

R.7 EXERCISES

Simplify each expression by removing as many factors as possible from under the radical. Assume that all variables represent positive real numbers.

1. $\sqrt[3]{125}$
2. $\sqrt[3]{1296}$
3. $\sqrt[3]{-3125}$
4. $\sqrt{50}$
5. $\sqrt{2000}$
6. $\sqrt{32y^5}$
7. $7\sqrt{2} - 8\sqrt{18} + 4\sqrt{72}$
8. $4\sqrt{3} - 5\sqrt{12} + 3\sqrt{75}$
9. $2\sqrt{5} - 3\sqrt{20} + 2\sqrt{45}$
10. $3\sqrt{28} - 4\sqrt{63} + \sqrt{112}$
11. $\sqrt[3]{2} - \sqrt[3]{16} + 2\sqrt[3]{54}$
12. $2\sqrt[3]{3} + 4\sqrt[3]{24} - \sqrt[3]{81}$
13. $\sqrt[3]{32} - 5\sqrt[3]{4} + 2\sqrt[3]{108}$
14. $\sqrt{2x^3y^2z^4}$
15. $\sqrt{98r^3s^4t^{10}}$
16. $\sqrt[3]{16x^8y^4z^5}$
17. $\sqrt[4]{x^8y^7z^{11}}$
18. $\sqrt{a^3b^5} - 2\sqrt{a^7b^3} + \sqrt{a^3b^9}$
19. $\sqrt{p^7q^3} - \sqrt{p^5q^9} + \sqrt{p^9q}$

Rationalize each denominator. Assume that all radicands represent positive real numbers.

20. $\frac{5}{\sqrt{7}}$
21. $\frac{-2}{\sqrt{3}}$
22. $\frac{-3}{\sqrt{12}}$
23. $\frac{4}{\sqrt{8}}$
24. $\frac{3}{1 - \sqrt{5}}$
25. $\frac{5}{2 - \sqrt{6}}$
26. $\frac{-2}{\sqrt{3} - \sqrt{2}}$
27. $\frac{1}{\sqrt{10} + \sqrt{3}}$
28. $\frac{1}{\sqrt{r} - \sqrt{3}}$
29. $\frac{5}{\sqrt{m} - \sqrt{5}}$
30. $\frac{y - 5}{\sqrt{y} - \sqrt{5}}$
31. $\frac{z - 11}{\sqrt{z} - \sqrt{11}}$
32. $\frac{\sqrt{x} + \sqrt{x + 1}}{\sqrt{x} - \sqrt{x + 1}}$
33. $\frac{\sqrt{p} + \sqrt{p^2 - 1}}{\sqrt{p} - \sqrt{p^2 - 1}}$

Rationalize each numerator. Assume that all radicands represent positive real numbers.

34. $\frac{1 + \sqrt{2}}{2}$
35. $\frac{1 - \sqrt{3}}{3}$
36. $\frac{\sqrt{x} + \sqrt{x + 1}}{\sqrt{x} - \sqrt{x + 1}}$
37. $\frac{\sqrt{p} + \sqrt{p^2 - 1}}{\sqrt{p} - \sqrt{p^2 - 1}}$

Simplify each root, if possible.

38. $\sqrt{16 - 8x + x^2}$
39. $\sqrt{4y^2 + 4y + 1}$
40. $\sqrt{4 - 25z^2}$
41. $\sqrt{9k^2 + h^2}$