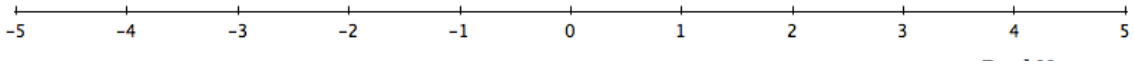
Algebra 2 Name _____
4-8 Complex Number A Date _____ **A#1-2**

Review: Categories of numbers

Natural Numbers	Whole Numbers	Integers	Rational Numbers	Irrational Numbers	Complex Numbers
1, 2, 3…	0, 1, 2, 3…	…-2, -1, 0, 1, …	$\frac{2}{3}, -1.4, -\frac{9}{2}$	$\pi, \phi, \sqrt{5}, -\sqrt{17}$	$\sqrt{-1}, 4i, \ 3-2i$



Real Numbers

Part 1: Define and Graph

Imaginary Numbers

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

Standard form: $a + bi$, $b \neq 0$

Pure imaginary number: bi

Find the pattern

$i^0 =$ $\qquad i^4 =$

$i =$ $\qquad i^5 =$

$i^2 =$ $\qquad i^6 =$

$i^3 =$ $\qquad i^7 =$

Because there are _____ terms in the pattern of exponentiating *i*, we divide the given exponent by _____ and evaluate using the _____.

Simplify each of the following.

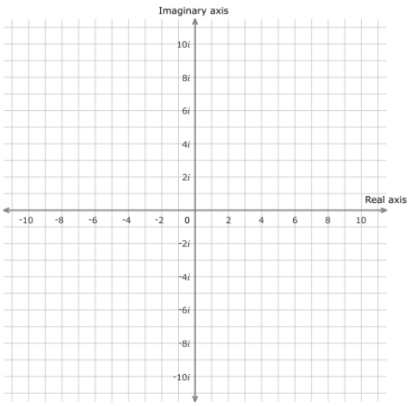
1. i^9 2. $-i^{12}$ 3. i^{23} 4. i^{46}

Graphing Complex Numbers

a. $-4i$ d. $-2-4i$

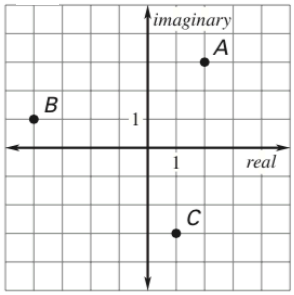
b. $5+8i$ e. $i\sqrt{3}$

c. $-4+3i$ f. $3-2i$



Identify the complex numbers plotted in the complex plane.

5.



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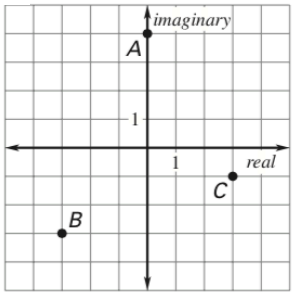

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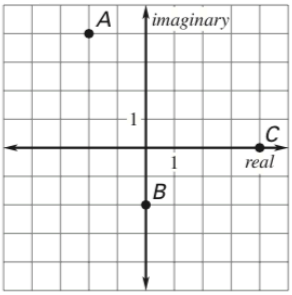

Part 2: Solving equations with complex numbers

Solve the equation.

Example: a. $x^2 + 49 = 0$ **b.** $2(x-2)^2 + 32 = 0$

1. $x^2 = -64$ **2.** $x^2 + 1 = 0$ **3.** $x^2 + 5 = 14$

4. $x^2 = -12$ **5.** $x^2 + 48 = 0$ **6.** $x^2 + 3 = -24$

7. $2x^2 - 9 = 3x^2$ **8.** $x^2 - 16 = 5x^2$ **9.** $11x^2 + 1 = 2x^2$

10. $-2(x + 1)^2 = 72$ **11.** $4(x - 2)^2 = -1$ **12.** $3(x + 5)^2 + 147 = 0$