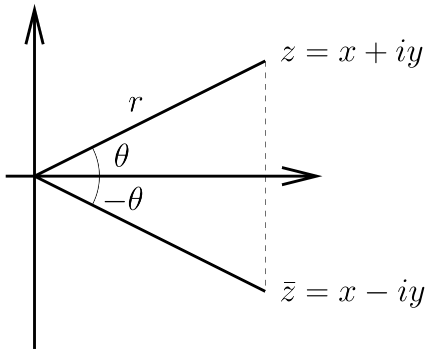
Komplekse tall



$$z = x + iy, \quad i^2 = -1$$
$$x = \text{Re } z, \quad y = \text{Im } z$$
$$z_1 + z_2 = (x_1 + x_2) + i(y_1 + y_2)$$
$$z_1 \cdot z_2 = (x_1 + iy_1)(x_2 + iy_2) = \cdots$$
$$\frac{z_1}{z_2} = \frac{(x_1 + iy_1)(x_2 - iy_2)}{(x_2 + iy_2)(x_2 - iy_2)} = \cdots$$

Kompleks konjugert

$$z = x + iy, \quad \bar{z} = x - iy,$$
$$z\bar{z} = x^2 + y^2 = |z|^2, \quad \text{Re } z = \frac{1}{2}(z + \bar{z}), \quad \text{Im } z = \frac{1}{2i}(z - \bar{z})$$

Polarform

$$x = r\cos\theta, \quad y = r\sin\theta$$
$$r = |z| = \sqrt{x^2 + y^2}$$
$$\theta = \arg z, \quad \tan\theta = \frac{y}{x}, \quad -\pi < \text{Arg } z \leq \pi$$
$$\theta = \arctan\frac{y}{x}, \quad \text{for } z \text{ i 1. og 4. kvadrant, } (-\frac{\pi}{2} < \theta < \frac{\pi}{2})$$
$$\theta = \arctan\frac{y}{x} + \pi, \quad \text{for } z \text{ i 2. og 3. kvadrant, } (\frac{\pi}{2} < \theta < \frac{3\pi}{2})$$
$$z = x + iy = r(\cos\theta + i\sin\theta) = re^{i\theta}$$

$$\text{Eulers formel:} \quad e^{i\theta} = \cos\theta + i\sin\theta$$