7-5 Exercises

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GUIDED PRACTICE

1. **Vocabulary** In the expression $\sqrt[5]{3x}$, what is the *index*?

Simplify each expression.

SEE EXAMPLE 1 p. 488

2. $8^{\frac{1}{3}}$ 3. $16^{\frac{1}{2}}$ 4. $0^{\frac{1}{6}}$ 5. $27^{\frac{1}{3}}$
6. $81^{\frac{1}{2}}$ 7. $216^{\frac{1}{3}}$ 8. $1^{\frac{1}{9}}$ 9. $625^{\frac{1}{4}}$
10. $36^{\frac{1}{2}} + 1^{\frac{1}{3}}$ 11. $8^{\frac{1}{3}} + 64^{\frac{1}{2}}$ 12. $81^{\frac{1}{4}} + 8^{\frac{1}{3}}$ 13. $25^{\frac{1}{2}} - 1^{\frac{1}{4}}$

SEE EXAMPLE 2 p. 489

14. $81^{\frac{3}{4}}$ 15. $8^{\frac{5}{3}}$ 16. $125^{\frac{2}{3}}$ 17. $25^{\frac{3}{2}}$
18. $36^{\frac{3}{2}}$ 19. $64^{\frac{4}{3}}$ 20. $1^{\frac{3}{4}}$ 21. $0^{\frac{2}{3}}$

SEE EXAMPLE 3 p. 489

22. **Geometry** Given a square with area a, you can use the formula $P = 4a^{\frac{1}{2}}$ to find the perimeter P of the square. Find the perimeter of a square that has an area of 64 m^2.

SEE EXAMPLE 4 p. 490

Simplify. All variables represent nonnegative numbers.

23. $\sqrt{x^4y^2}$ 24. $\sqrt[4]{z^4}$ 25. $\sqrt{x^6y^6}$ 26. $\sqrt[3]{a^{12}b^6}$
27. $\left(a^{\frac{1}{2}}\right)^2\sqrt{a^2}$ 28. $\left(x^{\frac{1}{3}}\right)^6\sqrt[4]{y^4}$ 29. $\dfrac{\left(z^{\frac{1}{3}}\right)^3}{\sqrt{z^2}}$ 30. $\dfrac{\sqrt[3]{x^6y^9}}{x^2}$

PRACTICE AND PROBLEM SOLVING

Independent Practice

For Exercises	See Example
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43–50	2
51	3
52–59	4

Extra Practice
Skills Practice p. S17
Application Practice p. S34

Simplify each expression.

31. $100^{\frac{1}{2}}$ 32. $1^{\frac{1}{5}}$ 33. $512^{\frac{1}{3}}$ 34. $729^{\frac{1}{2}}$
35. $32^{\frac{1}{5}}$ 36. $196^{\frac{1}{2}}$ 37. $256^{\frac{1}{8}}$ 38. $400^{\frac{1}{2}}$
39. $125^{\frac{1}{3}} + 81^{\frac{1}{2}}$ 40. $25^{\frac{1}{2}} - 81^{\frac{1}{4}}$ 41. $121^{\frac{1}{2}} - 243^{\frac{1}{5}}$ 42. $256^{\frac{1}{4}} + 0^{\frac{1}{3}}$
43. $4^{\frac{3}{2}}$ 44. $27^{\frac{2}{3}}$ 45. $256^{\frac{3}{4}}$ 46. $64^{\frac{5}{6}}$
47. $100^{\frac{3}{2}}$ 48. $1^{\frac{5}{3}}$ 49. $9^{\frac{5}{2}}$ 50. $243^{\frac{2}{5}}$

51. **Biology** Biologists use a formula to estimate the mass of a mammal's brain. For a mammal with a mass of m grams, the approximate mass B of the brain, also in grams, is given by $B = \frac{1}{8}m^{\frac{2}{3}}$. Find the approximate mass of the brain of a mouse that has a mass of 64 grams.

Simplify. All variables represent nonnegative numbers.

52. $\sqrt[3]{a^6c^9}$ 53. $\sqrt[3]{8m^3}$ 54. $\sqrt[4]{x^{16}y^4}$ 55. $\sqrt[3]{27x^6}$
56. $\left(x^{\frac{1}{2}}y^3\right)^2\sqrt{x^2}$ 57. $\left(a^2b^4\right)^{\frac{1}{2}}\sqrt[3]{b^6}$ 58. $\dfrac{\sqrt[3]{x^6y^6}}{yx^2}$ 59. $\dfrac{\left(a^2b^{\frac{1}{2}}\right)^4}{\sqrt{b^2}}$

Fill in the boxes to make each statement true.

60. $256^{\square} = 4$ 61. $\square^{\frac{1}{5}} = 1$ 62. $225^{\square} = 15$ 63. $\square^{\frac{1}{6}} = 0$
64. $64^{\square} = 16$ 65. $\square^{\frac{3}{4}} = 125$ 66. $27^{\square} = 81$ 67. $36^{\square} = 216$