

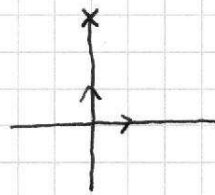
Chapitre 15: Nombres complexes (2)

Série 15-1

Exemple 2

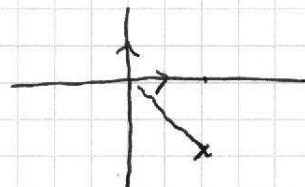
- $z_2 = 3i$ On place l'image de z_2

$$\text{donc } z_2 = [3; \frac{\pi}{2}]$$



- $z_4 = 2 - 2i$ On place l'image de z_4

$$\text{donc } z_4 = [2\sqrt{2}; -\frac{\pi}{4}]$$



- $z_6 = \sqrt{6} + i\sqrt{2}$

$$|z_6| = \sqrt{\sqrt{6}^2 + \sqrt{2}^2} = \sqrt{6+2} = \sqrt{8} = 2\sqrt{2}.$$

Soit θ un argument de z_6 .

$$\left. \begin{aligned} \cos \theta &= \frac{\sqrt{6}}{2\sqrt{2}} = \frac{\sqrt{3}\sqrt{2}}{2\sqrt{2}} = \frac{\sqrt{3}}{2} \\ \sin \theta &= \frac{\sqrt{2}}{2\sqrt{2}} = \frac{1}{2} \end{aligned} \right\} \text{ donc } \theta = \frac{\pi}{6} \text{ convient}$$

$$\text{Ainsi } z_6 = [2\sqrt{2}; \frac{\pi}{6}]$$

- $z_8 = 6\sqrt{3} - 6i$

$$|z_8| = \sqrt{(6\sqrt{3})^2 + 6^2} = \sqrt{36 \times 3 + 36} = \sqrt{144} = 12.$$

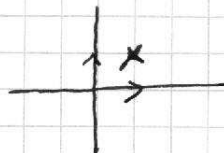
Soit θ un argument de z_8

$$\left. \begin{aligned} \cos \theta &= \frac{6\sqrt{3}}{12} = \frac{\sqrt{3}}{2} \\ \sin \theta &= \frac{-6}{12} = -\frac{1}{2} \end{aligned} \right\} \text{ donc } \theta = -\frac{\pi}{6} \text{ convient.}$$

$$\text{Ainsi } z_8 = [12; -\frac{\pi}{6}]$$

Exemple 3

On place l'image de $1+i$:



$$\text{donc } 1+i = \left[\sqrt{2}; \frac{\pi}{4} \right]$$

$$\text{Ainsi } z = \left[\sqrt{2}; \frac{\pi}{4} \right]^{2020} = \left[\sqrt{2}^{2020}; 2020 \times \frac{\pi}{4} \right]$$

$$\text{Or } \sqrt{2}^{2020} = 2^{1010}$$

$$\begin{aligned} \text{et } 2020 \frac{\pi}{4} &= 505\pi = \pi + 504\pi = \pi + 252\pi \\ &= \pi + 101 \times 2\pi. \end{aligned}$$

$$\text{Donc } z = \left[2^{1010}; \pi \right]$$

$$\text{On en déduit : } z = 2^{1010} (\cos \pi + i \sin \pi)$$

$$= 2^{1010} (-1 + i \times 0)$$

$$= -2^{1010}$$