

1) ໃຫ້ $Z = 4 - 3i$. ຄ່າຂອງ $|Z^4|$ ເທົ່າກັບຂັດໃດ?

ກ. 81

ຂ. 256

ຄ. 337

ງ. 625

$$\begin{aligned} |Z^4| &= |Z|^4 = (\sqrt{4^2 + (-3)^2})^4 \\ &= (\sqrt{16+9})^4 = (\sqrt{25})^4 \\ &= 5^4 = 625 \end{aligned}$$

2) ຮູບຮ່າງໂຕມຸມມິຕິຂອງ $z = 1 + i$ ແມ່ນຂັດໃດ?

ກ. $2 \left(\cos \frac{\pi}{4} + i \sin \frac{\pi}{4} \right)$ ✗

ຂ. $2 \left(\cos \frac{3\pi}{4} + i \sin \frac{3\pi}{4} \right)$ ✗

ຄ. $\sqrt{2} \left(\cos \frac{\pi}{4} + i \sin \frac{\pi}{4} \right)$ ✓

ງ. $\sqrt{2} \left(\cos \frac{3\pi}{4} + i \sin \frac{3\pi}{4} \right)$

3) ຮູບຮ່າງໂຕມຸມມິຕິຂອງຈຳນວນສົນ $z = -1 + i$ ແມ່ນຂັດໃດ?

(ກ) $\sqrt{2} \left(\cos \frac{\pi}{4} - i \sin \frac{\pi}{4} \right)$

(ຂ) $\sqrt{2} \left(\cos \frac{\pi}{4} + i \sin \frac{\pi}{4} \right)$

(ຄ) $\sqrt{2} \left(\cos \frac{3\pi}{4} + i \sin \frac{3\pi}{4} \right)$

(ງ) $\sqrt{2} \left(\cos \frac{3\pi}{4} - i \sin \frac{3\pi}{4} \right)$

$$Z = 1 + i \quad \text{ຈຳນວນ} \quad Z = r (\cos \varphi + i \sin \varphi)$$

$$\text{ຈຳນວນ} \cdot r = \sqrt{a^2 + b^2} = \sqrt{1^2 + 1^2} = \sqrt{1+1} = \sqrt{2}$$

$$\cos \varphi = \frac{a}{r} = \frac{1}{\sqrt{2}} = \frac{\sqrt{2}}{2} \Rightarrow \cos \frac{\pi}{4} = \frac{\sqrt{2}}{2}$$

$$\sin \varphi = \frac{b}{r} = \frac{1}{\sqrt{2}} = \frac{\sqrt{2}}{2} \Rightarrow \sin \frac{\pi}{4} = \frac{\sqrt{2}}{2}$$

$$\begin{aligned} \text{ເປັນໄດ້ຮູ້ ຮູບຮ່າງໂຕມຸມມິຕິຂອງຈຳນວນສົນ: } z &= (\cos \varphi + i \sin \varphi) \\ &= \sqrt{2} \left(\cos \frac{\pi}{4} + i \sin \frac{\pi}{4} \right) \end{aligned}$$

$$3. \quad Z = -1 + i, \quad Z = r (\cos \varphi + i \sin \varphi)$$

$$r = \sqrt{a^2 + b^2} = \sqrt{(-1)^2 + 1^2} = \sqrt{1+1} = \sqrt{2}$$

$$\cos \varphi = \frac{a}{r} = \frac{-1}{\sqrt{2}} = -\frac{\sqrt{2}}{2} \Rightarrow \cos \frac{3\pi}{4} = -\frac{\sqrt{2}}{2}$$

$$\cos \varphi = \frac{1}{\sqrt{2}} = \frac{\sqrt{2}}{2} \Rightarrow \cos \frac{3\pi}{4} = \frac{\sqrt{2}}{2}$$

$$\sin \varphi = \frac{1}{\sqrt{2}} = \frac{\sqrt{2}}{2} \Rightarrow \sin \frac{3\pi}{4} = \frac{\sqrt{2}}{2}$$

$$Z = \sqrt{2} \left(\cos \frac{3\pi}{4} + i \sin \frac{3\pi}{4} \right)$$