7.5.1. Transforme a su forma polar:

Para realizar los ejercicios utilizaremos las siguientes formulas
Para el modulo $C = \sqrt{A^2 + B^2}$
Para el ángulo $\theta = \tan^{-1}\left(\frac{B}{A}\right)$

$\boldsymbol{a)\ 2 + j3}$

$$C = \sqrt{2^2 + 3^2} = \sqrt{13}$$
$$\theta = \tan^{-1}\left(\frac{3}{2}\right) = 56.31°$$
$$\sqrt{13} < 56.31°$$

$\boldsymbol{b)\ -8 + j6.2}$

$$C = \sqrt{(-8)^2 + 6.2^2} = 10.12$$
$$\theta = \tan^{-1}\left(\frac{6.2}{-8}\right) = -37.77° => 180 - 37{,}77 = 142{,}23$$
$$10.12 < 142{,}23°$$

$\boldsymbol{c)\ 4.3 - j2.8}$

$$C = \sqrt{4.3^2 + 2.8^2} = 5.13$$
$$\theta = \tan^{-1}\left(\frac{-2.8}{4.3}\right) = -33.07°$$
$$5.13 < -33.07°$$

$\boldsymbol{d)\ -6 - j3.2}$

$$C = \sqrt{(-6)^2 + (-3.2)^2} = 6.8$$
$$\theta = \tan^{-1}\left(\frac{-3.2}{-6}\right) = 28.07° => -180 + 28{,}07 = -151{,}93$$
$$6.8 < -151{,}93°$$

7.5.2. Transforme a su forma rectangular:
Para realizar los ejercicios utilizaremos las siguientes formulas
Para $A = Ccos(\theta)$
Para $B = Csen(\theta)$

$\boldsymbol{a)\ 36 < -10°}$

$$A = 36\cos(-10) = 35.45$$
$$B = 36\,\mathrm{sen}(-10) = -6.25$$
$$35.45 - j6.25$$

$\boldsymbol{b)\ 28.7 < 135°}$

$$A = 28.7\cos(135) = -20.29$$
$$B = Csen(\theta) = 28.7\,\text{sen}(135) = 20.29$$
$$-20.29 + j20.29$$

$\boldsymbol{c)}\ \mathbf{11.2 < 28°}$

$$A = 11.2\cos(28) = 9.88$$
$$B = 11.2\,\text{sen}(28) = 5.25$$
$$9.88 + j5.25$$

$\boldsymbol{d)}\ \mathbf{45 < -117.9°}$

$$A = 45\cos(-117.9) = -21.05$$
$$B = 45\,\text{sen}(-117.9) = -39.76$$
$$-21.05 - j39.76$$

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

Utilizamos las formulas antes mencionadas

$\boldsymbol{a)}\ \mathbf{10 + j3 - (7 + j2)(3 < -115°) - 2j}$

$$7 + j2$$
$$C = \sqrt{7^2 + 2^2} = 7.28$$
$$\theta = \tan^{-1}\left(\frac{2}{7}\right) = 15.94°$$
$$7.28 < 15.94°$$

$$(7.28 < 15.94°)(3 < -115°) = 21.84 < -99.06°$$

$$=> 21.84 < -99.06°$$
$$A = 21.84\cos(-99.06) = -3.44$$
$$B = 21.84\,\text{sen}(-99.06) = -21.57$$
$$=> -3.44 - j21.57$$

$$10 + j3 + 3.44 + j21.57 - 2j = 0$$

$$=> \mathbf{13.44 + j22.57}$$

Ahora la expresamos en su forma polar

$$C = \sqrt{13.44^2 + 22.57^2} = 26.26$$
$$\theta = \tan^{-1}\left(\frac{22.57}{13.44}\right) = 59.22°$$

