

Arithmetic Operations of Complex Numbers

The operations on arithmetic numbers are intuitive in nature.

Addition

$$\begin{aligned}(2 + 3i) + (-1 + 2i) &= (2 - 1) + (3i + 2i) \\ &= 1 + 5i\end{aligned}$$

Subtraction

$$(2 + 3i) - (-1 + 2i) = 3 + i$$

Multiplication

$$\begin{aligned}(2 + 3i)(-1 + 2i) &= -2 + 4i - 3i - 6 \\ &= -8 + i\end{aligned}$$

Division

Similar to [rationalizing the denominator](#) for fractions involving radicals, we can multiply both numerator and denominator by the conjugate of the latter.

$$\begin{aligned}\frac{2 + 3i}{-1 + 2i} &= \frac{(2 + 3i)(-1 - 2i)}{(-1 + 2i)(-1 - 2i)} \\ &= \frac{-2 - 7i + 6}{1 + 4} \\ &= \frac{4 - 7i}{5} \\ &= \frac{4}{5} - \frac{7}{5}i\end{aligned}$$