

Algebra 2 - Complex Conjugates and Complex Solutions - Worksheet

Common Core N-CN.A.3, N-CN.C.7 · maths-pdf.fr/en/

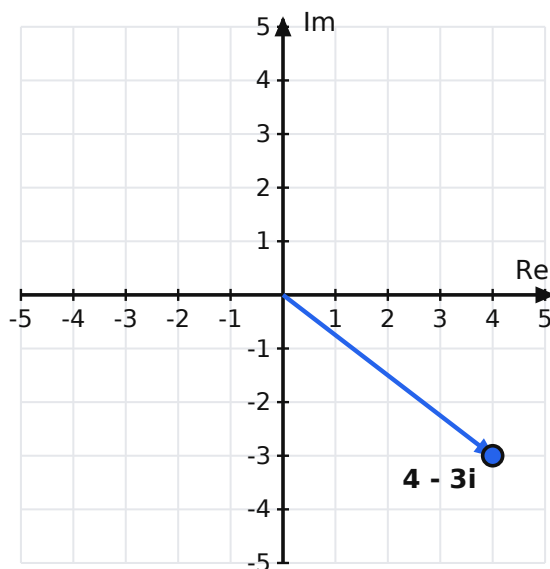
Name: _____ Class: _____ Date: ____/____/____

These 20 problems practice complex conjugates, division and complex solutions (Common Core N-CN.A.3 and N-CN.C.7). The first problems check finding conjugates and moduli, the middle problems add dividing complex numbers and solving quadratics with the formula, and the last six are word problems and multi-step tasks that need circuit impedance, projectile heights, and building equations from roots.

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.3, N-CN.C.7**

Exercise 1 - Find a conjugate



The point $4 - 3i$.

Write the complex conjugate of $4 - 3i$, shown on the plane.

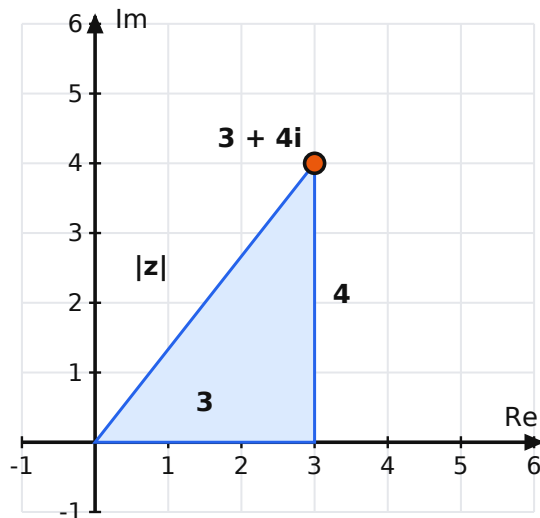
Exercise 2 - Conjugate of an imaginary number

Write the conjugate of $6i$ and of -9 .

Exercise 3 - Product with the conjugate

Find $(3+5i)(3-5i)$.

Exercise 4 - Modulus of $3 + 4i$



The modulus $|z|$ is the length of the hypotenuse: the distance from the origin.

Find the modulus of $3+4i$ using the triangle.

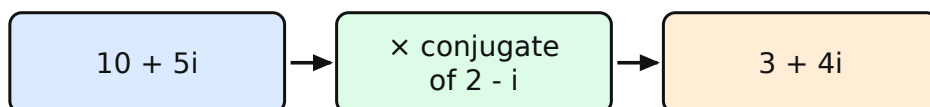
Exercise 5 - Modulus with a radical

Find $|2-4i|$ in simplest radical form.

Exercise 6 - Divide a real number

Divide and write in $a+bi$ form: $\frac{6}{1+i}$.

Exercise 7 - Divide complex numbers



Multiply top and bottom by the conjugate of the denominator.

Divide: $\frac{10+5i}{2-i}$.

Exercise 8 - Divide an imaginary number

Divide: $\frac{5i}{3+i}$.

