P.6 Complex Numbers

Objectives: 13) I can write a complex number in standard form.

14) I can add/subtract complex numbers.

15) I can multiply complex numbers.

16) I can find the conjugate of a complex number.

17) I can use conjugates to write a complex number in standard form.

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Quick Radical Review

$\sqrt{18}$ $5\sqrt[3]{24}$

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Complex Numbers

$i = \sqrt{-1}$ or $i^2 = -1$

Definition

Complex numbers are numbers of the form $a+bi$, where a and b are real numbers. The real number a is called the real part and the number b is called the imaginary part.

ex. $4 + 5i$

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$\sqrt{-16}$ $\sqrt{-3}$

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Add:

$(4-3i)+(-2+5i)$

$\left(4+\sqrt{-25}\right)+\left(-6-\sqrt{-16}\right)$

Subtract:

$(-3+7i)-(5-4i)$

$\left(3+\sqrt{-12}\right)-\left(-2-\sqrt{-27}\right)$

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Multiply

$4i(3-6i)$

$(2+3i)^2$

$(-2+4i)(3-i)$

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Complex Conjugates

Multiply (What Happens?)

$(4+3i)(4-3i)$

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Write the expression in standard form.

$\frac{1}{3+i}$

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

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$i = \sqrt{-1}$

$i^2 = (\sqrt{-1})^2 = -1$

$i^3 = i^2 \cdot i = -1 \cdot i = -i$

$i^4 = i^2 \cdot i^2 = (-1)(-1) = 1$

$i^5 = i^4 \cdot i = (1)i = i$

$i^6 = i^4 i^2 = (1)(-1) = -1$

$i^7 = i^6 \cdot i = (-1)i = -i$

$i^8 = i^4 i^4 = (1)(1) = 1$

$i^9 = i^8 \cdot i = (1)i = i$

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