EXTENSION

Exercises

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Homework Help

Simplify each expression. Assume all variables are positive.

1. $\sqrt[4]{32}$
2. $\sqrt[5]{64}$
3. $\sqrt[3]{24}$
4. $\sqrt[3]{32}$
5. $\sqrt{16x^4}$
6. $\sqrt[3]{27y^3}$
7. $\sqrt[3]{-8x^4}$
8. $\sqrt[5]{y^6}$
9. $\sqrt[3]{\frac{x^9}{27}}$
10. $\sqrt[3]{\frac{16}{x^3}}$
11. $\sqrt{\frac{50}{z}}$
12. $\sqrt[3]{\frac{x^{15}}{7}}$

Write each expression in radical form, and simplify.

13. $49^{\frac{1}{2}}$
14. $8^{\frac{2}{3}}$
15. $16^{\frac{3}{4}}$
16. $27^{\frac{4}{3}}$
17. $7^{\frac{1}{3}}$
18. $5^{\frac{2}{3}}$
19. $(-27)^{\frac{2}{3}}$
20. $(-32)^{\frac{3}{5}}$
21. $(-1000)^{\frac{2}{3}}$
22. $-36^{\frac{3}{2}}$
23. $(-1)^{\frac{1}{3}}$
24. $4^{\frac{5}{2}}$

Write each expression by using rational exponents. Assume all variables are positive.

25. $\sqrt[5]{11^2}$
26. $\sqrt[4]{x^3}$
27. $\sqrt[8]{y^2}$
28. $\sqrt[5]{7}$
29. $\sqrt[3]{9^6}$
30. $\left(\sqrt[4]{2}\right)^2$
31. $\sqrt{4^3}$
32. $\left(\sqrt{y}\right)^5$
33. $\sqrt[4]{7^8}$
34. $\left(\sqrt[6]{z}\right)^2$
35. $\sqrt[6]{m^4}$
36. $-\sqrt{19^7}$

Simplify each expression. Assume all variables are positive.

37. $8^{\frac{1}{2}} \cdot 8^{\frac{3}{2}}$
38. $n^{\frac{1}{3}} \cdot n^{\frac{5}{3}}$
39. $16^{\frac{1}{4}} \cdot 16^{\frac{1}{4}} \cdot 16^{\frac{3}{4}}$
40. $x^{\frac{1}{2}} \cdot x^3$
41. $\left(5^{\frac{1}{2}}\right)^6$
42. $\left(7^{\frac{3}{2}}\right)^{\frac{2}{3}}$
43. $\frac{49^{\frac{1}{4}}}{49^{\frac{3}{4}}}$
44. $\frac{25^{\frac{5}{4}}}{25^{\frac{1}{4}}}$
45. $8^{-\frac{1}{3}}$
46. $\left(\frac{1}{25}\right)^{-\frac{1}{2}}$
47. $\left(x^3 z^9\right)^{\frac{2}{3}}$
48. $\left(x^{\frac{1}{2}} y^2\right)^4 \sqrt[3]{y^3}$
49. $\left(m^4 n^2\right)^{\frac{1}{2}} \sqrt{m^2 n^2}$
50. $\frac{7^{\frac{1}{2}}}{\sqrt{7}}$
51. $\left(y^{\frac{2}{3}}\right) \sqrt[3]{y^9}$
52. $\frac{z^{\frac{1}{3}}}{\sqrt[3]{z^2}}$

53. The formula $r = \left(\frac{3V}{4\pi}\right)^{\frac{1}{3}}$ gives the radius r, in inches, of a sphere that has a volume of V cubic inches. Use the formula to find the radius of a sphere that has a volume of 36π in^3.

54. For which values of n is $2^{\frac{n}{2}}$ an integer? What are the integer values of $2^{\frac{n}{2}}$?

55. **Write About It** Describe two different ways to simplify the expression $\sqrt[3]{7^6}$. Which method is easier? Why?

56. **Critical Thinking** Explain how to solve the equation $16^{\frac{x}{2}} = 64$.