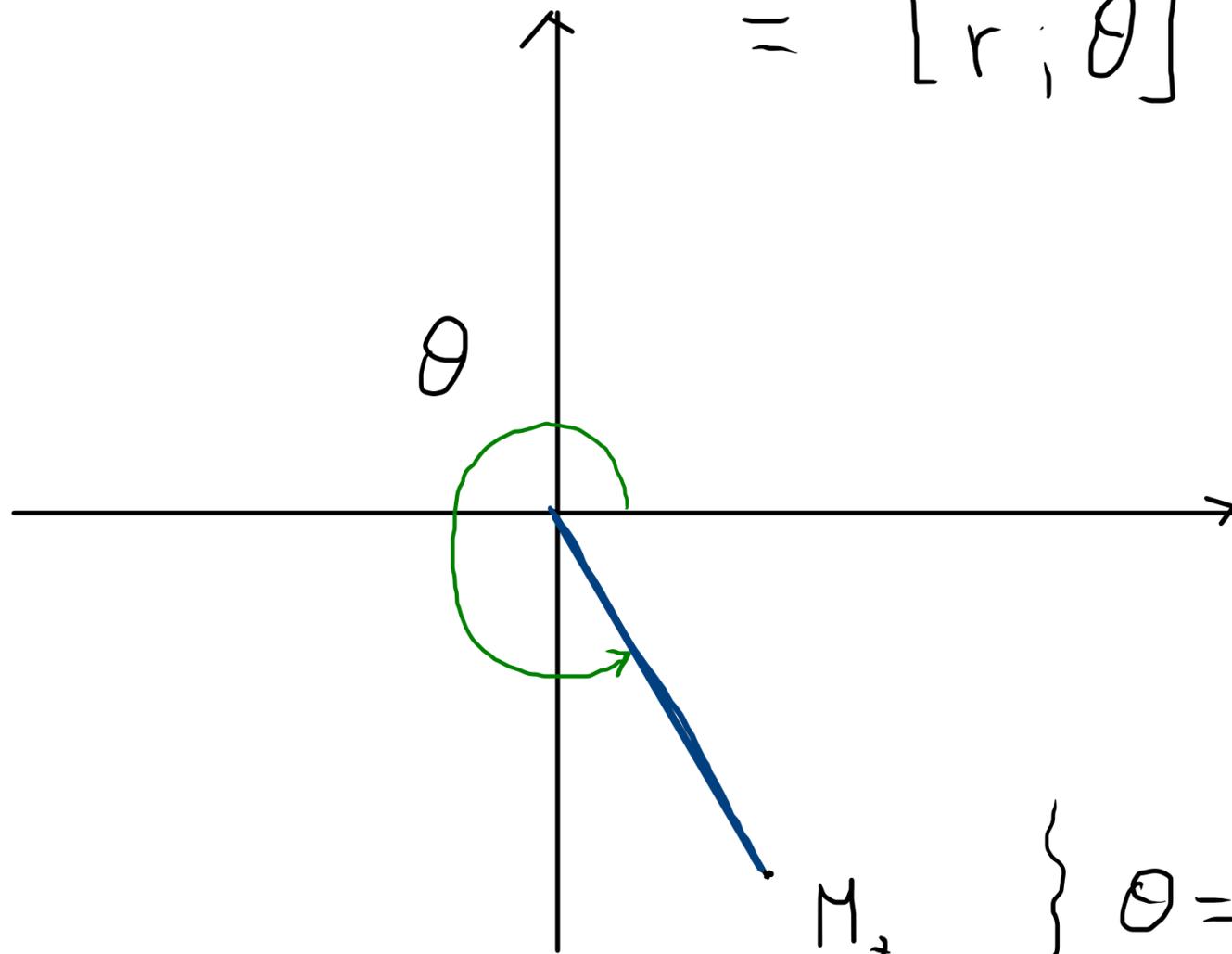


04.09.19

$$z = 5 - 12i = r (\cos(\theta) + i \sin(\theta))$$

$$= [r; \theta]$$



$$r = |z| = 13$$

$$\theta: \begin{cases} \cos(\theta) = \frac{5}{13} \\ \sin(\theta) = \frac{-12}{13} \end{cases}$$