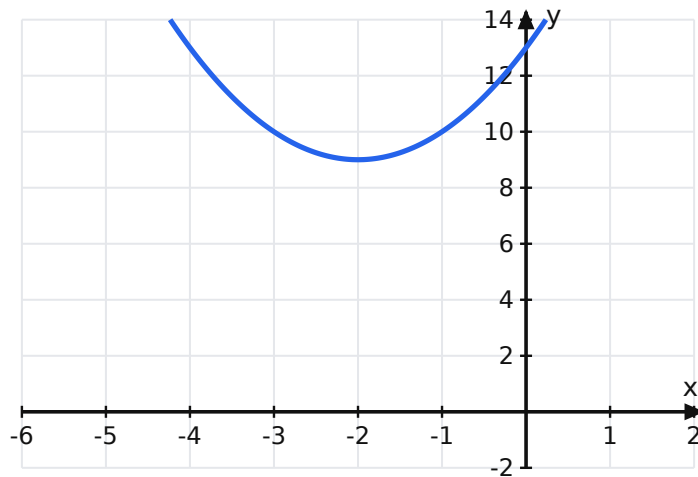
Exercise 9 - Divide with fractions in the answer

Divide: $\frac{3+2i}{1-4i}$.

Exercise 10 - Divide by i

Simplify $\frac{4+3i}{i}$.

Exercise 11 - Complex roots, easy



The graph of $y = x^2 + 4x + 13$ stays above the x-axis.

Solve $x^2 + 4x + 13 = 0$.

Exercise 12 - Complex roots, second

Solve $x^2 - 6x + 10 = 0$.

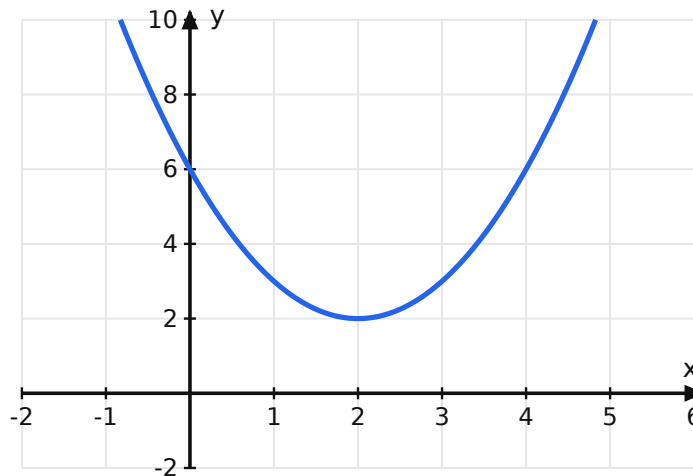
Exercise 13 - Leading coefficient 2

Solve $2x^2 + 2x + 5 = 0$.

Exercise 14 - Pure imaginary roots

Solve $5x^2 + 20 = 0$.

Exercise 15 - Use the graph



Graph of $y = x^2 - 4x + 6$.

State how many real solutions $x^2 - 4x + 6 = 0$ has, then find all complex solutions.

Exercise 16 - Build an equation

Write a quadratic equation with real coefficients whose solutions are $2+3i$ and $2-3i$.

Exercise 17 - Ball that never gets there

A ball is thrown so its height in feet after t seconds is $h = -16t^2 + 32t$. Maya claims the ball reaches 20 feet. Set $h = 20$, use the discriminant to decide, and explain what the result means.

Exercise 18 - Impedance

In an AC circuit, voltage $V = 10 + 20i$ volts drives current $I = 3 + i$ amps. Impedance is $Z = V \div I$. Find Z in ohms.

Exercise 19 - Rationalize

Simplify $\frac{1+2i}{1-2i}$.

Exercise 20 - Iterate

A fractal program starts with $z_0 = 1+i$ and repeats $z_{n+1} = z_n^2 + c$ with $c = -1+2i$. Find z_1 , then find the modulus of z_1 .

Exercise 21 - Second root

A quadratic with real coefficients has one solution $3-2i$. Find the other solution and the

equation $x^2+bx+c=0$.