

# 4-4 Skills Practice

Simplify.

1.  $\sqrt{-81x^6}$   
 $\sqrt{81} \sqrt{-1} \sqrt{x^6}$   
 $9ix^3$

2.  $\sqrt{-23} \cdot \sqrt{-46}$   
 $\sqrt{23} \sqrt{-1} \sqrt{46} \sqrt{-1}$   
 $i \cdot i \sqrt{23 \cdot 46}$   
 $= i^2 \sqrt{1058} = -23\sqrt{2}$

3.  $(3i)(-2i)(5i)$   
 $3(-2)(5)(i)(i)(i)$   
 $-30i^3$   
 $= -30i^2 \cdot i = -30(-1)i$   
 $= 30i$

4.  $i^{11}$   
 $i^{10} \cdot i = (i^2)^5 \cdot i$   
 $= (-1)^5 \cdot i = -i$

5.  $i^{65}$   
 $i^{64} \cdot i = (i^2)^{32} \cdot i$   
 $= (-1)^{32} \cdot i = i$

6.  $(7-8i) + (-12-4i)$   
 $7-8i-12-4i$   
 $-5-12i$

7.  $(-3+5i) + (18-7i)$   
 $-3+5i+18-7i$   
 $15-2i$

8.  $(10-4i) - (7+3i)$   
 $10-4i-7-3i$   
 $3-7i$

9.  $(7-6i)(2-3i)$   
 $14-21i-12i+18i^2$   
 $14-33i+18(-1)$   
 $-4-33i$

10.  $(3+4i)(3-4i)$   
 $9-12i+12i-16i^2$   
 $9-16(-1)$   
 $9+16 = 25$

$$11. \frac{8-6i}{3i} \cdot \frac{-3i}{-3i} = \frac{-24i+18i^2}{-9i^2}$$

$$\frac{-24i+18(-1)}{-9(-1)} = \frac{-18-24i}{9}$$

$$= \frac{-18}{9} - \frac{24}{9}i = -2 - \frac{8}{3}i$$

$$12. \frac{3i}{4+2i} \cdot \frac{4-2i}{4-2i} = \frac{12i-6i^2}{16-4i^2}$$

$$= \frac{12i-6(-1)}{16-4(-1)} = \frac{6+12i}{20}$$

$$= \frac{6}{20} + \frac{12i}{20} = \frac{3}{10} + \frac{3}{5}i$$

Solve each equation.

13.  $3x^2 + 3 = 0$

$$3x^2 = -3$$

$$x^2 = -1$$

$$x = \pm i$$

14.  $5x^2 + 125 = 0$

$$5x^2 = -125$$

$$x^2 = -25$$

$$x = \pm 5i$$

$$x = \pm \sqrt{25} \sqrt{-1}$$

$$= \pm 5i$$

15.  $4x^2 + 20 = 0$

$$4x^2 = -20$$

$$x^2 = -5$$

$$x = \pm \sqrt{-5}$$

$$= \pm \sqrt{5} \sqrt{-1}$$

$$x = \pm i\sqrt{5}$$

16.  $-x^2 - 16 = 0$

$$-x^2 = 16$$

$$x^2 = -16$$

$$x = \pm \sqrt{-16}$$

$$x = \pm \sqrt{16} \sqrt{-1}$$

$$= \pm 4i$$

Find the values of  $l$  and  $m$  that make each equation true.

17.  $20 - 12i = 5l + (4m)i$

$$20 = 5l$$

$$l = 4$$

$$-12i = \frac{4m}{4}i$$

$$-3 = m$$

18.  $l - 16i = 3 - (2m)i$

$$l = 3$$

$$-16i = \frac{-2m}{-2}i$$

$$8 = m$$

19.  $(4+l) + (2m)i = 9 + 14i$

$$4+l = 9$$

$$l = 5$$

$$\frac{2m}{2}i = \frac{14}{2}i$$

$$m = 7$$

20.  $(3-m) + (7l-14)i = 1 + 7i$

$$3-m = 1$$

$$-m = -2$$

$$m = 2$$

$$(7l-14)i = 7i$$

$$7l-14 = 7$$

$$7l = 21$$

$$l = 3$$