Fe 04 a

Exercice 5

Bregère Flora

a) $z_1 = (-2-2i)^7 = z^7$

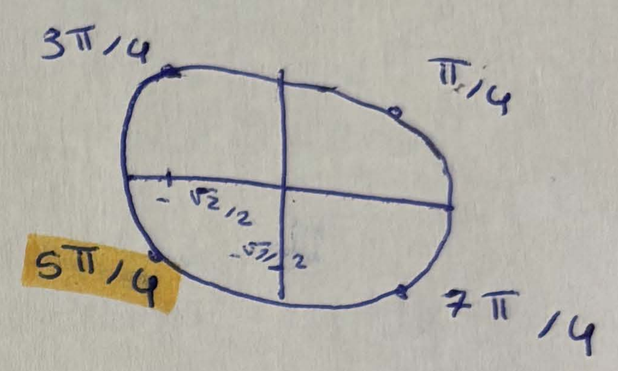
$z = -2-2i \quad (z = a + bi)$

$|z| = \sqrt{(-2)^2 + (-2)^2} = \sqrt{8} = 2\sqrt{2}$

or $|z|(\cos(\theta) + i\sin(\theta))$

$\cos\theta = \frac{a}{|z|} = \frac{-2}{2\sqrt{2}} = -\frac{\sqrt{2}}{2}$

$\sin\theta = \frac{b}{|z|} = \frac{-2}{2\sqrt{2}} = -\frac{\sqrt{2}}{2}$



$\theta = 5\pi/4$.

ainsi $(-2-2i)^7 = (2\sqrt{2})^7\left(\cos\left(\frac{5\pi}{4}\times 7\right) + i\sin\left(\frac{5\pi}{4}\times 7\right)\right)$.

or $\frac{5\pi}{4}\times 7 = \frac{35\pi}{4} = \frac{3\pi}{4} + 2\times 18\pi$

donc $(-2-2i)^7 = 2^{10}\sqrt{2}\left(\cos\left(\frac{3\pi}{4}\right) + i\sin\left(\frac{3\pi}{4}\right)\right)$

$a = |z|\cos(\theta) = 2^{10}\sqrt{2}\cos\left(\frac{3\pi}{4}\right) = -1024$

$b = |z|\sin(\theta) = 2^{10}\sqrt{2}\sin\left(\frac{3\pi}{4}\right) = 1024$.

$z_1 = a + ib$

$= -1024 + 1024i$