Algebra 2 4.4

Perform operations with imaginary numbers

Perform operations with complex numbers

radical

simplify by "casting out pairs"

square root property

real number

imaginary unit

pure imaginary numbers

complex numbers

complex conjugate

Quiz 4.3-4.4 Fri.

MCT 4.1-4.4 Tues.

$2+5i$

$2-5i$

$\sqrt{44x^3y^5}$

$2^{\frac{1}{2}}$ y^{11} $y^2x\,2\sqrt{11xy}$ $= 2xy^2\sqrt{11xy}$

whiteboards

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StudyTip

Reading Math Electrical engineers use j as the imaginary unit to avoid confusion with the i for current.

Complex numbers are used with electricity. In these problems, j usually represents the imaginary unit. In a circuit with alternating current, the voltage, current, and impedance, or hindrance to current, can be represented by complex numbers. To multiply these numbers, use the FOIL method.

Real-World Example 6 Multiply Complex Numbers

ELECTRICITY In an AC circuit, the voltage V, current C, and impedance I are related by the formula $V = C \cdot I$. Find the voltage in a circuit with current $2 + 4j$ amps and impedance $9 - 3j$ ohms.

volt = current · I (impedance / resistance)

$V = C \cdot I$

$V = (2+4j)(9-3j)$

$2+4j$

$9-3j$

$-6j \quad 12jj$

$12i^2$

$18+36j$

$18 \quad -12$

$6+30j$

GuidedPractice

$V = C \cdot I$

$V = 120$

6. Find the voltage in a circuit with current $2 - 4j$ amps and impedance $2 - 2j$ ohms.

$120 = (2-4j)(I)$

$$\frac{120}{2-4j} \cdot \frac{2+4j}{2+4j} = \frac{240 + 480j}{20} = \frac{240}{20} + \frac{480j}{20}$$

$12 + 24j$

$4 - 16jj = 4 - 16(-1)$

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