

2.4 Practice Set

1. Why do the indexes and the radicands have to be the same in order to add or subtract radicals?
2. Why do we need to simplify radical terms before attempting to add or subtract them?
3. How is addition and subtraction of radicals similar to addition and subtraction of polynomials?
4. Explain the differences in the processes for $5\sqrt{2} \cdot 5\sqrt{2}$ versus $5\sqrt{2} + 5\sqrt{2}$.

Perform the indicated operation(s) and simplify if possible.
Assume that all variables represent positive real numbers.

5. $3\sqrt{5} + 2\sqrt{5}$
6. $10\sqrt[3]{x} - 4\sqrt[3]{x}$
7. $\sqrt{80} - \sqrt{180}$
8. $7\sqrt{5y^3} + 3y\sqrt{45y}$
9. $\sqrt{81r^5} - \sqrt{4r^3} + \sqrt{25r^3}$
10. $\frac{7\sqrt{3}}{4} + \frac{5\sqrt{3}}{6}$
11. $3\sqrt{75} - 5\sqrt{32} + 2\sqrt{48}$
12. $-5\sqrt[3]{81} + \sqrt[3]{24}$
13. $a^2b\sqrt{9ab^5} - \sqrt{25a^5b^7}$

$$14. \quad \sqrt[3]{250xy^4} + 7y\sqrt[3]{54xy} - y\sqrt[3]{2xy}$$

$$15. \quad x\sqrt[5]{32x^6} - 2\sqrt[5]{x^{11}} + 3\sqrt{x}$$

(Hint: Pay attention to the index of each radical.)

$$16. \quad \sqrt{10}(\sqrt{2} + \sqrt{5})$$

$$17. \quad (\sqrt{3} - \sqrt{6})^2$$

$$18. \quad (7\sqrt{x} - 2)(4\sqrt{x} + 3)$$

$$19. \quad (\sqrt[3]{b} - 6)(\sqrt[3]{b} - 5)$$

$$20. \quad \sqrt{15}(\sqrt{15} + a\sqrt{45})$$

$$21. \quad (4\sqrt{3} + 9\sqrt{2})(\sqrt{3} - 5\sqrt{2})$$

$$22. \quad (\sqrt{x} - \sqrt{y})(\sqrt{x} + \sqrt{y})$$

$$23. \quad (\sqrt[3]{z} + 3)(\sqrt[3]{z^2} - 3z + 9)$$

$$24. \quad (\sqrt{y-2} + 9)^2$$

$$25. \quad \frac{-18+3\sqrt{5}}{6}$$

Distributed Practice Problems

Simplify each of the following. Assume that all variables represent positive real numbers.

$$26. \quad (-64y^{15})^{-\frac{2}{3}}$$

$$27. \quad (49x^{-10}y^6)^{\frac{1}{2}}(32x^{10}y^{-1})^{-\frac{3}{5}}$$

$$28. \quad \sqrt{3x^9y^2} \cdot \sqrt{6xy^5}$$

Perform the indicated operation and simplify if possible.

29. $(\sqrt{6x} - 7\sqrt{3x})(4\sqrt{2x} - \sqrt{3x})$

30. $\frac{2\sqrt[3]{250n^{14}}}{\sqrt[3]{2n^8}}$