

REPETITION 24/08

Complex numbers \mathbb{C}

$$z = a + ib \quad a, b \in \mathbb{R}$$

$$i^2 = -1$$

$$\begin{array}{ccc} & \uparrow & \uparrow \\ & a = \operatorname{Re}(z) & \operatorname{Im}(z) = b \end{array}$$

Addition :

$$z + w = \operatorname{Re}(z) + \operatorname{Re}(w) + i \left(\operatorname{Im}(z) + \operatorname{Im}(w) \right)$$

Multiplication :

$$z \cdot w = \operatorname{Re}(z)\operatorname{Re}(w) - \operatorname{Im}(z)\operatorname{Im}(w) + i \left(\operatorname{Re}(z)\operatorname{Im}(w) + \operatorname{Im}(z)\operatorname{Re}(w) \right)$$

Division :

$$\frac{1}{z} = \frac{\operatorname{Re}(z) - i\operatorname{Im}(z)}{\operatorname{Re}(z)^2 + \operatorname{Im}(z)^2}$$

Remark : Complex numbers can be viewed as pairs

$$a + ib \in \mathbb{C} \quad \longleftrightarrow \quad (a, b) \in \mathbb{R}^2$$