Name _____ Date _____ Class _____

LESSON 5-5

Practice B

Complex Numbers and Roots

Express each number in terms of *i*.

1. $\sqrt{-32}$

2. $2\sqrt{-18}$

3. $\sqrt{-\frac{1}{9}}$

Solve each equation.

4. $3x^2 + 81 = 0$

6. $\frac{1}{4}x^2 + 12 = 0$

Find the values of *x* and *y* that make each equation true.

8. $2x - 20i = 8 - (4y)i$

9. $5i - 6x = (10y)i + 2$

Find the zeros of each function.

10. $f(x) = x^2 - 2x + 4$

11. $g(x) = x^2 + 6x + 14$

Find the zeros of each function by using the Quadratic Formula.

3. $h(x) = x^2 - x + 12$

7. $2x^2 + 7 = -4x$

ers and Roots

$3x + 1$ $7i - 1$ $-2i$ $\sqrt{8}$

essing $\sqrt{-1}$? i

are of i? -1

omplex number $a + bi$? a

f the complex number $a + bi$? bi

of i.

7. $3\sqrt{-9}$ — $9i$

8. $-\sqrt{-81}$ — $-9i$

10. $\sqrt{-25}$ — $5i$

11. $3\sqrt{-49}$ — $21i$

bi is $a - bi$. What is the complex ring?

13. $5i$ — $-5i$

14. $2 - 3i$ — $2 + 3i$

equation $x^2 = -25$?

$= \sqrt{-25}$, so $x = 5i$ and $-5i$.

: these roots are correct?

ou could multiply $(x + 5i)(x -$ original expression.

equation $48 + 3x^2 = 0$?

$= \sqrt{-16}$, so $x = 4i$ and $-4i$.

: these roots are correct?

ou could multiply $(x + 4i)(x -$ original expression.

ers and Roots

2. $3x^2 + 14 = -19$

$x = \pm i\sqrt{11}$

4. $g(x) = -2x^2 + 8x - 16$ — $x = 2 \pm 2i$

5. $h(x) = x^2 - 2x + 3$ — $x = 1 \pm i\sqrt{2}$

make each equation true.

7. $-40i + 2x = (5y)i - 12$ — $x = -6, y = -8$

8. $-8y + 14i = (7x)i - 2$ — $x = 2, y = 0.25$

10. $-5i + \frac{12}{5}$ — $\frac{12}{5} + 5i$

11. $-2 - 1.5i$ — $-2 + 1.5i$

LESSON 5-5

Practice B

Complex Numbers and Roots

Express each number in terms of i.

1. $\sqrt{-32}$ — $4i\sqrt{2}$

2. $2\sqrt{-18}$ — $6i\sqrt{2}$

3. $\sqrt{-\frac{1}{9}}$ — $\frac{1}{3}i$

Solve each equation.

4. $3x^2 + 81 = 0$ — $x = \pm 3i\sqrt{3}$

6. $\frac{1}{4}x^2 + 12 = 0$ — $x = \pm 4i\sqrt{3}$

Find the values of x and y that make each equation true.

8. $2x - 20i = 8 - (4y)i$ — $x = 4, y = 5$

9. $5i - 6x = (10y)i + 2$ — $x = -\frac{1}{3}, y = \frac{1}{2}$

Find the zeros of each function.

10. $f(x) = x^2 - 2x + 4$ — $x = 1 \pm i\sqrt{3}$

11. $g(x) = x^2 + 6x + 14$ — $x = -3 \pm i\sqrt{5}$

3. $h(x) = -x^2 - x + 12$ — $x = \frac{1 \pm i\sqrt{47}}{2}$

An **imaginary number** is the square root of a negative number.
Use the definition $\sqrt{-1} = i$ to simplify square roots.

Simplify.

$\sqrt{-25}$

$\sqrt{(25)(-1)}$ *Factor out* -1.

$\sqrt{(25)}\sqrt{-1}$ *Separate roots.*

$5\sqrt{-1}$ *Simplify.*

$5i$ *Express in terms of i.*

$-\sqrt{-48}$

$-\sqrt{(48)(-1)}$ *Factor out* -1.

$-\sqrt{(48)}\sqrt{-1}$ *Separate roots.*

$-\sqrt{16}\sqrt{3}\sqrt{-1}$ *Factor the perfect square.*

$-4\sqrt{3}\sqrt{-1}$ *Simplify.*

$-4i\sqrt{3}$ *Express in terms of i.*

Real Imaginary

Complex numbers are numbers that can be written in the form $a + bi$.