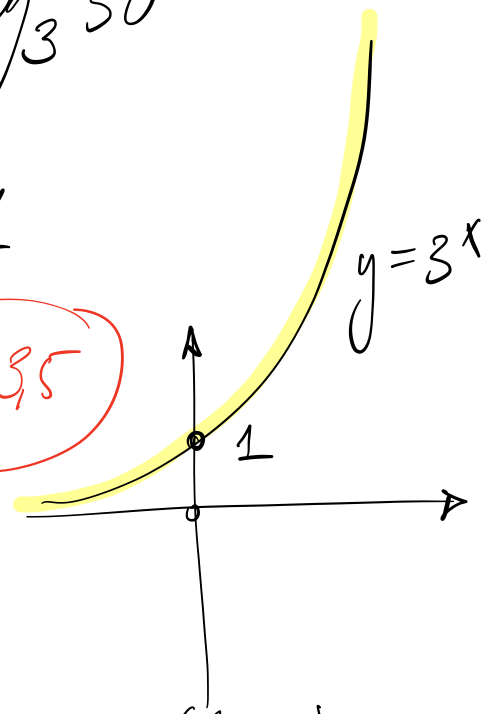
$$3^x = 50 \Leftrightarrow x = \log_3 50$$

$$3^3 = 27 < 50 < 3^4 = 81$$

$$27 \xrightarrow{+23} 50 \xrightarrow{+31} 81$$

$x \simeq 3{,}5$

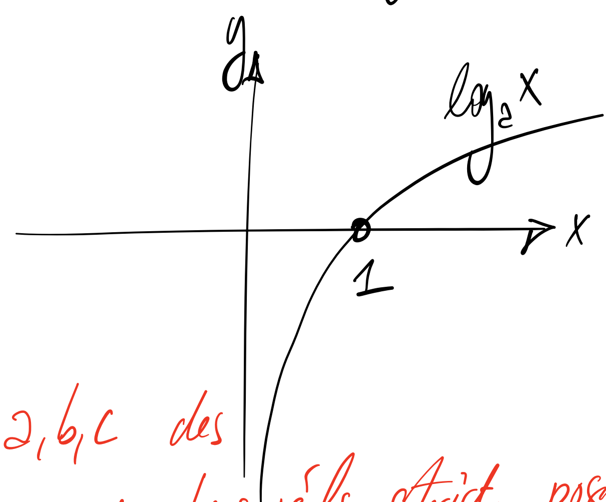


$$2^{(\log_2 x)} = x$$

$$\log_2 2 = 1$$

$$\log_2 (xy) = \log_2 (x) + \log_2 (y)$$

$$\log_2 (x^r) = r \cdot \log_2 x$$



Prop.

$$\log_a b = \frac{\log_c b}{\log_c a}$$

a, b, c des nombres réels strict. positifs et $a, b, c \neq 1$.

preuve:

$$\boxed{\log_a b \cdot \log_c a = \log_c b}$$

$c^{(\ )}$

$$\Leftrightarrow \quad c^{\log_a b \cdot \log_c a} = c^{\log_c b}$$

$$\Leftrightarrow \quad \left(c^{\log_c a}\right)^{\log_a b} = c^{\log_c b} = b$$

$$\Leftrightarrow \quad a^{\log_a b} = b$$

$$\Leftrightarrow \quad b = b$$

CQFD

$$\log_3 50 = \frac{\log_{10} 50}{\log_{10} 3} = \frac{\log_2 50}{\log_2 3}$$

$$\log_3 50 = \frac{\ln(50)}{\ln(3)}$$

$$\ln(x) = \log_e x$$

$$\approx \log_{2{,}718281\ldots} x$$

$$\mathbb{C} = \{a+bi \mid a, b \in \mathbb{R}\}$$

$$\boxed{x^3 - 15x = 4} \iff x^3 + 0x^2 - 15x - 4 = 0$$

	1	0	-15	-4
4		4	16	4
	1	4	1	0

$$(x-4)(x^2+4x+1) = 0$$

$$x = 4 \text{ or } x^2+4x+1 = 0$$

$$\Delta = 16 - 4 = 12$$

$$x = \frac{-4 \pm \sqrt{12}}{2}$$

$$x^3 - 15x = 4$$

1
1 1
1 2 1
1 3 3 1

$$x = u+v$$

$$(u+v)^3 - 15(u+v) = 4$$

$$u^3 + \boxed{3u^2v + 3uv^2} + v^3 - 15(u+v) = 4$$

$$u^3 + v^3 + 3uv(u+v) - 15(u+v) = 4$$

$$u^3+v^3+(u+v)\boxed{(3uv-15)}=4 \quad \Leftrightarrow \quad x^3-15x=4$$

Si $3uv-15=0$, alors $u^3+v^3=4$ et l'éq. est satisfaite.

$$\begin{cases} u^3+v^3=4 \\ 3uv=15 \end{cases} \qquad \begin{cases} u^3+v^3=4 \\ uv=5 \end{cases}$$

$$\begin{cases} u^3+v^3=4 \\ u^3v^3=125 \end{cases} \qquad \begin{cases} a+b=4 \\ a\cdot b=125 \end{cases} \qquad b=4-a$$

$$a(4-a)=125$$

$$a^2-4a+125=0$$

$$a=\frac{4\pm\sqrt{16-500}}{2}=\frac{4\pm\sqrt{-484}}{2}$$

$$-484=(22i)^2$$

$$a=\frac{4\pm 22i}{2}$$

$$=2\pm 11i$$

$$\boxed{\begin{aligned} a&=2+11i \\ b&=2-11i \end{aligned}}$$

$$u^3 = 2+11i = (2+i)^3 \Rightarrow u = 2+i$$

$$v^3 = 2-11i = (2-i)^3 \Rightarrow v = 2-i$$

$$(2+i)^3 = (4+4i+i^2)(2+i)$$

$$= (3+4i)(2+i) = 6+3i+8i-4$$

$$= 2+11i$$

$$\Rightarrow u+v = (2+i)+(2-i) = 4$$

$\boxed{1.1.9}$ $\quad z = x + iy$

$$a z^2 + bz + c = 0 \qquad a, b, c \in \mathbb{R}$$

car z est solution.

$$a(\bar{z})^2 + b\bar{z} + c = 0$$

$$a\left((x-iy)^2\right) + b(x-iy) + c = 0$$

$$a(x^2-y^2-2xyi) + (bx - i(by)) + c = 0$$

$$a\underbrace{\left((x^2-y^2) + (-2xy)i\right)}_{\overline{(z^2)}} + \overline{bz} + c = 0$$