$$\theta = \begin{cases} 67,38^\circ + n \cdot 360^\circ \\ -67,38^\circ + n \cdot 360^\circ \end{cases}$$

$$[r; \theta] \Rightarrow z = r (\cos(\theta) + i \sin(\theta))$$

$$\theta = 292.619864948040426^\circ$$

1.2.2 Écrire les nombres complexes ci-dessous sous forme trigonométrique :

a) 1

b) i

c) -2

d) $-1 - i$

e) $-1 - \sqrt{3}i$

f) $3 + 4i$

e) $z = -1 - \sqrt{3}i$ $|z| = \sqrt{(-1)^2 + (-\sqrt{3})^2} = 2$

$$\theta : \begin{cases} \cos(\theta) = \frac{-1}{2} \\ \sin(\theta) = \frac{-\sqrt{3}}{2} \end{cases}$$

$$\Rightarrow \boxed{\pi} \theta = 120^\circ \text{ ou } -120^\circ$$

$$\theta = 240^\circ = \frac{240}{180} \pi = \frac{4}{3} \pi$$

$$z = \left[2; \frac{4\pi}{3} \right]$$

1.2.3 Écrire les nombres complexes ci-dessous sous forme algébrique :

a) $\left[4; -\frac{\pi}{3}\right]$

d) $\left[4; \frac{\pi}{3}\right]$

b) $\left[\frac{3}{4}; \frac{3\pi}{4}\right]$

e) $\left[1; -\frac{\pi}{2}\right]$

c) $[\pi; -\pi]$

f) $e^{i\pi}$?

30
45
60

$$\begin{aligned}\left[4; -\frac{\pi}{3}\right] &= 4 \left(\cos\left(-\frac{\pi}{3}\right) + i \sin\left(-\frac{\pi}{3}\right) \right) \\ &= 4 \left(\frac{1}{2} + i \left(-\frac{\sqrt{3}}{2}\right) \right) \\ &= 2 - 2\sqrt{3}i\end{aligned}$$

$\frac{1}{2}$
 $\frac{\sqrt{2}}{2}$
 $\frac{\sqrt{3}}{2}$

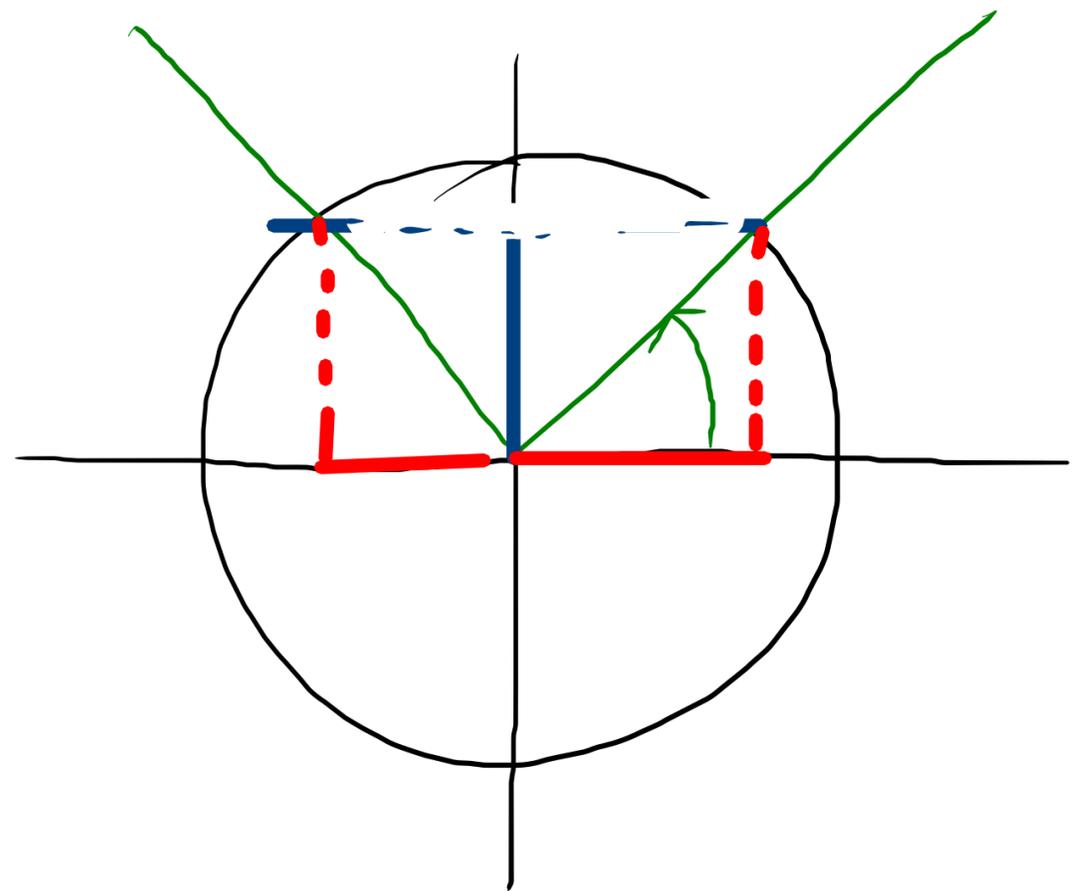
$$b) \left[\frac{3}{4}; \frac{3\pi}{4} \right]$$