$$\mathbf{26.26 < 59.22°}$$

***b*)** $\mathbf{6.8 < 125.3° + \frac{4.5 < -11.5°}{7.6 - j1.2}}$

$$7.6 - j1.2$$

$$C = \sqrt{7.6^2 + (-1.2)^2} = 7.69$$
$$\theta = \tan^{-1}\left(\frac{-1.2}{7.6}\right) = -8.97°$$
$$\mathbf{=> 7.69 < -8.97°}$$
$$6.8 < 125.3° + \frac{4.5 < -11.5°}{7.69 < -8.97°}$$

$$\frac{4.5 < -11.5°}{7.69 < -8.97°} = \frac{4.5}{7.69} < -11.5 + 8.97°$$
$$\mathbf{=> 0.58 < -2.53°}$$

$$(6.8 < 125.3°) + (0.58 < -2.53°)$$

$$A = 6.8\cos(125.3) = -3.92$$
$$B = 6.8\,\text{sen}(125.3) = 5.54$$
$$\mathbf{=> -3.92 + j5.54}$$

$$A = 0.58\cos(-2.53) = 0.57$$
$$B = 0.58\,\text{sen}(-2.53) = -0.02$$
$$\mathbf{=> 0.57 - j0.02}$$

$$(-3.92 + j5.54) + (0.57 - j0.02)$$
$$\mathbf{=> -3.35 + j5.52}$$

Pasamos a su forma polar

$$C = \sqrt{(-3.35)^2 + 5.52^2} = 6.45$$
$\theta = \tan^{-1}\left(\frac{5.52}{-3.35}\right) = -58.74°$=>180-58.74=121,26

$$\mathbf{=> 6.45 < 121.26°}$$

***c*)** $\mathbf{\frac{34 + j28.6}{4 < -20.8°} - 51.2 < 215°}$

$$34 + j28.6$$

$$C = \sqrt{34^2 + 28.6^2} = 44.43$$
$$\theta = \tan^{-1}\left(\frac{28.6}{34}\right) = 40.07°$$
$$\mathbf{=> 44.43 < 40.07°}$$

$$\frac{44.42 < 40.06°}{4 < -20.8°} = \frac{44.43}{4} < 40.06° + 20.8°$$
$$\mathbf{=> 11.10 < 60.87°}$$

$$(11.10 < 60.87°) - (51.2 < 215°)$$

$$A = 11.10\cos(60.87) = 5.40$$
$$B = 11.10sen(60.87) = 9.70$$
$$=> \mathbf{5.4 + j9.70}$$

$$A = 51.2\cos(215) = -41.94$$
$$B = 51.2\,\text{sen}(215) = -29.36$$
$$=> \mathbf{-41.94 - j29.36}$$

