

6.1 EXERCISES

HOMWORK KEY

 = **WORKED-OUT SOLUTIONS**
on p. WS1 for Exs. 9, 25, and 63

 = **TAKS PRACTICE AND REASONING**
Exs. 33, 46, 47, 65, 67, and 68

SKILL PRACTICE

- VOCABULARY** Copy and complete: In the expression $\sqrt[4]{10,000}$, the number 4 is called the ?
- WRITING** Explain how the sign of a determines the number of real fourth roots of a and the number of real fifth roots of a .

EXAMPLE 1

on p. 414
for Exs. 3–20

MATCHING EXPRESSIONS Match the expression in rational exponent notation with the equivalent expression in radical notation.

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|-------------------|---------------|------------------|----------------------|
| 3. $2^{1/3}$ | 4. $2^{3/2}$ | 5. $2^{2/3}$ | 6. $2^{1/2}$ |
| A. $(\sqrt{2})^3$ | B. $\sqrt{2}$ | C. $\sqrt[3]{2}$ | D. $(\sqrt[3]{2})^2$ |

USING RATIONAL EXPONENT NOTATION Rewrite the expression using rational exponent notation.

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|-------------------|------------------|------------------------------|------------------------|
| 7. $\sqrt[3]{12}$ | 8. $\sqrt[5]{8}$ | 9. $(\sqrt[3]{10})^7$ | 10. $(\sqrt[8]{15})^3$ |
|-------------------|------------------|------------------------------|------------------------|

USING RADICAL NOTATION Rewrite the expression using radical notation.

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| 11. $5^{1/4}$ | 12. $7^{1/3}$ | 13. $14^{2/5}$ | 14. $21^{9/4}$ |
|---------------|---------------|----------------|----------------|

FINDING n TH ROOTS Find the indicated real n th root(s) of a .

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|----------------------|----------------------|----------------------|
| 15. $n = 2, a = 64$ | 16. $n = 3, a = -27$ | 17. $n = 4, a = 0$ |
| 18. $n = 3, a = 343$ | 19. $n = 4, a = -16$ | 20. $n = 5, a = -32$ |

EXAMPLE 2

on p. 415
for Exs. 21–33

EVALUATING EXPRESSIONS Evaluate the expression without using a calculator.

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|---------------------------|--------------------|--------------------------|---------------------------|
| 21. $\sqrt[6]{64}$ | 22. $8^{1/3}$ | 23. $16^{3/2}$ | 24. $\sqrt[3]{-125}$ |
| 25. $27^{2/3}$ | 26. $(-243)^{1/5}$ | 27. $(\sqrt[3]{8})^{-2}$ | 28. $(\sqrt[3]{-64})^4$ |
| 29. $(\sqrt[4]{16})^{-7}$ | 30. $25^{3/2}$ | 31. $64^{-2/3}$ | 32. $\frac{1}{81^{-3/4}}$ |

33.  **TAKS REASONING** What is the value of $128^{5/7}$?

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|------------|-------------|-------------|-------------|
| A 8 | B 16 | C 32 | D 64 |
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EXAMPLE 3


on p. 415
for Exs. 34–46

APPROXIMATING ROOTS Evaluate the expression using a calculator. Round the result to two decimal places when appropriate.

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| 34. $\sqrt[5]{32,768}$ | 35. $\sqrt[7]{1695}$ | 36. $\sqrt[9]{-230}$ | 37. $85^{1/6}$ |
| 38. $25^{-1/3}$ | 39. $20,736^{1/4}$ | 40. $(\sqrt[4]{187})^3$ | 41. $(\sqrt{6})^{-5}$ |
| 42. $(\sqrt[5]{-8})^8$ | 43. $86^{-5/6}$ | 44. $1974^{2/7}$ | 45. $\frac{1}{(-17)^{3/5}}$ |

46.  **TAKS REASONING** Which expression has the greatest value?

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|---------------------|--------------------|-------------------------|----------------------------|
| A $27^{3/5}$ | B $5^{3/2}$ | C $\sqrt[3]{81}$ | D $(\sqrt[3]{2})^8$ |
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47.  **OPENS ENDOURMENT** Write two different expressions of the form $a^{1/n}$ that equal 3, where a is a real number and n is an integer greater than 1.