$$z = \frac{3}{4} \left(\underbrace{\cos\left(\frac{3\pi}{4}\right)} + i \underbrace{\sin\left(\frac{3\pi}{4}\right)} \right)$$

$$z = \frac{3}{4} \left(-\frac{\sqrt{2}}{2} + i \frac{\sqrt{2}}{2} \right)$$

$$z = -\frac{3\sqrt{2}}{8} + \frac{3\sqrt{2}}{8}i$$

	cos	sin
30°	$\frac{\sqrt{3}}{2}$	$\frac{1}{2}$
45°	$\frac{\sqrt{2}}{2}$	$\frac{\sqrt{2}}{2}$
60°	$\frac{1}{2}$	$\frac{\sqrt{3}}{2}$



1.2.4 Calculer :

$$\text{a) } \underset{z_1}{\left[2; \frac{\pi}{4}\right]} \cdot \underset{z_2}{\left[3; \frac{\pi}{6}\right]} = [\quad] \quad \text{b) } \left[6; \frac{2\pi}{3}\right] : \left[3; -\frac{\pi}{3}\right]$$

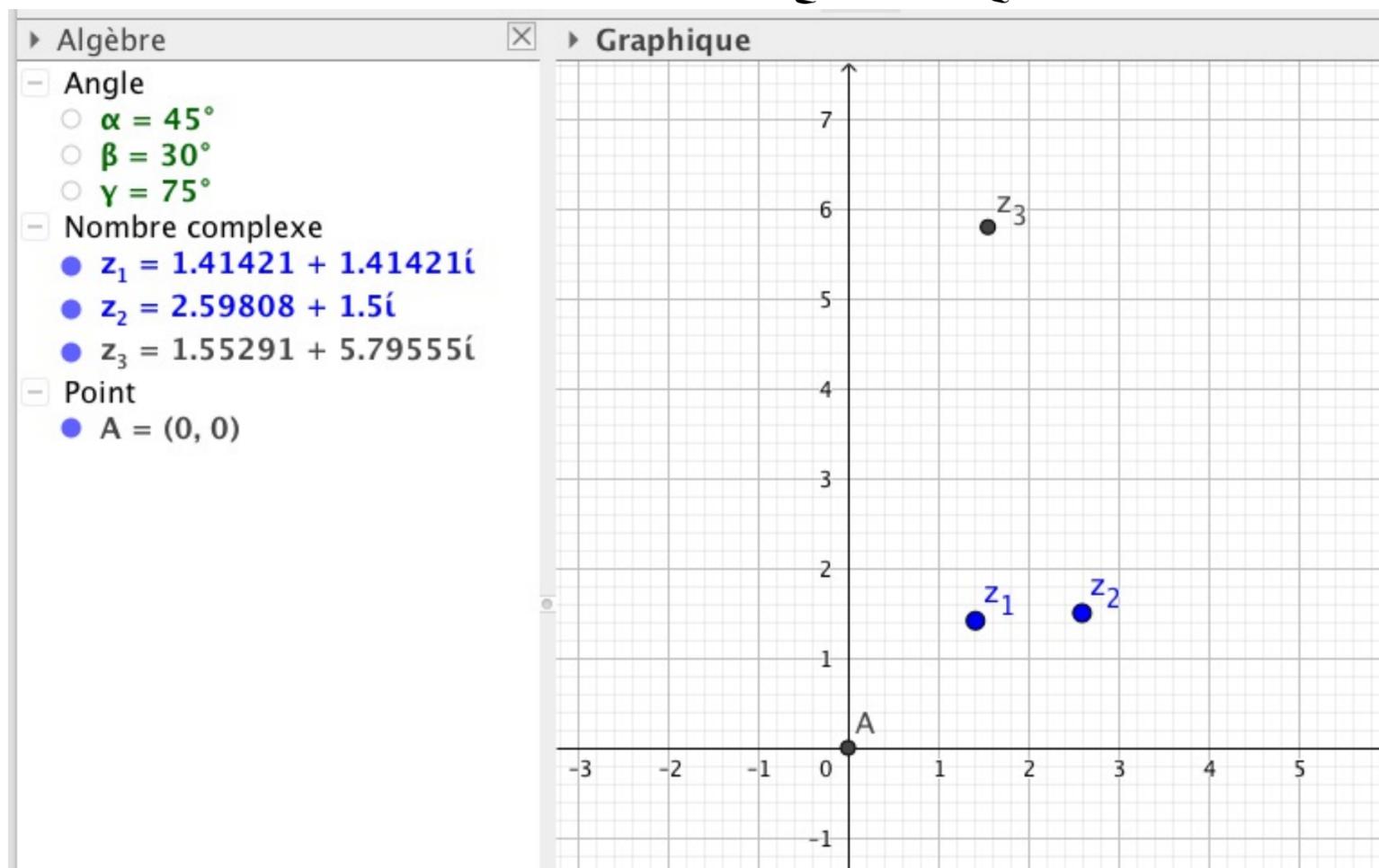
$$\text{c) } \left[2; \frac{\pi}{3}\right]^3$$

$$z_1 = 2 \left(\frac{\sqrt{2}}{2} + \frac{\sqrt{2}}{2}i \right) = \sqrt{2} + \sqrt{2}i$$

$$z_2 = 3 \left(\frac{\sqrt{3}}{2} + \frac{1}{2}i \right) = \frac{3}{2}\sqrt{3} + \frac{3}{2}i$$

$$z_1 z_2 = \left[2 \cdot 3; \frac{\pi}{4} + \frac{\pi}{6} \right]$$

$$\begin{aligned} \frac{z_1}{z_2} &= \left[2; \frac{2\pi}{3} - \left(-\frac{\pi}{3}\right) \right] \\ &= \left[2; \pi \right] \\ &= -2 \end{aligned}$$



$$\left[2; \frac{\pi}{3}\right]^3 = [8; \pi] = -8$$

$$\textcircled{1} [r_1, \theta_1] \cdot [r_2, \theta_2] = [r_1 r_2; \theta_1 + \theta_2]$$

$$\textcircled{2} [r_1, \theta_1] \div [r_2, \theta_2] = \left[\frac{r_1}{r_2}; \theta_1 - \theta_2 \right]$$

$$\textcircled{3} [r, \theta]^n = [r^n, n\theta]$$

$$r_1, r_2 \neq 0$$

1.2.4 Calculer :

a) $\left[2; \frac{\pi}{4} \right] \cdot \left[3; \frac{\pi}{6} \right]$

b) $\left[6; \frac{2\pi}{3} \right] : \left[3; -\frac{\pi}{3} \right]$

c) $\left[2; \frac{\pi}{3} \right]^3$

||

$$\left[6; \frac{5\pi}{12} \right]$$

$$\frac{\pi}{4} + \frac{\pi}{6} = \frac{3\pi + 2\pi}{12}$$

Devoir :

1.2.5

Feuille ex 16 , ex 22