$$(5.4 + j9.70) - (-41.94 - j29.36)$$

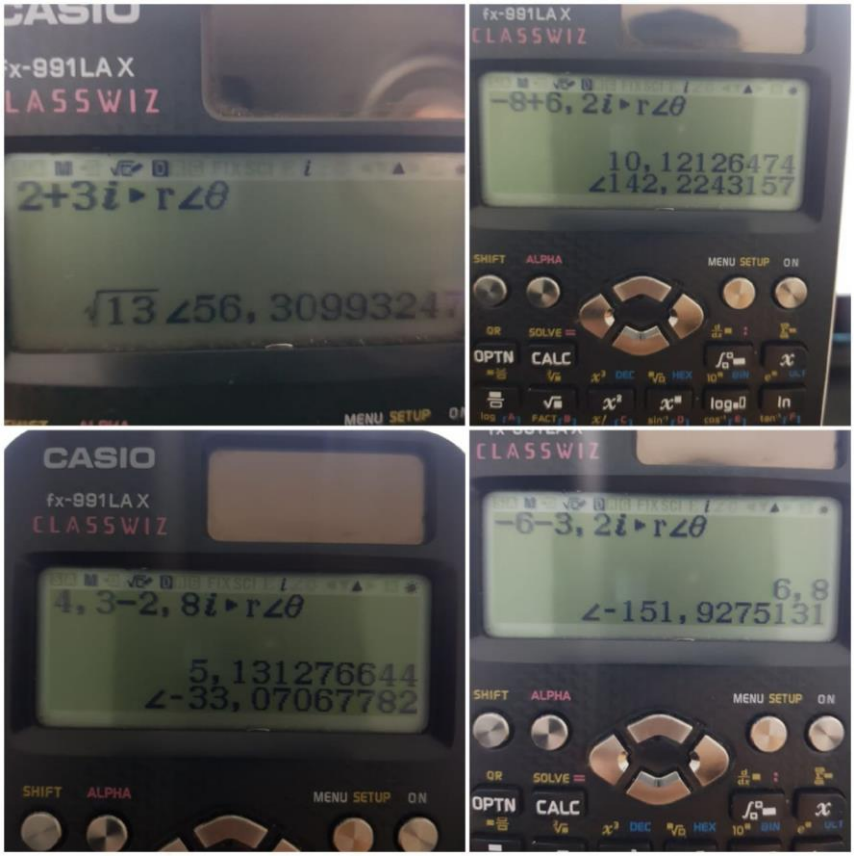
$$=> \mathbf{47.34 + j39.06}$$

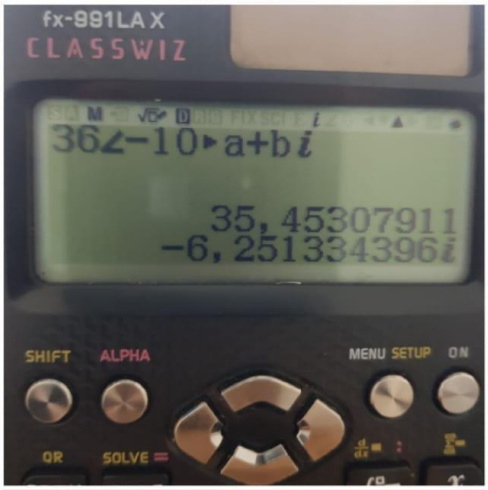
Pasamos a su forma polar

$$C = \sqrt{47.34^2 + 39.06^2} = 61.37$$
$$\theta = \tan^{-1}\left(\frac{39.06}{47.34}\right) = 39.52°$$

