PRACTICE & PROBLEM SOLVING

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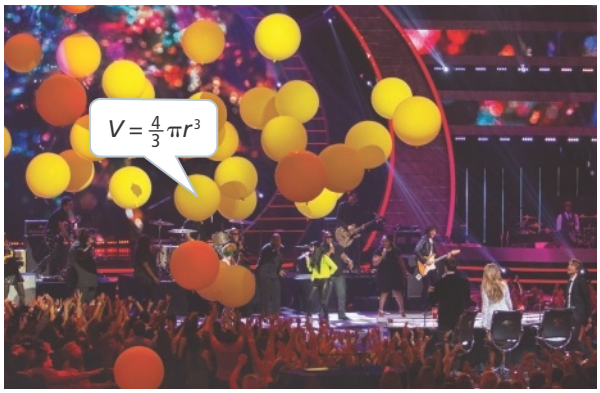
Practice Tutorial

Additional Exercises Available Online

UNDERSTAND

18. Construct Arguments Justice found that the fifth root of $243x^{15}y^5$ is $3x^3y$. Is Justice correct? Explain your reasoning.

19. Make Sense and Persevere For a show, each sphere was inflated to have a volume of $4{,}186\frac{2}{3}$ in.^{3} Explain how to find the radius r of one of the inflated spheres. Use technology to compute your answer.



20. Error Analysis Describe and correct the error a student made in writing this exponential expression in radical form.

$$x^{\frac{4}{3}} = (x^4)^{\frac{1}{3}}$$
$$(x^4)^{\frac{1}{3}} = \sqrt[4]{x^3}$$

✗

21. Construct Arguments Determine whether $\sqrt[3]{x^2}$ is equal to $(\sqrt[3]{x})^2$. Explain your reasoning.

22. Use Structure How many third roots does −512 have? Explain your reasoning.

23. Higher Order Thinking The annual interest formula below calculates the final balance of an account, F, given a starting balance, S, and an interest rate, r, after 10 years.

$$F = S(1 + r)^{10}$$

When solving for r, why can the negative root be ignored?

24. Mathematical Connections The lengths of the two legs of a right triangle are 4 and 8. What is the length of the hypotenuse, in simplest radical form?

PRACTICE

Find the specified roots of each number. SEE EXAMPLE 1

25. the real fourth roots of 81

26. the real third roots of 343

27. the real fifth roots of 1,024

28. the real square roots of 25

Rewrite each expression using a fractional exponent. SEE EXAMPLE 2

29. $\sqrt[4]{16^2}$ **30.** $\sqrt[6]{729}$

31. $\sqrt[7]{x^2}$ **32.** $\sqrt[4]{ab}$

What is the value of each expression? Round to the nearest hundredth if necessary. SEE EXAMPLE 3

33. $\sqrt[4]{25^2}$ **34.** $-\sqrt[3]{125^5}$

Simplify each expression. SEE EXAMPLE 4

35. $\sqrt[3]{8y^9}$ **36.** $\sqrt[4]{q^{12}z^4}$

37. $\sqrt[6]{729a^{24}b^{18}}$ **38.** $\sqrt[8]{v^8g^{40}}$

Solve each equation. SEE EXAMPLE 5

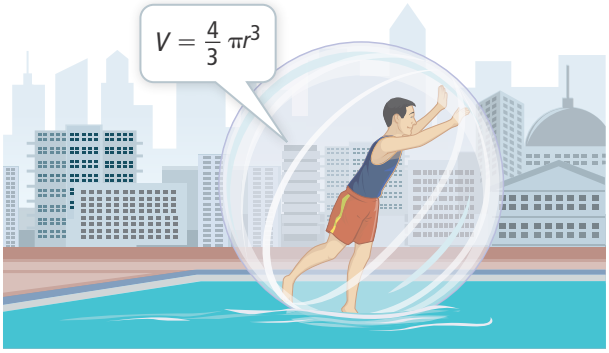
39. $1{,}125 = 9x^3$ **40.** $6{,}480 = 5w^4$

41. $270 = 10q^3$ **42.** $256 = 4h^6$

43. A small cube has the volume shown. Its side length is 1.5 in. less than a second, larger cube. What is the volume of the larger cube? SEE EXAMPLE 6

APPLY

44. Model With Mathematics A water-walking ball has a volume of approximately 4.19 m^3. What is the radius, r, of the ball?



45. Make Sense and Persevere Ahmed received a box of gifts. The box is a rectangular prism with the same height and width, and the length is twice the width. The volume of the box is 3,456 $in.^3$ What is the height of the box?

46. Make Sense and Persevere Amelia's bank account earns interest annually. The equation shows her starting balance of \$200 and her balance at the end of four years, \$220.82. At what rate, r, did Amelia earn interest?

$$220.82 = 200(1 + r)^4$$

47. Model With Mathematics One measure of a patient's body surface area is found using the expression $\sqrt{\frac{H \cdot W}{3{,}600}}$. Write this with a fractional exponent.

ASSESSMENT PRACTICE

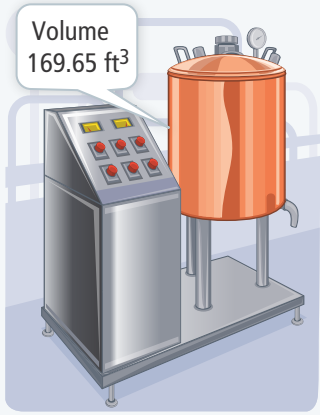
48. Determine if each expression is another way to write $b^{\frac{3}{4}}$. Select *Yes* or *No*.

	Yes	No
a. $\sqrt[4]{b^3}$	❑	❑
b. $(b^3)^{\frac{1}{4}}$	❑	❑
c. $b^{\frac{4}{3}}$	❑	❑
d. $\sqrt[3]{b^4}$	❑	❑
e. $\frac{b^3}{b^4}$	❑	❑

49. SAT/ACT Which of the following is equivalent to $\sqrt[6]{4{,}096x^{18}y^{30}}$?

Ⓐ $682.7x^{15}y^{24}$
Ⓑ $4x^{1.6}y^{1.8}$
Ⓒ $4{,}096x^3y^5$
Ⓓ $4x^3y^5$
Ⓔ $682.7x^3y^5$

50. Performance Task A milk processing company uses cylindrical-shaped containers. The height of the container is equal to the diameter of the base.



Part A The volume of one container is about 169.65 ft^3. How much material is needed to make the lateral surface of the shipping container?

Part B The cargo hold of a ship is 20 ft high. What is the largest number of these shipping containers that could be stacked on top of each other inside the cargo hold?