

Simplify. Assume that all radicals denote real numbers.

1. $\sqrt{54} - \sqrt{6} + \sqrt{96}$ $6\sqrt{6}$
3. $3\sqrt{20} + 5\sqrt{45} + \sqrt{75}$ $21\sqrt{5} + 5\sqrt{3}$
5. $\sqrt[4]{m}(\sqrt[4]{m^3} + \sqrt[4]{m})$ $m + \sqrt{m}$
7. $(\sqrt{2} + \sqrt{6})(\sqrt{2} - \sqrt{6})$ -4
9. $(5\sqrt{2} + \sqrt{3})(2\sqrt{2} - 3\sqrt{3})$ $11 - 13\sqrt{6}$
11. $\frac{4}{\sqrt{3} + 2}$ $8 - 4\sqrt{3}$
13. $\frac{2\sqrt{2} + 3\sqrt{5}}{\sqrt{2} - \sqrt{5}}$ $\frac{-19 - 5\sqrt{10}}{3}$

Solve. If there are no solutions, so state.

15. $\sqrt{3z - 5} = 5$ 10
17. $\sqrt{7y + 3} = -1$ No solution
19. $\sqrt[3]{3 - 7x} = -2$ 5
21. $\sqrt{3w^2 + 4} - 2 = w$ $0, 2$
23. $\sqrt[3]{8v^2 - 6v} + 1 = 0$ $\frac{1}{4}, \frac{1}{2}$
25. $u = \frac{1}{3}\sqrt{6u - 1}$ $\frac{1}{3}$
27. $5(t - 3\sqrt{t}) + 3 = 3(t + 1)$ $0, \frac{225}{4}$

2. $\sqrt[3]{256} + \sqrt[3]{-108} + 10\sqrt[3]{32}$ $21\sqrt[3]{4}$
4. $\sqrt{112x^4} - \sqrt{7x^4}$ $3x^2\sqrt{7}$
6. $(\sqrt{m} - \sqrt{n})^2$ $m - 2\sqrt{mn} + n$
8. $(\sqrt{3} + 2\sqrt{5})^2$ $23 + 4\sqrt{15}$
10. $(\sqrt[3]{3} + \sqrt[3]{4})(\sqrt[3]{9} - \sqrt[3]{2})$ $1 - \sqrt[3]{6} + \sqrt[3]{36}$
12. $\frac{2\sqrt{3} + \sqrt{5}}{\sqrt{3} + \sqrt{5}}$ $\frac{-1 + \sqrt{15}}{2}$
14. $\frac{\sqrt{a} - \sqrt{b}}{\sqrt{a} + \sqrt{b}}$ $\frac{a - 2\sqrt{ab} + b}{a - b}$

OPTIONAL FOR EXTRA PRACTICE

16. $3 = \sqrt[3]{12 + 5a}$ $\{3\}$
18. $\sqrt{6b + 1} - 2 = 0$ $\{\frac{1}{2}\}$
20. $\sqrt{5c^2 - 48} = c\sqrt{2}$ $\{4\}$ ⁻⁴ extraneous
22. $\sqrt{d^2 - 19} - 2d + 11 = 0$ $\{10\}$ $\frac{4}{3}$ extra
24. $e - 3\sqrt{e} = 10$ $\{25\}$ 4 extra
26. $8f = 1 - 2\sqrt{f}$ $\{\frac{1}{16}\}$ $\frac{1}{4}$ extra
28. $\sqrt[4]{2g^2 + 9} = \sqrt[3]{27}$ $\{\pm 6\}$