

## Additionstestfall

$$z_1 := 3 - 4i, \quad z_2 := (-6) + 8i$$

$$\begin{aligned} z_1 + z_2 &= (3 - 4i) + (-6 + 8i) \\ \Leftrightarrow &= 3 - 6 - 4i + 8i \\ \Leftrightarrow &= \underbrace{3}_{\text{real}} + \underbrace{4i}_{\text{imaginäre}} \end{aligned}$$

## Subtraktions testfall

seien  $z_1$  &  $z_2$  wie im Additions t.f.

$$\begin{aligned} z_1 - z_2 &= (3 - 4i) - (-6 + 8i) \\ \Leftrightarrow &= 3 - 4i - (-6) - 8i \\ \Leftrightarrow &= 3 + 6 - 4i - 8i \\ \Leftrightarrow &= \underbrace{9}_{\text{real}} - \underbrace{12i}_{\text{imaginäre}} \end{aligned}$$

## Multplikations testfall

seien  $z_1$  &  $z_2$  wie im Additions t.f.

$$\begin{aligned} z_1 \cdot z_2 &= (3 - 4i) \cdot (-6 + 8i) \\ \Leftrightarrow &= 3 \cdot (-6 + 8i) + (-4i) \cdot (-6 + 8i) \\ \Leftrightarrow &= 18 - 18 + 24i + 24i - 32i^2 \\ \Leftrightarrow &= -18 + 32 + 48i \\ \Leftrightarrow &= \underbrace{14}_{\text{real}} + \underbrace{48i}_{\text{imaginäre}} \end{aligned}$$

## Divisions test fall

seien  $z_1$  &  $z_2$  wie im Additions t.f.

$$\frac{z_1}{z_2} = \frac{3 - 4i}{-6 + 8i}$$

$$\Leftrightarrow = \frac{(3 - 4i) \cdot (-6 - 8i)}{(-6 + 8i) \cdot (-6 - 8i)}$$

$$\Leftrightarrow = \frac{3 \cdot (-6 - 8i) - 4i \cdot (-6 - 8i)}{-6 \cdot (-6 - 8i) + 8i \cdot (-6 - 8i)}$$

$$\Leftrightarrow = \frac{-18 - 24i + 24i + 32i^2}{36 - 48i + 48i - 64i^2}$$

$$\Leftrightarrow = \frac{-18 - 32}{36 + 64}$$

$$\Leftrightarrow = \frac{-50}{100}$$

$$\Leftrightarrow = \underbrace{-0,5}_{\text{real}} \quad \underbrace{+ 0,0i}_{\text{imaginäre}}$$