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. $\dfrac{4}{\sqrt{3} + 2}$ $8 - 4\sqrt{3}$

13. $\dfrac{2\sqrt{2} + 3\sqrt{5}}{\sqrt{2} - \sqrt{5}}$ $\dfrac{-19 - 5\sqrt{10}}{3}$

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. $\dfrac{2\sqrt{3} + \sqrt{5}}{\sqrt{3} + \sqrt{5}}$ $\dfrac{-1 + \sqrt{15}}{2}$

14. $\dfrac{\sqrt{a} - \sqrt{b}}{\sqrt{a} + \sqrt{b}}$ $\dfrac{a - 2\sqrt{ab} + b}{a - b}$

Solve. If there are no solutions, so state.

15. $\sqrt{3z - 5} = 5$ 10

17. $\sqrt{7y + 3} = -1$ No solution

19. $\sqrt[5]{3 - 7x} = -2$ 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. $5(t - 3\sqrt{t}) + 3 = 3(t + 1)$ $0, \dfrac{225}{4}$

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. $\sqrt{d^2 - 19} - 2d + 11 = 0$ $\{10\}$ $\frac{14}{3}$ extra

24. $e - 3\sqrt{e} = 10$ $\{25\}$ 4 extra,

26. $8f = 1 - 2\sqrt{f}$ $\{\frac{1}{16}\}$ $\frac{1}{4}$ extra

28. $\sqrt[4]{2g^2 + 9} = \sqrt[3]{27}$ $\{\pm 6\}$