

Question

$$re^{j\theta} = \frac{1-j}{1+j}$$

$$\theta = ?$$

$$r = ?$$

Answer

$$\frac{1-j}{1+j} \cdot \frac{1-j}{1-j} = \frac{1-2j+j^2}{1-j^2} = -\frac{2j}{2} = -j = e^{-j\frac{\pi}{2}}$$

complex conjugate
of denominator



$$\theta = -\frac{\pi}{2}$$

$$r = 1$$

Question

$$re^{j\theta} = 2 - 2j$$

$$\theta = ?$$

$$r = ?$$

Answer



$$\theta = -\frac{\pi}{4}$$

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

Question

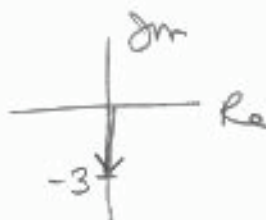
$$-\sqrt{-9}$$

$$\theta = ?$$

$$r = ?$$

Answer

$$-\sqrt{-9} = -3j = 3e^{-\frac{\pi}{2}}$$



$$\theta = -\frac{\pi}{2}$$

$$r = 3$$

Use 0.7 mm mechanical pencil. Keep 0.25 inch from edge of box. Erase mistakes thoroughly.

CTP4

Problem Type Acronym

Name

ID #

Question

$$re^{j\theta} = \frac{2}{(1-j)}$$

$$\theta = ?$$

$$r = ?$$

Answer

$$\frac{2}{(1-j)} \frac{(1+j)}{(1+j)} = \frac{2}{2} + \frac{2j}{2} = 1 + j$$



$$\theta = \frac{\pi}{4}$$

$$r = \sqrt{2}$$

Question

Express the complex number

$$\frac{4}{1-j\sqrt{3}}$$

as a phasor $re^{j\theta}$.

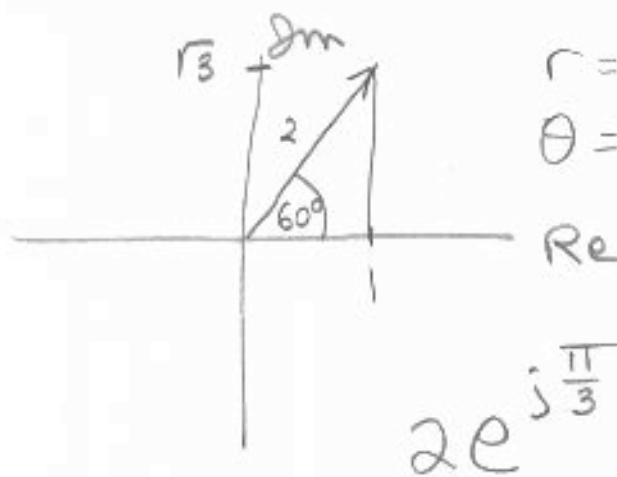
Make sure $r \geq 0$

and $-\pi < \theta \leq \pi$ (express in radians)

Draw a picture of the phasor
on the complex plane.

Answer

$$\frac{4}{1-j\sqrt{3}} \cdot \frac{1+j\sqrt{3}}{1+j\sqrt{3}} = \frac{4(1+j\sqrt{3})}{1+3} = 1+j\sqrt{3}$$



$$r = 2$$

$$\theta = 60^\circ = \frac{\pi}{3}$$

$$2e^{j\frac{\pi}{3}}$$

Question

Express the complex number

$$\frac{3}{\sqrt{2}} - j\frac{3}{\sqrt{2}}$$

as a phasor $re^{j\theta}$

Make sure $r \geq 0$

and $-\pi < \theta \leq \pi$ (express in radians)

Draw a picture of the phasor
on the complex plane.

Answer

