

Practice Worksheet**Computing with Radicals****Simplify.**

1. $4\sqrt{24} + \sqrt{18} - 5\sqrt{54} - 4\sqrt{450}$

2. $\sqrt{45} - (\sqrt{5})^2 + \sqrt{180}$

3. ~~$\sqrt[3]{56} + \sqrt[3]{24} - \sqrt{28}$~~

4. ~~$9\sqrt[4]{5} - \sqrt[4]{5} + 11\sqrt[4]{5}$~~

5. ~~$\sqrt[4]{x^8} + 2\sqrt[3]{x^6} - \sqrt{x^2} + \sqrt[3]{x^3}$~~

6. $\sqrt{75v^5t^3} - \sqrt{48v^3t^7}$

7. $(6 - \sqrt{3})^2$

8. $(4\sqrt{7} + 5\sqrt{2})(2\sqrt{7} - 3\sqrt{2})$

9. ~~$(x^2 + \sqrt[3]{a^2})(x^4 - \sqrt[3]{a^2}x^2 + \sqrt[3]{a^4})$~~

10. ~~$(6 - \sqrt[3]{4})(\sqrt[3]{32} + \sqrt[3]{16})$~~

11. $2\sqrt{48} - \sqrt{12} - 3\sqrt{63} + \sqrt{112}$

12. ~~$\sqrt[3]{108} + 2\sqrt[3]{32} + 2\sqrt[3]{500} - 2\sqrt[3]{4}$~~

13. $\sqrt{810} + \sqrt{240} + \sqrt{135} - \sqrt{250}$

14. ~~$\sqrt[3]{216} - \sqrt[3]{48} + \sqrt[3]{432}$~~

15. $(\sqrt{12} - 2\sqrt{3})^2$

16. $(\sqrt{18} + 2\sqrt{3})^2$

17. $(\sqrt{5} - \sqrt{6})(\sqrt{5} + \sqrt{2})$

18. $(\sqrt{50} + \sqrt{27})(\sqrt{2} - \sqrt{6})$

19. ~~$\frac{3}{2 - \sqrt{5}}$~~

20. ~~$\frac{6}{\sqrt{2} - 1}$~~

21. ~~$\frac{5 + \sqrt{3}}{4 + \sqrt{3}}$~~

22. ~~$\frac{6}{2 - \sqrt{7}}$~~

23. ~~$\sqrt[3]{144} + \sqrt[3]{\frac{2}{3}} - 5\sqrt[3]{18}$~~

24. $\sqrt{\frac{3}{8}} + \sqrt{54} - \sqrt{6}$

Practice Worksheet**Products and Quotients of Radicals****Simplify.**

1. $\sqrt[3]{-432}$

2. $\sqrt{540}$

3. $\sqrt{5}(\sqrt{10} - \sqrt{45})$

4. $\sqrt[3]{6}(4\sqrt[3]{12} + 5\sqrt[3]{9})$

5. $(2\sqrt[3]{24})(7\sqrt[3]{18})$

6. $\sqrt[4]{32x^4y^5n^{10}}$

7. $\sqrt{1792}$

8. $\sqrt[3]{-6750}$

9. $\sqrt{3x^2y^3} \cdot \sqrt{75xy^5}$

10. $\sqrt[3]{9t^5v^8} \cdot \sqrt[3]{6tv^4}$

11. $\sqrt{60} \cdot \sqrt{105}$

12. $\sqrt[3]{3600} \cdot \sqrt[3]{165}$

13. $\frac{\sqrt{35}}{\sqrt{7}}$

14. $\frac{\sqrt[4]{42}}{\sqrt[4]{7}}$

15. $\sqrt{\frac{3}{5}}$

16. $\sqrt{\frac{6}{w}}$

17. $\sqrt[4]{\frac{5}{27}}$

18. $\sqrt[4]{\frac{8}{9a^3}}$

19. $\frac{\sqrt{20}}{\sqrt{5}}$

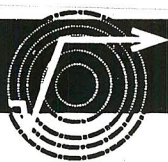
20. $\sqrt{\frac{11}{9}}$

21. $\sqrt[3]{\frac{2}{9}}$

22. $\sqrt[3]{\frac{9}{25}}$

23. $\frac{\sqrt[3]{16}}{\sqrt[3]{4}}$

24. $\frac{\sqrt[3]{9}}{\sqrt[3]{4}}$



Radicals

Products of Radicals

All variables are non-negative numbers.

Products — Multiply radicals and simplify.

$$4\sqrt{3} \cdot 2\sqrt{18} = 8\sqrt{54} = 8\sqrt{9 \cdot 6} = 8 \cdot 3\sqrt{6} = 24\sqrt{6}$$
$$\sqrt{2a} \cdot \sqrt{6a} = \sqrt{12a^2} = \sqrt{4 \cdot 3 \cdot a^2} = 2a\sqrt{3}$$

