

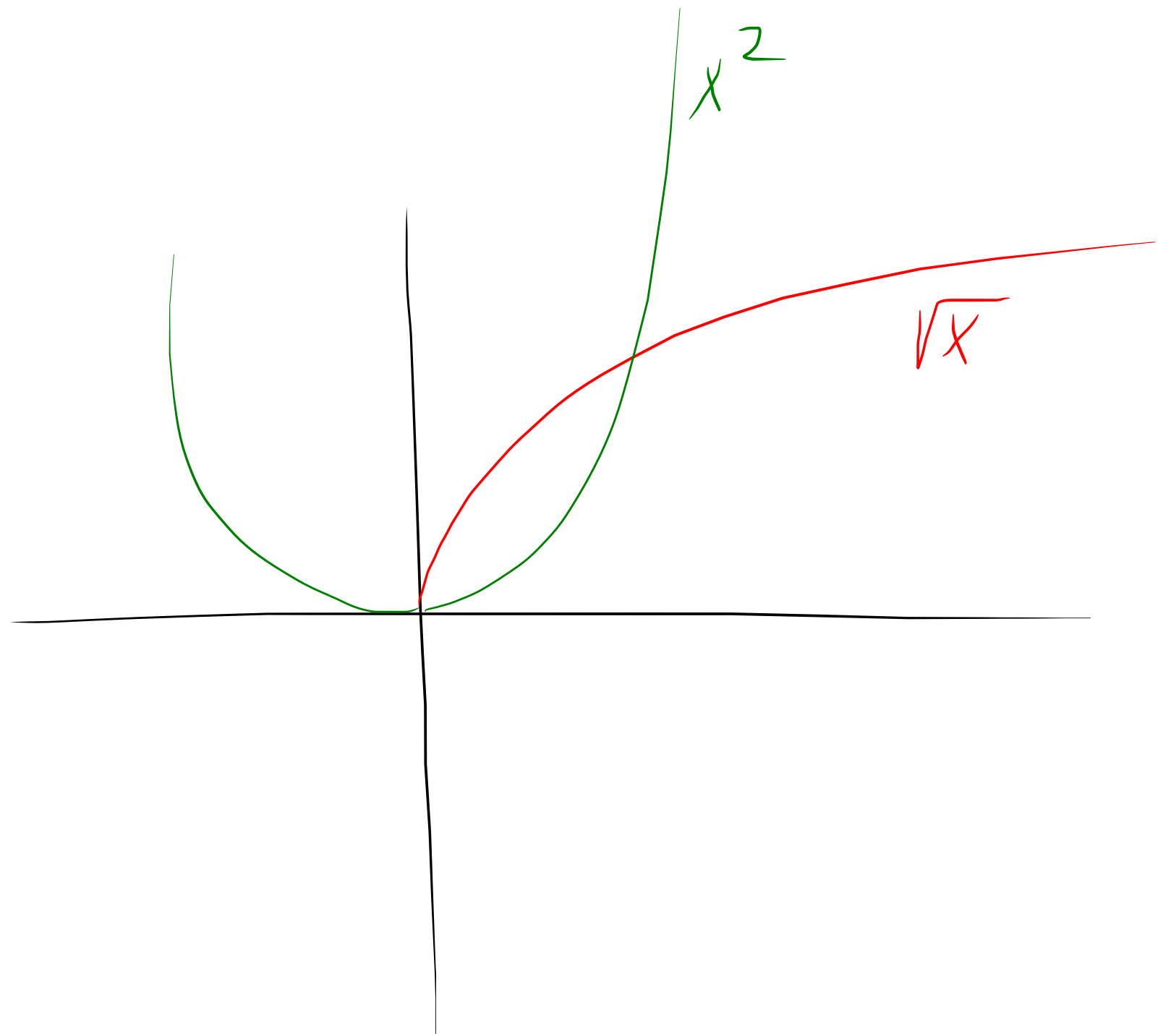
16

$$x^2 = 16$$

$$x = \pm \sqrt{16} = \pm 4$$

$$\sqrt{} : \mathbb{R}_+ \longrightarrow \mathbb{R}_+$$

$$x \longmapsto \sqrt{x}$$



$$z = 1 + 2i \in \mathbb{C}$$

$$w \in \mathbb{C} \text{ tq. } w^2 = z$$

$$w^2 = 1 + 2i$$

$$w = a + bi$$

$$b^2 i^2 = -b^2$$

$$w^2 = (a + bi)^2 = a^2 + 2abi + (bi)^2$$

$$= a^2 - b^2 + 2ab i$$

$$= \underbrace{(a^2 - b^2)}_{\text{Re}(w^2)} + \underbrace{(2ab)}_{\text{Im}(w^2)} i$$

$$(a^2 - b^2) + (2ab) i = 1 + 2i$$



$$|x + iy| = \sqrt{x^2 + y^2}$$

$$\Leftrightarrow \begin{cases} a^2 - b^2 = 1 \\ 2ab = 2 \end{cases} \quad a, b \in \mathbb{R}$$

$$w = a + bi$$

De plus,

$$w^2 = 1 + 2i \Rightarrow |w^2| = |1 + 2i| \quad |w| = \sqrt{a^2 + b^2}$$

$$|w|^2 = \sqrt{1^2 + 2^2} = \sqrt{5}$$

$$(\sqrt{a^2 + b^2})^2 = \sqrt{5}$$

$$a^2 + b^2 = \sqrt{5}$$

$$\text{Finalement: } \begin{cases} a^2 - b^2 = 1 \\ a^2 + b^2 = \sqrt{5} \\ 2ab = 2 \end{cases} \quad 2a^2 = 1 + \sqrt{5}$$

$$a^2 = \frac{1 + \sqrt{5}}{2}$$

$$b = \frac{1}{a}$$

$$a = \pm \sqrt{\frac{1 + \sqrt{5}}{2}}$$

$$b = \pm \sqrt{\frac{2}{1 + \sqrt{5}}}$$

$$\Rightarrow w = \pm \left(\sqrt{\frac{1 + \sqrt{5}}{2}} + \sqrt{\frac{2}{1 + \sqrt{5}}} i \right)$$