

1.5.3 Écrire sous forme cartésienne ($z = a + ib$) les nombres complexes suivants :

a) $w_1 = 2e^{i\frac{\pi}{6}}$

c) $w_3 = e^{-i\frac{\pi}{6}}$

e) $w_5 = \sqrt{3}e^{i\frac{\pi}{4}}$

b) $w_2 = 3e^{-2i\frac{\pi}{3}}$

d) $w_4 = 3e^{i\pi}$

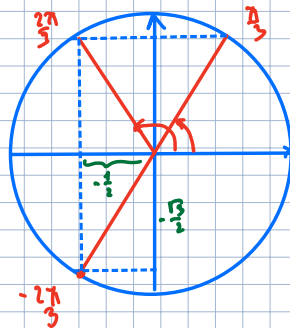
f) $w_6 = e^{i\pi}$

Rappel :

$$z = r \left(\cos(\theta) + i \sin(\theta) \right) = r e^{i\theta}$$

a) $w_1 = 2 e^{i\frac{\pi}{6}} = 2 \left(\cos\left(\frac{\pi}{6}\right) + i \sin\left(\frac{\pi}{6}\right) \right) = 2 \left(\frac{\sqrt{3}}{2} + i \frac{1}{2} \right)$
 $\Rightarrow w_1 = \sqrt{3} + i$

b) $w_2 = 3 e^{-2i\frac{\pi}{3}} = 3 e^{i(-\frac{2\pi}{3})} = 3 \left(\cos\left(-\frac{2\pi}{3}\right) + i \sin\left(-\frac{2\pi}{3}\right) \right)$
 $= 3 \left(-\frac{1}{2} + i \left(-\frac{\sqrt{3}}{2}\right) \right) = -\frac{3}{2} - \frac{3\sqrt{3}}{2} i$
 $\Rightarrow w_2 = -\frac{3}{2} - \frac{3\sqrt{3}}{2} i$



c) $w_3 = e^{-i\frac{\pi}{6}} = \cos\left(-\frac{\pi}{6}\right) + i \sin\left(-\frac{\pi}{6}\right) = \frac{\sqrt{3}}{2} + i \left(-\frac{1}{2}\right)$
 $\Rightarrow w_3 = \frac{\sqrt{3}}{2} - \frac{i}{2}$

d) $w_4 = 3 e^{i\pi} = 3 \left(\cos(\pi) + i \sin(\pi) \right) = 3 (-1 + i \cdot 0) \Rightarrow w_4 = -3$

e) $w_5 = \sqrt{3} e^{i\frac{\pi}{4}} = \sqrt{3} \left(\cos\left(\frac{\pi}{4}\right) + i \sin\left(\frac{\pi}{4}\right) \right) = \sqrt{3} \left(\frac{\sqrt{2}}{2} + i \frac{\sqrt{2}}{2} \right)$
 $\Rightarrow w_5 = \frac{\sqrt{6}}{2} + \frac{\sqrt{6}}{2} i$

f) $w_6 = e^{i\pi} = \cos(\pi) + i \sin(\pi) = -1 + i \cdot 0 \Rightarrow w_6 = -1$