

Complex Numbers in Normal Form

$$z = x + iy, i^2 = -1, x = \operatorname{Re} z, y = \operatorname{Im} z$$

Operations $z_1 = x_1 + iy_1, z_2 = x_2 + iy_2$

$$z_1 + z_2 = (x_1 + x_2) + i(y_1 + y_2)$$

$$z_1 z_2 = (x_1 x_2 - y_1 y_2) + i(x_1 y_2 + x_2 y_1)$$

$$\frac{z_1}{z_2} = \frac{(x_1 + iy_1)(x_2 - iy_2)}{(x_2 + iy_2)(x_2 - iy_2)}$$

Complex Conjugate Numbers

$$z = x + iy, \bar{z} = x - iy$$

$$z \bar{z} = x^2 + y^2 = |z|^2$$

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

Triangle Inequality

$$|z_1 + z_2| \leq |z_1| + |z_2|$$