

Name \_\_\_\_\_

*Key*

Date \_\_\_\_\_

**Complex Numbers and Radicals Review**

Simplify each radical.

1.  $\sqrt{-25}$

$$5i$$

2.  $\sqrt{-49}$

$$7i$$

3.  $\sqrt{-60}$

$$2i\sqrt{15}$$

4.  $\sqrt{-960}$

$$8i\sqrt{15}$$

5.  $\sqrt{-16x^5y^2}$

$$4x^2yi\sqrt{x}$$

6.  $\sqrt{-125x^8y^{13}}$

$$5x^4y^6i\sqrt{5y}$$

Perform the indicated operations with complex numbers and simplify each answer.

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

$$9 - 2i$$

8.  $(4 - 5i) - (-3 - 7i)$

$$7 + 2i$$

9.  $-2i(5 + 12i)$

$$24 - 10i$$

10.  $(2 - 7i)(3 + 6i)$

$$48 - 9i$$

11.  $\frac{5}{7i}$

$$\frac{-35i}{49} = \left(\frac{-5i}{7}\right)$$

12.  $\frac{3-7i}{2+4i}$

$$\frac{-22 - 26i}{20} = \left(\frac{-11 - 13i}{10}\right)$$

Simplify each expression.

13.  $i^{20}$

$$1$$

14.  $i^{17}$

$$(i^2)^8 \cdot i = i$$

15.  $i^{34}$

$$(i^2)^{17} = -1$$

Find the conjugate for the following.

16.  $-8i$

$$8i$$

17.  $2 - 5i$

$$2 + 5i$$

18.  $7 + 12i$

$$7 - 12i$$

19.  $-2 + \sqrt{7}$

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

Perform the following operations with radical. Simplify each answer.

20.  $5\sqrt{20} + 3\sqrt{5}$

$$10\sqrt{5} + 3\sqrt{5}$$

$$13\sqrt{5}$$

21.  $3\sqrt{18} + 3\sqrt{8} - 5\sqrt{3}$

$$9\sqrt{2} + 6\sqrt{2} - 5\sqrt{3}$$

$$15\sqrt{2} - 5\sqrt{3}$$

22.  $3\sqrt{15}(4 - 9\sqrt{6})$

$$12\sqrt{15} - 27\sqrt{90}$$

$$12\sqrt{15} - 81\sqrt{10}$$

23.  $(2 + 7\sqrt{5})(2\sqrt{5} + 3\sqrt{2})$

$$4\sqrt{5} + 6\sqrt{2} + 70 + 21\sqrt{10}$$

24.  $\frac{\sqrt{5}}{\sqrt{3}} \cdot \frac{\sqrt{3}}{\sqrt{3}}$

$$\frac{\sqrt{15}}{3}$$

25.  $\frac{2+3\sqrt{5}}{7-\sqrt{3}} \cdot \frac{7+\sqrt{3}}{7+\sqrt{3}}$

$$\frac{14 + 2\sqrt{3} + 21\sqrt{5} + 3\sqrt{15}}{46}$$

Solve each equation.

26.  $5x^2 + 10 = 0$

$$x^2 = -2$$

$$x = \pm i\sqrt{2}$$

27.  $8x^2 + 40 = 0$

$$x^2 = -5$$

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

28.  $\sqrt{x-7} = 9$

$$x - 7 = 81$$

$$x = 88$$

29.  $\sqrt[3]{2x-1} = 5$

$$2x - 1 = 125$$

$$2x = 126$$

$$x = 63$$

30.  $(5x+7)^{1/2} = 8$

$$\sqrt{5x+7} = 8$$

$$5x+7 = 64$$

$$5x = 57$$

$$x = 57/5$$

31.  $5 - \sqrt{2x+3} < 3$

$$-\sqrt{2x+3} < -2$$

$$\sqrt{2x+3} > 2$$

$$2x+3 > 4$$

$$x > 1/2$$