$$=> \mathbf{61.37 < 39.52°}$$

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

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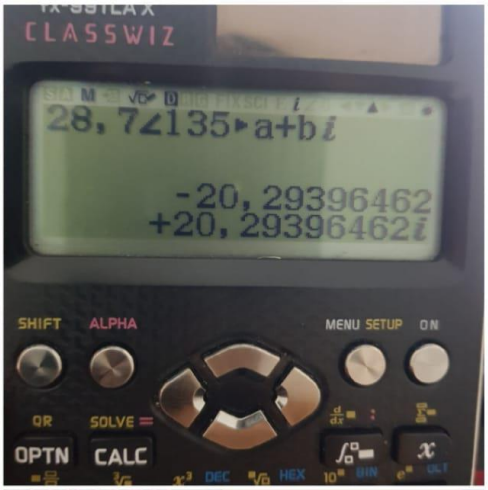
QR
SOLVE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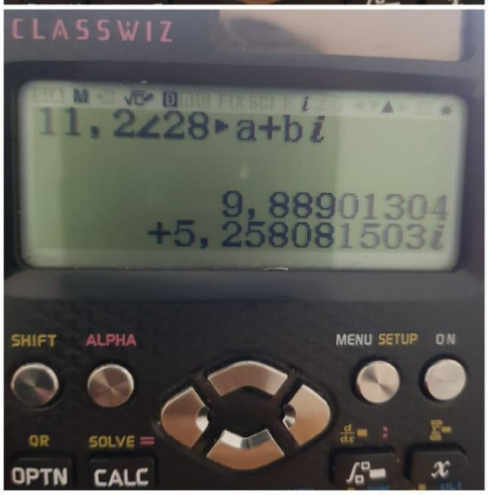
OPTN
CALC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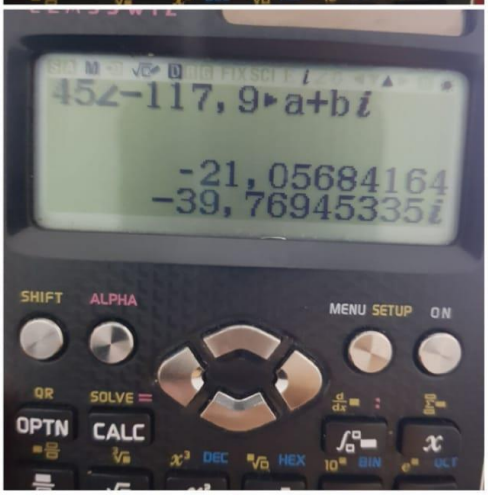
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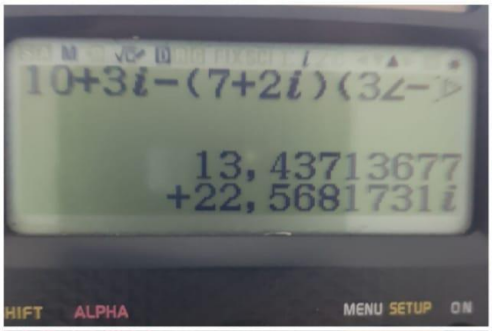
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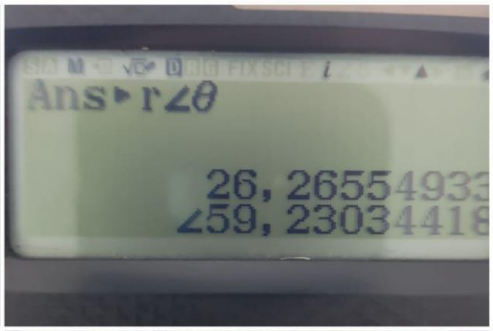
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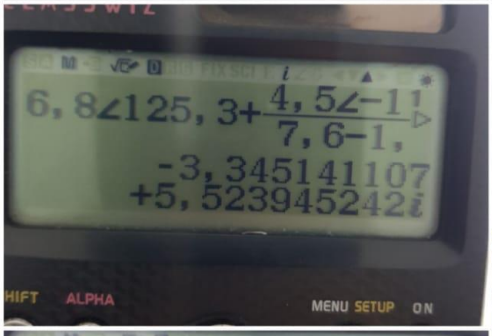
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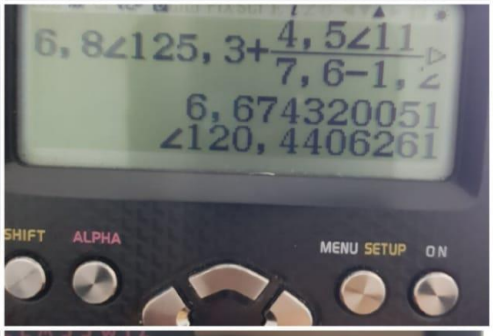
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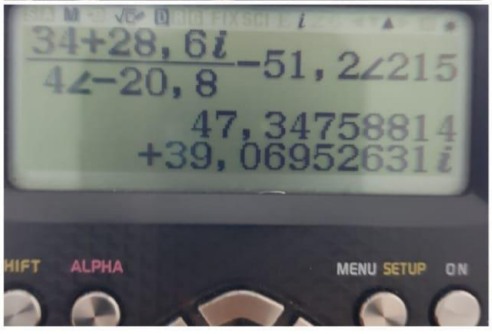
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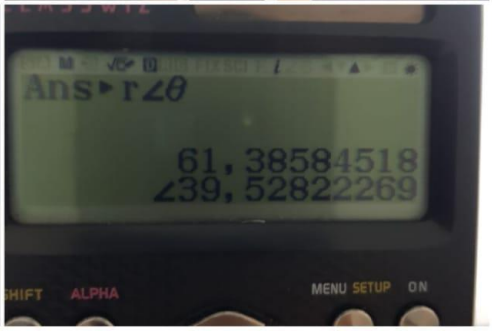
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