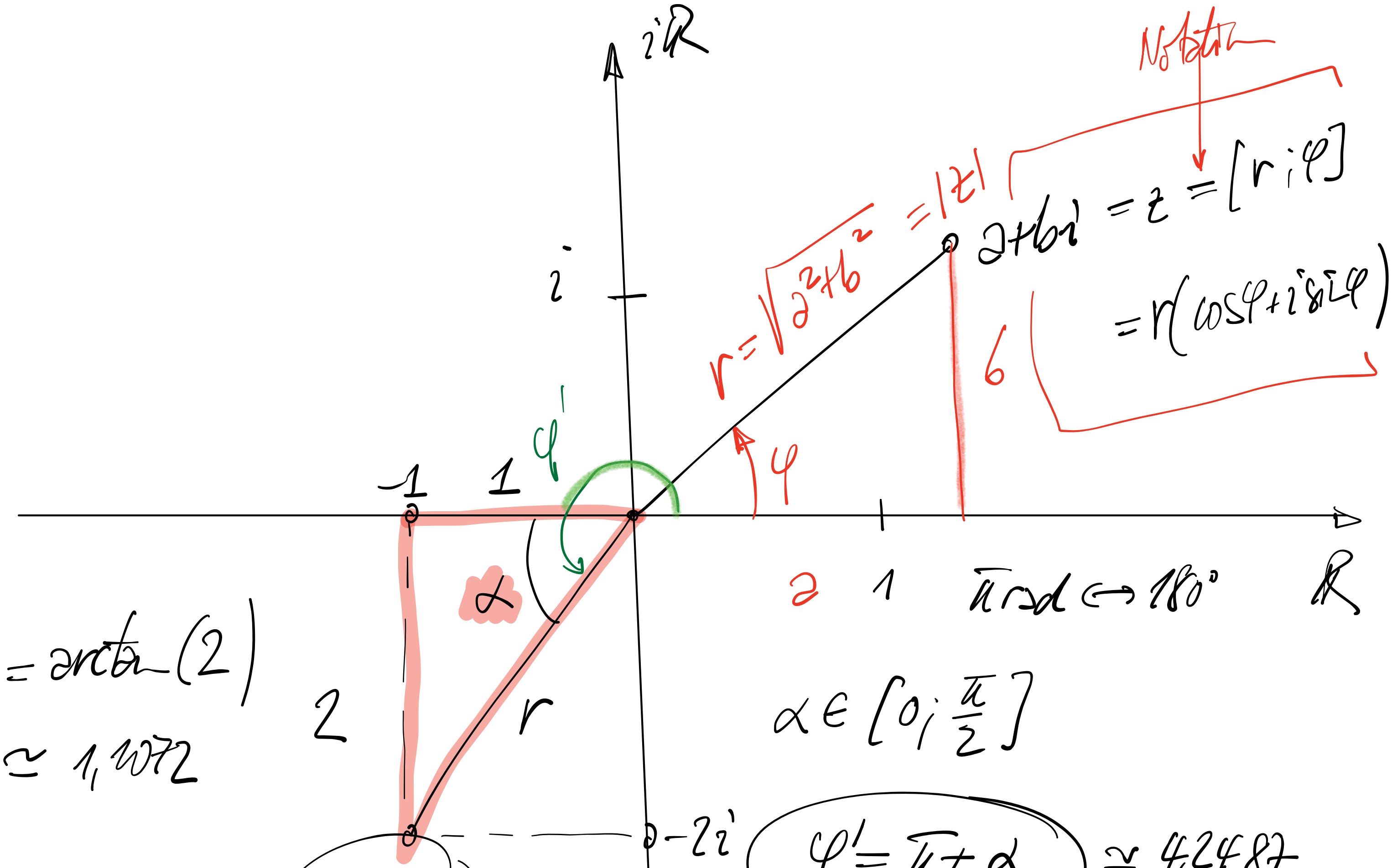


Notation

$a+bi = z = [r; \varphi]$

$= r(\cos\varphi + i\sin\varphi)$

$\pi \text{ rad} \leftrightarrow 180°$

$\alpha = \arctan(2)$

$\simeq 1{,}1072$

$\alpha \in [0; \frac{\pi}{2}]$

