

## 6-1

## Practice

Form G

## Roots and Radical Expressions

Find all the real square roots of each number.

1. 400

2. -196

3. 10,000

4. 0.0625

Find all the real cube roots of each number.

5. 216

6. -343

7. -0.064

8.  $\frac{1000}{27}$

Find all the real fourth roots of each number.

9. -81

10. 256

11. 0.0001

12. 625

Find each real root.

13.  $\sqrt{144}$

14.  $-\sqrt{25}$

15.  $\sqrt{-0.01}$

16.  $\sqrt[3]{0.001}$

17.  $\sqrt[4]{0.0081}$

18.  $\sqrt[3]{27}$

19.  $\sqrt[3]{-27}$

20.  $\sqrt{0.09}$

Simplify each radical expression. Use absolute value symbols when needed.

21.  $\sqrt{81x^4}$

22.  $\sqrt{121y^{10}}$

23.  $\sqrt[3]{8g^6}$

24.  $\sqrt[3]{125x^9}$

25.  $\sqrt[5]{243x^5y^{15}}$

26.  $\sqrt[3]{(x-9)^3}$

27.  $\sqrt{25(x+2)^4}$

28.  $\sqrt[3]{\frac{64x^9}{343}}$

29.  $\sqrt[3]{-0.008}$

30.  $\sqrt[4]{\frac{x^4}{81}}$

31.  $\sqrt{36x^2y^6}$

32.  $\sqrt[4]{(m-n)^4}$

33. A cube has volume  $V = s^3$ , where  $s$  is the length of a side. Find the side length for a cube with volume  $8000 \text{ cm}^3$ .

34. The temperature  $T$  in degrees Celsius ( $^{\circ}\text{C}$ ) of a liquid  $t$  minutes after heating is given by the formula  $T = 8\sqrt{t}$ . When is the temperature  $48^{\circ}\text{C}$ ?

**6-1****Practice** (continued)

Form G

## Roots and Radical Expressions

**Find the two real solutions of each equation.**

35.  $x^2 = 4$

36.  $x^4 = 81$

37.  $x = 0.16$

38.  $x^2 = \frac{16}{49}$

39.  $x^4 = \frac{16}{625}$

40.  $x^2 = \frac{121}{625}$

41.  $x^2 = 0.000009$

42.  $x^4 = 0.0001$

44. The number of new customers  $n$  that visit a dry cleaning shop in one year is directly related to the amount  $a$  (in dollars) spent on advertising. This relationship is represented by  $n^3 = 13,824a$ . To attract 480 new customers, how much should the owners spend on advertising during the year?

45. **Geometry** The volume  $V$  of a sphere with radius  $r$  is given by the formula  $V = \frac{4}{3}\pi r^3$ .

- What is the radius of a sphere with volume  $36\pi$  cubic inches?
- If the volume increases by a factor of 8, what is the new radius?

45. A clothing manufacturer finds the number of defective blouses  $d$  is a function of the total number of blouses  $n$  produced at her factory. This function is  $d = 0.000005n^2$ .

- What is the total number of blouses produced if 45 are defective?
- If the number of defective blouses increases by a factor of 9, how does the total number of blouses change?

46. The velocity of a falling object can be found using the formula  $v^2 = 64h$ , where  $v$  is the velocity (in feet per second) and  $h$  is the distance the object has already fallen.

- What is the velocity of the object after a 10-foot fall?
- How much does the velocity increase if the object falls 20 feet rather than 10 feet?