

## 2.7 Practice Set

1. What is a complex number?
2. Why does the product rule for radicals ( $\sqrt{a} \cdot \sqrt{b} = \sqrt{ab}$ ) fail when both  $a$  and  $b$  are negative? Give an example.
3. Describe the technique for dividing complex numbers. How is it similar to rationalizing the denominator for radical expressions?
4. Describe the pattern for the powers of  $i$ .

Simplify each of the following expressions. Write answers as complex numbers  $a + bi$ .

5.  $\sqrt{-48}$

6.  $\sqrt{-90}$

7.  $\sqrt{-3} \cdot \sqrt{-12}$

8.  $(5 - 8i) + (9 + 2i)$

9.  $(6 + 17i) - (3 - 4i)$

10.  $(-3i)(-11i)$

11.  $4i(5i - 2)$

12.  $(4 + 5i)(3 - 7i)$

13.  $(5 + 7i)^2$

14.  $\frac{2}{i}$

15.  $\frac{1}{9+6i}$

16.  $\frac{4-i}{7+5i}$
17.  $(4.2 - 12.7i) - (1.35 + 2i)$
18.  $\left(\frac{3}{5} - \frac{4}{5}i\right) + \left(\frac{6}{7} + i\right)$
19.  $\left(\frac{1}{4} - \frac{3}{8}i\right)\left(\frac{1}{2} + \frac{3}{2}i\right)$
20.  $(1.8 + 1.7i)(3.1 + 4.3i)$
21.  $\frac{5.4+3i}{2-4.9i}$
22.  $i^{18}$
23.  $(-6i)^7$
24.  $i^{13} - i^8$
25.  $\frac{20+\sqrt{-125}}{15}$

### Distributed Practice Problems

Solve each of the following equations for the indicated variable.

26.  $\sqrt{69-t} - t = 3$
27.  $\sqrt{y} - \sqrt{3y-2} = -2$

Perform the indicated operation and/or simplify each of the following.

Assume that all variables represent positive real numbers and rationalize all denominators.

$$28. \quad \sqrt[4]{\frac{16}{27}}$$

$$29. \quad \frac{\sqrt{3}-\sqrt{5}}{\sqrt{3}+\sqrt{5}}$$

$$30. \quad \frac{(4a^{-3}b^2)^{\frac{1}{2}}}{(27x^3y^{-2})^{-\frac{2}{3}}}$$