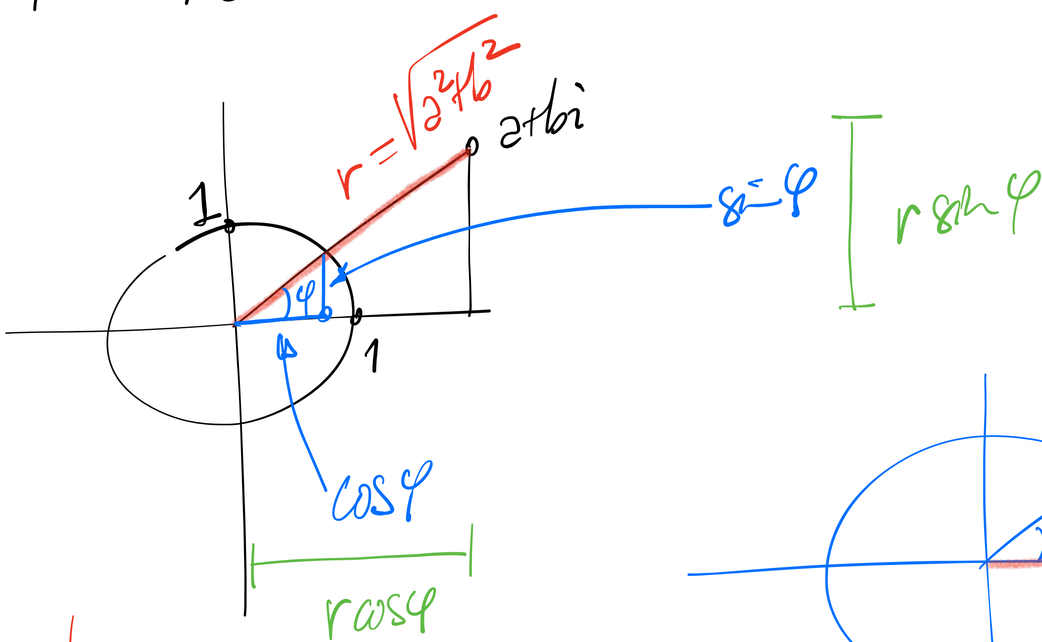
$r = \sqrt{(-1)^2+(-2)^2}$

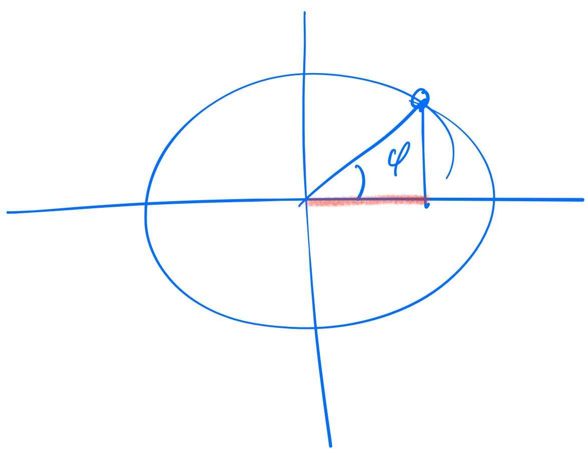
$= \sqrt{1+4} = \sqrt{5}$

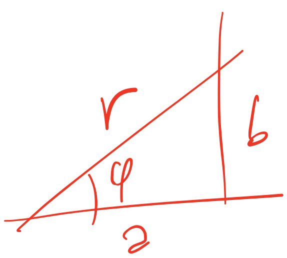
$\varphi' = \pi + \alpha \simeq 4{,}2487$

