

Algebra 2 - Complex Numbers: Adding, Subtracting and Multiplying - Worksheet

Common Core N-CN.A.1, N-CN.A.2 · maths-pdf.fr/en/

Name: _____ Class: _____ Date: ____/____/____

These 20 problems practice adding, subtracting and multiplying complex numbers (Common Core N-CN.A.1 and N-CN.A.2). The first problems check square roots of negative numbers and powers of i , the middle problems add sums, differences, and products of binomials, and the last six are word problems and multi-step tasks that need voltage and impedance, checking solutions, and unknown coefficients.

Work in order and show every step. Write each answer in simplest form, and open the answer key only after you have tried the problem yourself.

Algebra 2 · Common Core State Standards: **N-CN.A.1, N-CN.A.2**

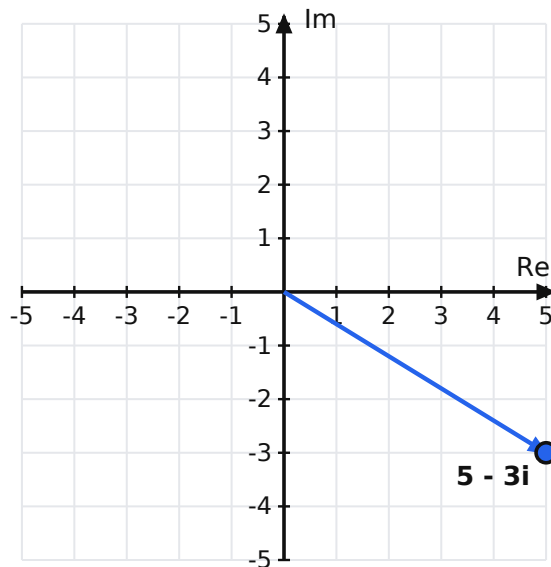
Exercise 1 - Square root of a negative

Simplify $\sqrt{-49}$.

Exercise 2 - Radical with a factor

Write $\sqrt{-18}$ in the form $b i$, with the radical in simplest form.

Exercise 3 - Real and imaginary parts



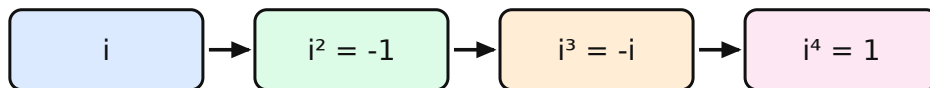
The point $5 - 3i$.

Identify the real part and the imaginary part of $5 - 3i$.

Exercise 4 - Power of i

Evaluate i^7 .

Exercise 5 - Large power of i



The powers of i repeat in a cycle of length 4.

Use the cycle to evaluate i^{58} .

Exercise 6 - Add complex numbers

Add: $(3 + 5i) + (2 - 9i)$.

Exercise 7 - Subtract complex numbers

Subtract: $(7 - 2i) - (4 - 6i)$.

Exercise 8 - Multiply by i

Multiply: $3i(2 - 5i)$.

Exercise 9 - Multiply two binomials

	4	-1i
2	8	-2i
3i	12i	-3i ² = 3

Four partial products for the product.

Multiply: $(2+3i)(4-i)$.

Exercise 10 - Product with a conjugate pair

Multiply: $(5+2i)(5-2i)$.

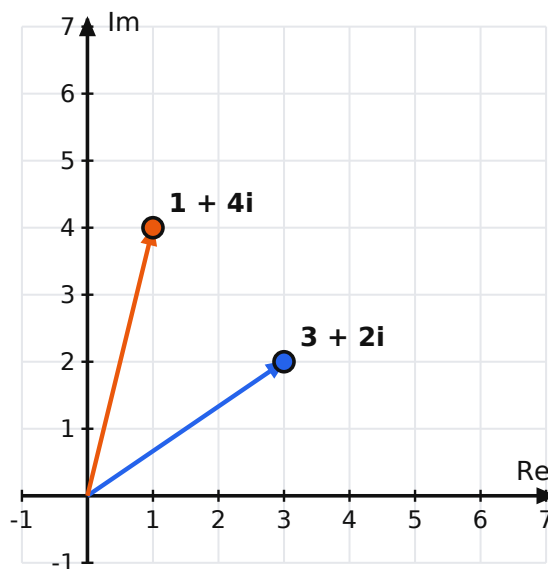
Exercise 11 - Square a complex number

Expand: $(3-4i)^2$.

Exercise 12 - Plot complex numbers

Plot $2-3i$ and $-4+i$ on a complex plane and state the coordinates of each point.

Exercise 13 - Add as vectors



Two complex numbers.

Find the sum of the two complex numbers shown and give the coordinates of the sum.

Exercise 14 - Solve with imaginary roots

Solve $x^2 + 25 = 0$ over the complex numbers.

Exercise 15 - Mixed powers

Simplify $2i^3 + 5i^2 - i^4$.

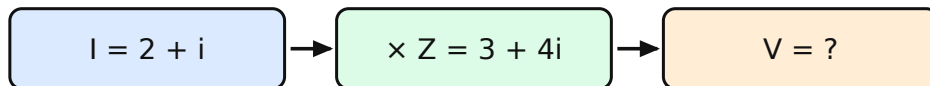
Exercise 16 - Fourth power

Evaluate $(1+i)^4$ by squaring twice.

Exercise 17 - Series circuit

In an AC circuit, two components have impedances $Z_1 = 3 + 4i$ ohms and $Z_2 = 5 - i$ ohms. In a series circuit the total impedance is the sum. Find the total impedance.

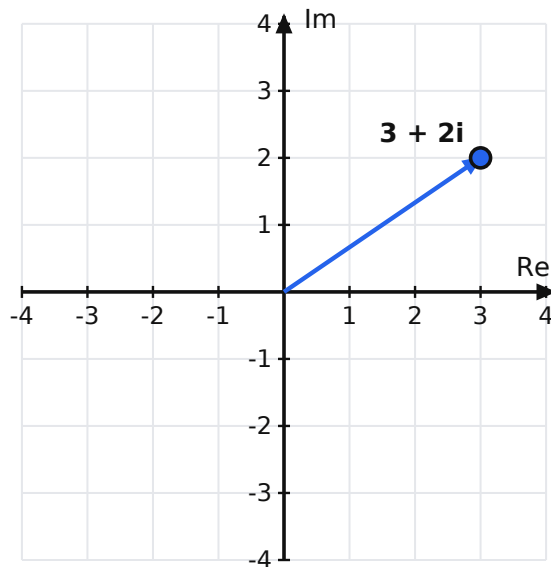
Exercise 18 - Voltage from current



Voltage = current $\times$ impedance.

A circuit has current $I = 2 + i$ amps and impedance $Z = 3 + 4i$ ohms. Voltage is $V = IZ$. Calculate the voltage.

Exercise 19 - Rotation by i



The point $3 + 2i$.

Multiply $3+2i$ by i and plot both numbers. Describe what multiplying by i does to the point.

Exercise 20 - Make a real product

Find the value of k so that $(2+3i)(1+ki)$ is a real number.

Exercise 21 - Find a square root

Find real numbers a and b with $(a+bi)^2 = -5+12i$, given $a > 0$.