$$z^2 = (x^2-y^2) + 2xy\,i$$

$$a\overline{\left((x^2-y^2) + 2xyi\right)} + \overline{bz} + c = 0$$

$$a \cdot \overline{(z^2)} + \overline{bz} + c = 0$$

$$\overline{az^2} + \overline{bz} + c = 0$$

$c \in \mathbb{R}$

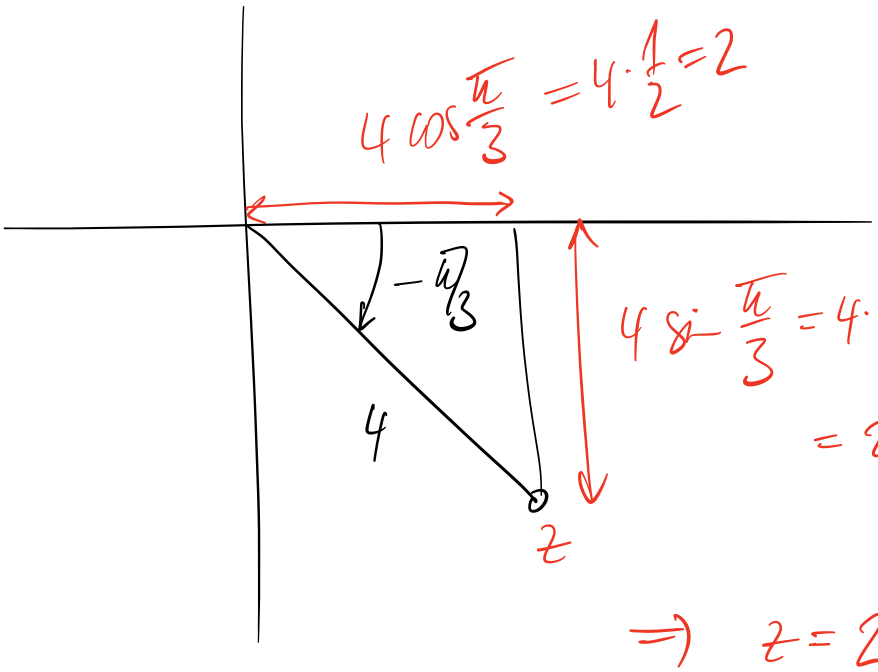
$\Rightarrow \bar{c} = c$

$$\overline{az^2} + \overline{bz} + \bar{c} = 0$$

$$\underbrace{\overline{(az^2 + bz + c)}}_{=0} = 0$$

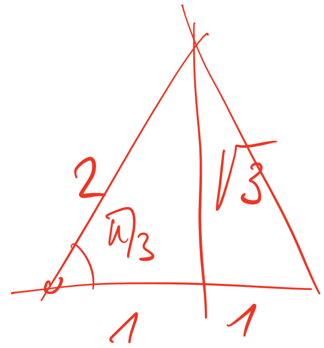
CQFD

$$[4; -\pi/3]$$



$$4\cos\frac{\pi}{3} = 4\cdot\frac{1}{2} = 2$$

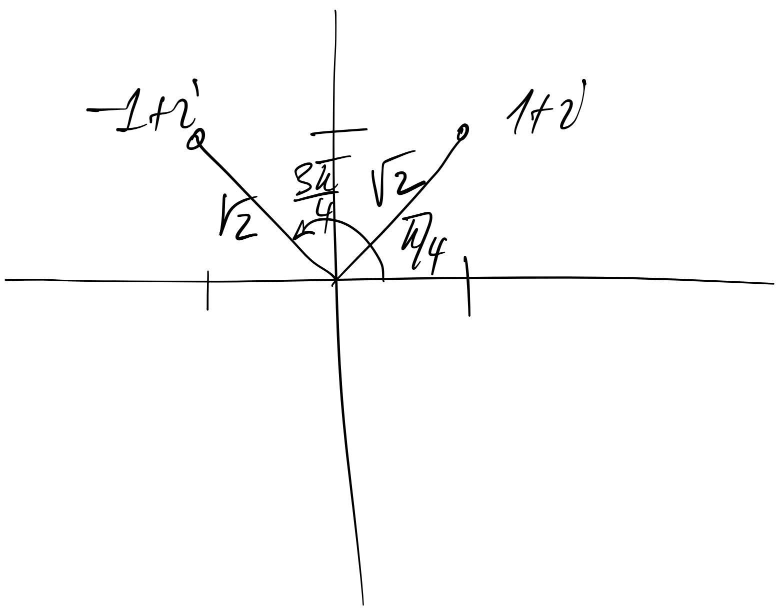
$$4\sin\frac{\pi}{3} = 4\cdot\frac{\sqrt{3}}{2} = 2\sqrt{3}$$



$$\cos\frac{\pi}{3} = \frac{1}{2}$$

$$\Rightarrow \quad z = 2 - 2\sqrt{3}\cdot i$$

$$(-1+i)(1+i) =$$



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

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

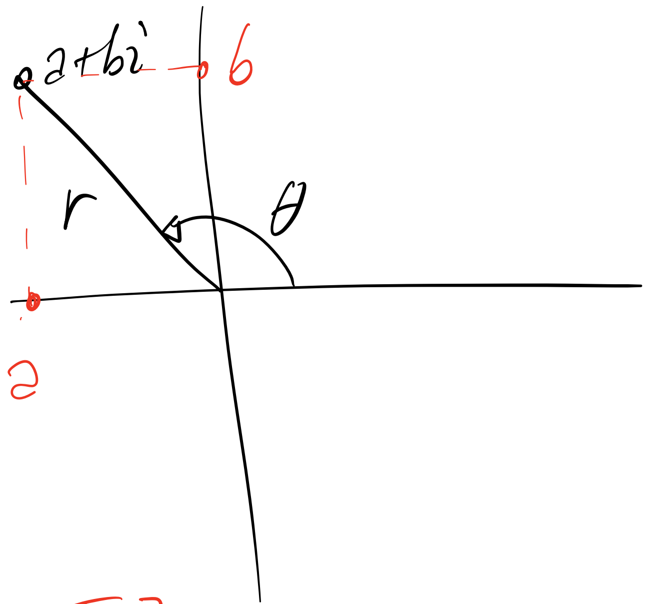
$$[2; \pi] = -2$$

$$\left[\sqrt{2}; \frac{3\pi}{4}\right] \div \left[\sqrt{2}; \frac{\pi}{4}\right] = \left[\frac{\sqrt{2}}{\sqrt{2}}; \frac{3\pi}{4} - \frac{\pi}{4}\right]$$

$$= \left[1; \frac{\pi}{2}\right] = i$$

$z = a + bi$

$z = [r; \theta]$



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