$\Rightarrow -1-2i \cong \sqrt{5}(\cos 4{,}25 + i\sin 4{,}25)$

rad





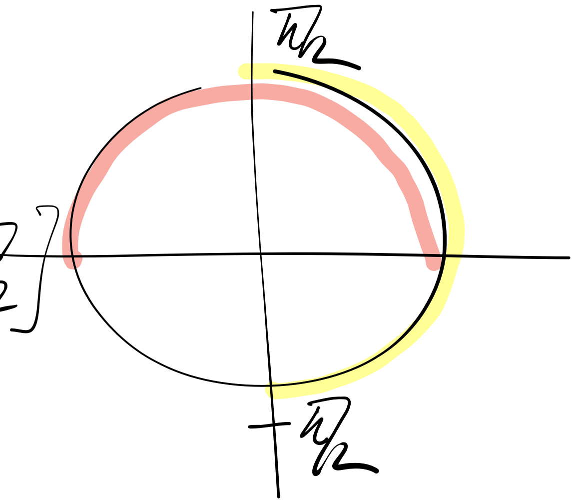


$\cos\varphi = \frac{a}{r}$

$\sin\varphi = \frac{b}{r}$

$\sin : \mathbb{R} \longrightarrow [-1;1]$

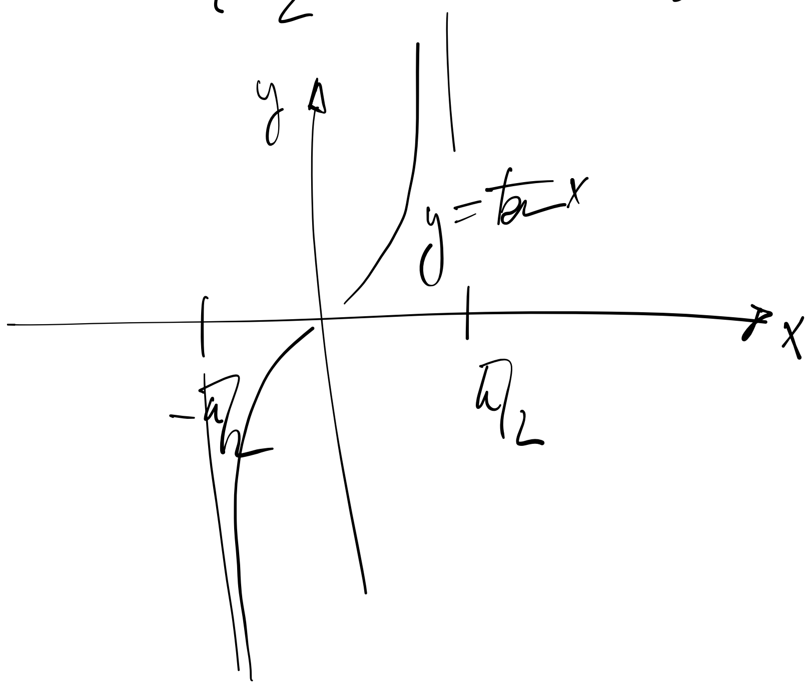
$\arcsin : [-1;1] \longrightarrow [-\frac{\pi}{2}; \frac{\pi}{2}]$

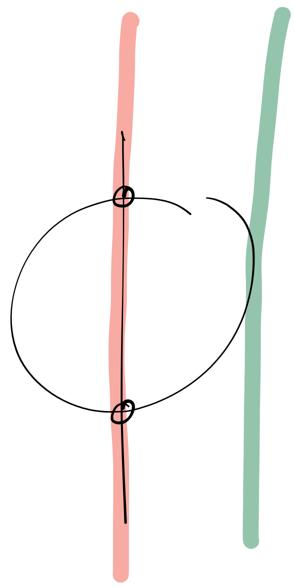


$\cos : \mathbb{R} \longrightarrow [-1;1]$

$\arccos : [-1;1] \longrightarrow [0;\pi]$

$\tan : \mathbb{R} - \{ \frac{\pi}{2} + k\pi \,/\, k \in \mathbb{Z} \} \longrightarrow \mathbb{R}$





$\arctan : \mathbb{R} \longrightarrow [-\pi/2 ; \pi/2]$

$a+bi \longleftrightarrow r(\cos\varphi + i\sin\varphi) = [r; \varphi]$

Interpret?

$(\cos\varphi_1 + i\sin\varphi_1)(\cos\varphi_2 + i\sin\varphi_2) \overset{?}{=}$

$[1; \varphi_1] \cdot [1; \varphi_2] \overset{?}{=}$

1.1.7 $\quad z = x+iy$

$a+bi$

$$\Im(\bar{z}+1) = \Im(x-iy+1) = \Im((x+1)+i(-y))$$

partie imaginaire: b

partie réelle: a

$$= -y$$

$$\Rightarrow 2\,\Im(\bar{z}+1) = -2y$$

$$\Re(-z+2) = \Re(-x-iy+2)$$

$$= \Re((2-x)+i\cdot(-y))$$

$$= 2-x$$

$\Im : \mathbb{C} \to \mathbb{R}$

$a+bi \mapsto b$

$\Re : \mathbb{C} \to \mathbb{R}$

$a+bi \mapsto b$

$z_1 = a_1 + b_1 \cdot i$

$z_2 = a_2 + b_2 \cdot i$

$z_1 + z_2 = (a_1 + a_2) + (b_1 + b_2) i$

$\overline{z_1 + z_2} = (a_1 + a_2) - (b_1 + b_2) i$

$= a_1 - b_1 i + a_2 - b_2 i = \overline{z_1} + \overline{z_2}$

$\overline{(\lambda z)} = \lambda \overline{z} \qquad \lambda \in \mathbb{R}$

$\overline{z_1 \cdot z_2} \stackrel{?}{=} \overline{(a_1 a_2 - b_1 b_2) + (a_1 b_2 + a_2 b_1) i} = \overline{(a_1 + b_1 i) \cdot (a_2 + b_2 i)}$

$= (a_1 a_2 - b_1 b_2) - (a_1 b_2 + a_2 b_1) i$

$\overline{z_1} \cdot \overline{z_2} = (a_1 - b_1 i)(a_2 - b_2 i) = (a_1 a_2 - b_1 b_2) - (a_1 b_2 + a_2 b_1) i$

$\Rightarrow \overline{z_1 \cdot z_2} = \overline{z_1} \cdot \overline{z_2}$

$$\overline{\left(\frac{z_1}{z_2}\right)} = \frac{\overline{z_1}}{\overline{z_2}}$$

<u>Prop.</u> $[r_1 ; \varphi_1] \cdot [r_2 ; \varphi_2] = [r_1 r_2 ; \varphi_1 + \varphi_2]$ ← direct

$[r ; \varphi]^n = [r^n ; n\varphi]$ ← Par réc. sur n

<u>preuve</u>: