

The Equality of Complex Numbers

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$$a, b, c, d \in \mathbb{R}$$

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$$a, b, c, d \in \mathbb{R}$$
$$a + bi = c + di$$

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$$\begin{aligned} a, b, c, d &\in \mathbb{R} \\ a + bi = c + di &\Leftrightarrow a = c, \end{aligned}$$

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proof

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$$a, b, c, d \in \mathbb{R}$$

$$a + bi = c + di \Leftrightarrow a = c, b = d$$

proof

$$a + bi = c + di$$

$$a - c = (d - b)i$$

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$$a + bi = c + di \Leftrightarrow a = c, b = d$$

proof

$$\begin{aligned} a + bi &= c + di \\ a - c &= (d - b)i \\ (a - c)^2 &= (d - b)^2 i^2 \end{aligned}$$

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$$\begin{aligned} a + bi &= c + di \\ a - c &= (d - b)i \\ (a - c)^2 &= (d - b)^2 i^2 \\ (a - c)^2 &= -(d - b)^2 \end{aligned}$$

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$$\begin{aligned} a + bi &= c + di \\ a - c &= (d - b)i \\ (a - c)^2 &= (d - b)^2 i^2 \\ (a - c)^2 &= -(d - b)^2 \\ (a - c)^2 + (d - b)^2 &= 0 \end{aligned}$$

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$$a + bi = c + di \Leftrightarrow a = c, b = d$$

proof

$$\begin{aligned}a + bi &= c + di \\a - c &= (d - b)i \\(a - c)^2 &= (d - b)^2 i^2 \\(a - c)^2 &= -(d - b)^2 \\(a - c)^2 + (d - b)^2 &= 0 \\a - c = 0 &, d - b = 0 \\a = c &, b = d\end{aligned}$$