

12.8 EQ: How do you solve quadratic equations?

$$\sqrt{x^2 = 9}$$

$$x = \pm 3$$

$$\sqrt{x^2 = -9}$$

Nonreal ans? **MODE**

$$= \sqrt{-1} \cdot \sqrt{9} = \pm i \cdot 3 = \pm 3i \rightarrow \text{a+bi}$$

Imaginary Numbers	
$i = \sqrt{-1}$	$i^2 = -1$

Complex number:  $a + bi$

real →

← real

$$5 + 3i$$

$$\sqrt{2} + \sqrt{3}i$$

Write the following as a complex number: 1)  $\sqrt{-9} + 6$

$$\boxed{6 + 3i}$$

2)  $\sqrt{-18} - 7$

$$\boxed{\begin{array}{l} -7 + 4.24i \\ -7 + \sqrt{18}i \end{array}}$$

Add/subtract/multiply complex numbers:

3)  $(5 + 7i) + (-2 + 6i)$

$3 + 13i$

4)  $(8 + 3i) - (2 - 4i)$

$6 + 7i$

5)  $7 - (3 + 2i)$

$4 - 2i$

6)  $(5i)(4i)$

$20i^2$   
 $20(-1)$   
 $-20$

7)  $(2i)(-7i)$

$-14i^2$   
 $-14(-1)$   
 $14$

8)  $(2 + 3i)(-3 + 5i)$

	$-3$	$5i$	
$2$	$-6$	$10i$	
$3i$	$-9i$	$15i^2$	

$-6 + i + 15i^2 - 15$   
 $-21 + i$

9)  $(6 - 5i)(4 + 3i)$

$39 - 2i$

Plot each complex number and find its absolute value.

10)  $-5 + 3i$

11)  $5 - i$

Summary: