**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 (°C) of a liquid $t$ minutes after heating is given by the formula $T = 8\sqrt{t}$. When is the temperature 48°C?

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## 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.** $x^2 = 0.16$

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

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

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

**41.** $x^2 = 0.000009$

**42.** $x^4 = 0.0001$

**43.** 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?

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

**a.** What is the radius of a sphere with volume $36\pi$ cubic inches?

**b.** 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 $d = 0.000005n^2$.

**a.** What is the total number of blouses produced if 45 are defective?

**b.** 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.

**a.** What is the velocity of the object after a 10-foot fall?

**b.** How much does the velocity increase if the object falls 20 feet rather than 10 feet?

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