1. $\sqrt{2} \cdot \sqrt{8}$

8. $5\sqrt{6} \cdot 2\sqrt{2}$

2. $5\sqrt{5} \cdot 3\sqrt{14}$

9. $\sqrt{x} \cdot \sqrt{9x}$

3. $\sqrt{5b} \cdot \sqrt{10b}$

10. $\sqrt{2x} \cdot \sqrt{10x^2y}$

4. $a\sqrt{2x} \cdot x\sqrt{6x}$

11. $4x\sqrt{5} \cdot \sqrt{8xy^2}$

5. $2m\sqrt{7mn} \cdot 3\sqrt{7m}$

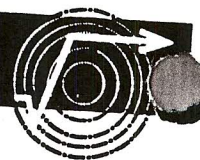
12. $2\sqrt{x^3} \cdot 4\sqrt{x}$

6. $-5a\sqrt{2a^4b} \cdot 4b\sqrt{12a^3b^4}$

13. $-7\sqrt{3y} \cdot \sqrt{6y}$

7. $2\sqrt{5}(-\sqrt{3x})$

14. $\sqrt{xy} \cdot \sqrt{xy}$



Quotients of Radicals

Quotients—Rationalizing the denominator.

$$\sqrt{\frac{7}{8}} = \frac{\sqrt{7}}{\sqrt{8}} = \frac{\sqrt{2}}{\sqrt{2}} \cdot \frac{\sqrt{14}}{\sqrt{16}} = \frac{\sqrt{14}}{4}$$

$$\sqrt{\frac{2a^4b^3}{27x^3}} = \frac{\sqrt{2a^4b^3}}{\sqrt{27x^3}} \cdot \frac{\sqrt{3x}}{\sqrt{3x}} = \frac{\sqrt{6a^4b^3x}}{\sqrt{81x^4}} = \frac{a^2b\sqrt{6bx}}{9x^2}$$

1. $\sqrt{\frac{2ab^2}{c^2d}}$ *omit*

8. $\sqrt{\frac{8}{25}}$

2. $\sqrt{\frac{2x}{3y}}$

9. $\frac{3\sqrt{2}}{\sqrt{3}}$

3. $\sqrt{\frac{19x^2}{32}}$

10. $\sqrt{\frac{4x^2}{25}}$

4. $\sqrt{\frac{4a^2b}{x^8y^7}}$ *omit*

11. $\sqrt{\frac{11y^3}{9}}$

5. $\sqrt{\frac{5a}{3x^2}}$ *omit*

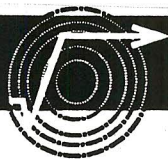
12. $\sqrt{\frac{25}{3x}}$

6. $\sqrt{\frac{7a^2}{8cd}}$ *omit*

13. $\sqrt{\frac{3}{6x^3}}$ *omit*

7. $\sqrt{\frac{n^2}{7}}$

14. $\frac{\sqrt{8x^2y}}{\sqrt{2y}}$



Radicals

Sums and Differences of Radicals

$$3\sqrt{9xy^4} - y\sqrt{16xy^2} + 2y^2\sqrt{25x} = 9y^2\sqrt{x} - 4y^2\sqrt{x} + 10y^2\sqrt{x} = 15y^2\sqrt{x}$$

$$10\sqrt{\frac{1}{5}} + 4\sqrt{18} + 3\sqrt{45} - 8\sqrt{\frac{1}{2}} = 2\sqrt{5} + 12\sqrt{2} + 9\sqrt{5} - 4\sqrt{2} = 11\sqrt{5} + 8\sqrt{2}$$

1. $3\sqrt{7} - 4\sqrt{7} + 2\sqrt{7}$

8. $\sqrt{50} + \sqrt{98} - \sqrt{75} + \sqrt{27}$

2. $4\sqrt{27} - 2\sqrt{48} + \sqrt{147}$

9. $2x\sqrt{ab} - 2y\sqrt{ab} + 4x\sqrt{ab}$
omit

3. $5\sqrt{3} - 4\sqrt{7} - 3\sqrt{3} + \sqrt{7}$

10. $2b\sqrt{3c} + b\sqrt{5c} + b\sqrt{3c} - 2b\sqrt{5c}$

4. $5\sqrt{x} - 3\sqrt{x} + a\sqrt{x}$

11. $4\sqrt{c^3d^3} + 3cd\sqrt{4cd} - 2c\sqrt{9cd^3}$
omit

A. Write using rational exponents $\sqrt[8]{2x^4y^{16}z^6}$

B. Express $3^{\frac{1}{3}}a^{\frac{4}{3}}b^{\frac{2}{3}}$ in simplest radical form.

C. Rewrite $\sqrt[3]{15m^4n}$ using rational exponents.



Combined Operations with Radicals

1. $\sqrt{\frac{8}{9}} + 2\sqrt{\frac{1}{2}} - 3\sqrt{\frac{9}{8}}$ *omit*

8. $\sqrt{100x} - \sqrt{9x}$

2. $3\sqrt{2x^3} - \sqrt{8x^3}$ *omit*

9. $\sqrt{12y^3} - 2\sqrt{3y^3} + \sqrt{27y^3}$ *omit*

3. $\sqrt{3}(\sqrt{3} + 2) =$

10. $\sqrt{25 - \frac{25}{4}}$ *omit*

4. $\sqrt{7}(8 + \sqrt{12}) =$

11. $\sqrt{\frac{60m^3n}{5m}} =$

5. $\sqrt{5}(\sqrt{2} - \sqrt{3}) =$

12. $2x\sqrt{25x} + x\sqrt{4x} - 3x\sqrt{9x}$

6. $(\sqrt{5} - 2)(\sqrt{5} + 2)$

13. $\frac{2}{\sqrt{6} - 3}$ *omit*

7. $(8 + \sqrt{3})(8 - \sqrt{3})$

14. $\frac{4}{-2 + \sqrt{7}}$ *omit*