

**LESSON 2.6 Skills Practice**

Name \_\_\_\_\_ Date \_\_\_\_\_

**Now It's Getting Complex . . . But It's Really Not Difficult!**  
**Complex Number Operations**
**2**
**Vocabulary**

Match each term to its corresponding definition.

- |                                       |   |
|---------------------------------------|---|
| 1. the number $i$                     | A. a number in the form $a + bi$ where $a$ and $b$ are real numbers and $b$ is not equal to 0 |
| 2. imaginary number                   | B. term $a$ of a number written in the form $a + bi$  |
| 3. pure imaginary number              | C. a polynomial with two terms  |
| 4. complex number                     | D. pairs of numbers of the form $a + bi$ and $a - bi$   |
| 5. real part of a complex number      | E. a number such that its square equals $-1$  |
| 6. imaginary part of a complex number | F. a number in the form $a + bi$ where $a$ and $b$ are real numbers                           |
| 7. complex conjugates                 | G. a polynomial with three terms  |
| 8. monomial                           | H. a number of the form $bi$ where $b$ is not equal to 0                                      |
| 9. binomial                           | I. term $bi$ of a number written in the form $a + bi$   |
| 10. trinomial                         | J. a polynomial with one term   |

**LESSON 2.6** Skills Practice

page 2

**Problem Set**Calculate each power of  $i$ .

1.  $i^{48}$

$$\begin{aligned}i^{48} &= (i^4)^{12} \\ &= 1^{12} \\ &= 1\end{aligned}$$

2.  $i^{361}$

3.  $i^{55}$

4.  $i^{1000}$

5.  $i^{-22}$

6.  $i^{-7}$

**LESSON 2.6** Skills Practice

page 3

Name \_\_\_\_\_ Date \_\_\_\_\_

Rewrite each expression using  $i$ .

7.  $\sqrt{-72}$

$$\begin{aligned}\sqrt{-72} &= \sqrt{36(2)(-1)} \\ &= 6\sqrt{2}i\end{aligned}$$

8.  $\sqrt{-49} + \sqrt{-23}$

**2**

9.  $38 - \sqrt{-200} + \sqrt{121}$

10.  $\sqrt{-45} + 21$

11.  $\frac{\sqrt{-48} - 12}{4}$

12.  $\frac{1 + \sqrt{4} - \sqrt{-15}}{3}$

13.  $-\sqrt{-28} + \frac{\sqrt{21}}{3} - \frac{\sqrt{12}}{6}$

14.  $\frac{\sqrt{-75} + \sqrt{80}}{10}$

**LESSON 2.6 Skills Practice**

page 4

Simplify each expression.

15.  $(2 + 5i) - (7 - 9i)$

$$\begin{aligned}(2 + 5i) - (7 - 9i) &= 2 + 5i - 7 + 9i \\ &= (2 - 7) + (5i + 9i) \\ &= -5 + 14i\end{aligned}$$

16.  $-6 + 8i - 1 - 11i + 13$

2

17.  $-(4i - 1 + 3i) + (6i - 10 + 17)$

18.  $22i + 13 - (7i + 3 + 12i) + 16i - 25$

19.  $9 + 3i(7 - 2i)$

20.  $(4 - 5i)(8 + i)$

21.  $-0.5(14i - 6) - 4i(0.75 - 3i)$

22.  $\left(\frac{1}{2}j - \frac{3}{4}\right) + \left(\frac{1}{8} - \frac{3}{4}j\right)$

## LESSON 2.6 Skills Practice

page 5

Name \_\_\_\_\_ Date \_\_\_\_\_

Determine each product.

23.  $(3 + i)(3 - i)$

$$\begin{aligned}(3 + i)(3 - i) &= 9 - 3i + 3i - i^2 \\ &= 9 - (-1) \\ &= 10\end{aligned}$$

24.  $(4i - 5)(4i + 5)$

2

25.  $(7 - 2i)(7 + 2i)$

26.  $\left(\frac{1}{3} + 3i\right)\left(\frac{1}{3} - 3i\right)$

27.  $(0.1 + 0.6i)(0.1 - 0.6i)$

28.  $-2[(-i - 8)(-i + 8)]$

Identify each expression as a monomial, binomial, or trinomial. Explain your reasoning.

29.  $4xi + 7x$

The expression is a monomial because it can be rewritten as  $(4i + 7)x$ , which shows one  $x$  term.

30.  $-3x + 5 - 8xi + 1$

31.  $6x^2i + 3x^2$

**LESSON 2.6** Skills Practice

page 6

32.  $8i - x^3 + 7x^2i$

**2**

33.  $xi - x + i + 2 - 4i$

34.  $-3x^2i - x^2 + 6x^3 + 9i - 1$

Simplify each expression, if possible.

35.  $(x - 6i)^2$

$$(x - 6i)^2 = x^2 - 6xi - 6xi + 36i^2$$

$$= x^2 - 12xi + 36(-1)$$

$$= x^2 - 12xi - 36$$

36.  $(2 + 5xi)(7 - xi)$

37.  $3xi - 4yi$

38.  $(2xi - 9)(3x + 5i)$

**LESSON 2.6** Skills Practice

page 7

Name \_\_\_\_\_ Date \_\_\_\_\_

39.  $(x + 4i)(x - 4i)(x + 4i)$

2

40.  $(3i - 2xi)(3i - 2xi) + (2i - 3xi)(2 - 3xi)$

For each complex number, write its conjugate.

41.  $7 + 2i$

$7 - 2i$

42.  $3 + 5i$

43.  $8i$

44.  $-7i$

45.  $2 - 11i$

46.  $9 - 4i$

47.  $-13 - 6i$

48.  $-21 + 4i$

**LESSON 2.6** Skills Practice

page 8

Calculate each quotient.

49.  $\frac{3 + 4i}{5 + 6i}$

$$\frac{3 + 4i}{5 + 6i} = \frac{3 + 4i}{5 + 6i} \cdot \frac{5 - 6i}{5 - 6i} = \frac{15 - 18i + 20i - 24i^2}{25 - 30i + 30i - 36i^2}$$

$$= \frac{15 + 2i + 24}{25 + 36} = \frac{39 + 2i}{61} = \frac{39}{61} + \frac{2}{61}i$$

2

50.  $\frac{8 + 7i}{2 + i}$

51.  $\frac{-6 + 2i}{2 - 3i}$

52.  $\frac{-1 + 5i}{1 - 4i}$

53.  $\frac{6 - 3i}{2 - i}$

54.  $\frac{4 - 2i}{-1 + 2i}$