 2\ +\ 3\,j}$

$$r = \sqrt{2^2 + 3^2} = \sqrt{4 + 9} = \sqrt{13} = 3.60$$

$$\theta = \tan^{-1}\left(\frac{3}{2}\right) = 56.31°$$

$$\boldsymbol{R = 3.60\ \angle\ 56.31°}$$

$\boldsymbol{b)\ -8\ +\ 6.2\,j}$

$$r = \sqrt{8^2 + 6.2^2} = \sqrt{64 + 38.44} = \sqrt{102.44} = 10.12$$

$$\theta = \tan^{-1}\left(\frac{6.2}{-8}\right) = -37.77°$$

$$\boldsymbol{R = 10.12\ \angle -37.77°}$$

$\boldsymbol{c)\ 4.3\ -\ 2.8\,j}$

$$r = \sqrt{4.3^2 + (-2.8)^2} = \sqrt{18.49 + 7.84} = \sqrt{26.33} = 5.12$$

$$\theta = \tan^{-1}\left(\frac{-2.8}{4.3}\right) = -33.07°$$

$$\boldsymbol{R = 5.12\angle -33.07°}$$

$\boldsymbol{d)\ -6\ -\ 3.2\,j}$

$$r = \sqrt{(-6)^2 + (-3.2)^2} = \sqrt{36 + 10.24} = \sqrt{46.24} = 6.8$$

$$\theta = \tan^{-1}\left(\frac{-3.2}{-6}\right) = 28.07°$$

$$\boldsymbol{R = 6.8\angle 28.07°}$$

Transforme a su forma rectangular:

Fórmula de coordenadas rectangulares

$$\boldsymbol{x = rcos(\theta)}$$

$$\boldsymbol{y = rsen(\theta)}$$

$\boldsymbol{a)\ 36 \angle -10°}$

$$= 36\cos(-10) + 36sen(-10)$$

$$= 35.45 + j(-6.25)$$

$$= \boldsymbol{35.45 - j6.25}$$

$\boldsymbol{b)\ 28.7 \angle 135°}$

$$= 28.7\cos(135) + 28.7sen(135)$$

$$= \boldsymbol{-20.29 + j20.29}$$

$\boldsymbol{c)\ 11.2 \angle 28°}$

$$= 11.2\cos(28) + 11.2sen(28)$$

$$= \boldsymbol{9.89 + j5.26}$$

$\boldsymbol{d)\ 45 \angle -117.9°}$

$$= 45\cos(-117.9) + 45sen(-117.9)$$

$$= -21.06 + j(-39.77)$$

$$= \boldsymbol{-21.06 - j39.77}$$

Realice las siguientes operaciones paso a paso, y represente el resultado tanto en su forma rectangular como en su forma polar.

Fórmula de radio $\boldsymbol{r = \pm\sqrt{x^2 + y^2}}$

Fórmula del ángulo $\boldsymbol{\theta = \tan^{-1}\left(\frac{y}{x}\right)}$

Fórmula de coordenadas rectangulares

$$\boldsymbol{x = rcos(\theta)}$$

$$\boldsymbol{y = rsen(\theta)}$$

$\boldsymbol{a)\ \frac{10\ +\ 3\,j}{2j} -\ (\ 7\ +\ 2\,j\ )\ (\ 3 \angle -115°)}$

Transformo en polares para dividir

$$r = \sqrt{10^2 + 3^2} = \sqrt{100 + 9} = \sqrt{109} = 10.44$$

$$\theta = \tan^{-1}\left(\frac{3}{10}\right) = 16.70°$$

$$r = \sqrt{0^2 + 2^2} = \sqrt{4} = 2$$

$$\theta = \tan^{-1}\left(\frac{2}{0}\right) = 90°$$

Transformo en polares para multiplicar

$$r = \sqrt{7^2 + 2^2} = \sqrt{53} = 7.28$$

$$\theta = \tan^{-1}\left(\frac{2}{7}\right) = 15.94°$$

$$= \frac{\mathbf{10.44 \angle 16.70}}{\mathbf{2 \angle 90}} - ((\mathbf{7.28 \angle 15.94})(\mathbf{3 \angle -115°}))$$

$$= \mathbf{5.22 \angle -73.3} - (\mathbf{21.69 \angle -99.06})$$

$$= \mathbf{1.5 - j5} - (\mathbf{-3.41 - j21.42})$$

$$= \mathbf{1.5 - j5 + 3.41 + j21.42})$$

$$\mathbf{R = 4.9 - j16.42}$$

b) $\mathbf{6.8 \angle 125.3° + \frac{4.5 \angle -11.5°}{7.6 - 1.2j}}$

$$r = \sqrt{7.6^2 + 1.2^2} = \sqrt{59.2} = 7.69$$

$$\theta = \tan^{-1}\left(\frac{1.2}{7.6}\right) = 8.97°$$

$$= \mathbf{6.8 \angle 125.3° + \frac{4.5 \angle -11.5°}{7.69 \angle 8.97°}}$$

$$= \mathbf{6.8 \angle 125.3° + 0.59 \angle -20.47}$$

$$x = 6.8cos(125.3°) \qquad x = 0.59cos(-20.47)$$

$$y = 6.8sen(125.3°) \qquad y = 0.59sen(-20.47)$$

$$= \mathbf{-3,93 + .j5.55 + 0.55 - j0.21}$$

$$\boldsymbol{R = -3.38 + j5.34}$$

c) $\mathbf{\frac{34 + j28.5}{4 \angle -20.8} - 51.2 \angle 215°}$

$$r = \sqrt{34^2 + 28.5^2} = \sqrt{1968.25} = 44.36$$

$$\theta = \tan^{-1}\left(\frac{28.5}{34}\right) = 39.97°$$

$$= \frac{\mathbf{44.36 \angle 39.97}}{\mathbf{4 \angle -20.8}} - (\mathbf{51.2 \angle 215°})$$

$$= \mathbf{11.09 \angle 60.77°} - (\mathbf{51.2 \angle 215°})$$

$$x = 11.09cos(60.77°) \qquad x = 51.2cos(215°)$$

$$y = 11.09sen(60.77°) \qquad y = 51.2sen(215°)=$$

$$= \mathbf{5.42 + j9.68} - (\mathbf{-41.94 - 29.37})$$

$$\boldsymbol{R = 47.36 + j39.05}$$

Resuelva las operaciones anteriores por medio de la calculadora y compare resultados.

A

$$\frac{10+3i}{2i} - (7+2i)(-1.27-2.72i) = 4.95+16.58i$$

Pasos

$$\frac{10+3i}{2i} - (7+2i)(-1.27-2.72i)$$

$$(7+2i)(-1.27-2.72i) = -3.45-21.58i$$

$$= \frac{10+3i}{2i} - (-3.45-21.58i)$$

$$-(-3.45-21.58i): \quad 3.45+21.58i$$

$$= \frac{10+3i}{2i} + 3.45 + 21.58i$$

$$\frac{10+3i}{2i} = \frac{3-10i}{2}$$

$$= \frac{3-10i}{2} + 3.45 + 21.58i$$

Reescribir $\frac{3-10i}{2} + 3.45 + 21.58i$ en la forma binómica: $4.95+16.58i$

$$= 4.95+16.58i$$

B

Mostrar pasos

$$(-3.93 + 5.55i) + \frac{4.41 - 0.9i}{7.6 - 1.2i} = -3.34560\ldots + 5.52385\ldots i$$

Pasos

$$(-3.93 + 5.55i) + \frac{4.41 - 0.9i}{7.6 - 1.2i}$$

Quitar los parentesis: $(-a) = -a$

$$= -3.93 + 5.55i + \frac{4.41 - 0.9i}{7.6 - 1.2i}$$

$$\frac{4.41 - 0.9i}{7.6 - 1.2i} = \frac{34.596 - 1.548i}{59.2}$$ *Mostrar pasos*

$$= -3.93 + 5.55i + \frac{34.596 - 1.548i}{59.2}$$

Mostrar pasos

Reescribir $-3.93 + 5.55i + \frac{34.596 - 1.548i}{59.2}$ en la forma binómica: $-3.34560\ldots + 5.52385\ldots i$

$$= -3.34560\ldots + 5.52385\ldots i$$

C

Mostrar pasos

$$\frac{34 + 28.5i}{3.74 - 1.42i} - (-41.94 - 29.37i) = 47.35677\ldots + 39.04695\ldots i$$

Pasos

$$\frac{34 + 28.5i}{3.74 - 1.42i} - (-41.94 - 29.37i)$$

$$\frac{34 + 28.5i}{3.74 - 1.42i} = \frac{86.69 + 154.87i}{16.004}$$ *Mostrar pasos*

$$= \frac{86.69 + 154.87i}{16.004} - (-41.94 - 29.37i)$$

$-(-41.94 - 29.37i)$: $41.94 + 29.37i$ *Mostrar pasos*

$$= \frac{86.69 + 154.87i}{16.004} + 41.94 + 29.37i$$

Mostrar pasos

Reescribir $\frac{86.69 + 154.87i}{16.004} + 41.94 + 29.37i$ en la forma binómica: $47.35677\ldots + 39.04695\ldots i$

$$= 47.35677\ldots + 39.04695\ldots i$$