

Multiplying Radicals

Review — Multiplying Monomials

Multiply the coefficients and add the exponents of like variables.

1. $x(2x^2)$

3. $2x^2(4x^2)$

5. $x^4(2x^4)$

2. $2x(3x^2)$

4. $-3x^3(4x^3)$

6. $3x^5(4x^4)$

Multiplying Square Radicals

Multiply the coefficients and multiply the radicands. Simplify the result completely.

1. $\sqrt{2}\sqrt{3}$

6. $(-2\sqrt{7})(5\sqrt{2})$

11. $(2\sqrt{6})(5\sqrt{15})$

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

7. $(-4\sqrt{3})(5\sqrt{11})$

12. $(5\sqrt{14})(2\sqrt{21})$

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

8. $(-10\sqrt{5})(-2\sqrt{7})$

13. $(3\sqrt{12})(4\sqrt{18})$

4. $\sqrt{3}\sqrt{12}$

9. $(-3\sqrt{2})(-2\sqrt{6})$

14. $(-6\sqrt{10})(5\sqrt{15})$

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

10. $(4\sqrt{5})(3\sqrt{10})$

Multiplying Square Radicals with Variables

Multiply the coefficients and radicands. Simplify the result completely.

1. $\sqrt{2x}\sqrt{3x}$

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

11. $(-6\sqrt{3x^3})(5\sqrt{11xy})$

2. $\sqrt{5x}\sqrt{5x}$

7. $(4\sqrt{3x})(-5\sqrt{6x^3})$

12. $(-12\sqrt{x^5y^3})(4\sqrt{6x^3y})$

3. $\sqrt{9x^2}\sqrt{x}$

8. $(20\sqrt{7x})(-4\sqrt{x^3})$

13. $(4x^2\sqrt{3x^2y})(3xy\sqrt{6xy^3})$

4. $2\sqrt{x}(3\sqrt{2x})$

9. $(3\sqrt{5x^2})(2\sqrt{10x})$

14. $(-5x\sqrt{6x^3y})(-2y^2\sqrt{15xy^3})$

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

10. $(5x\sqrt{7})(2x^2\sqrt{14x})$

Multiplying Cube Radicals

Multiply the coefficients and radicands. Look for perfect-cube factors and simplify completely.

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| 1. $\sqrt[3]{2^3}\sqrt[3]{4}$ | 6. $(2^3\sqrt[3]{3x})(3^3\sqrt[3]{9x^2})$ | 11. $(-6^3\sqrt[3]{3x^3})(5^3\sqrt[3]{11xy})$ |
| 2. $\sqrt[3]{3^3}\sqrt[3]{9}$ | 7. $-3^3\sqrt[3]{4y^2}\sqrt[3]{16y}$ | 12. $(-12^3\sqrt[3]{x^5y^3})(4^3\sqrt[3]{6x^3y})$ |
| 3. $(2^3\sqrt[3]{2})(3^3\sqrt[3]{4})$ | 8. $5^3\sqrt[3]{3x}(6^3\sqrt[3]{4x^2})$ | 13. $(3x^2\sqrt[3]{4x^2y})(-5y^3\sqrt[3]{16xy^2})$ |
| 4. $(-2^3\sqrt[3]{3})(4^3\sqrt[3]{9})$ | 9. $-5^3\sqrt[3]{4x^2}\sqrt[3]{25x^5}$ | 14. $(-4x^3\sqrt[3]{10x^4y^2})(6y^2\sqrt[3]{25x^2y})$ |
| 5. $\sqrt[3]{2x^3}\sqrt[3]{4x^2}$ | 10. $4x^2\sqrt[3]{3x^2y} \cdot x^3\sqrt[3]{2y^2}$ | |

Dividing Radicals

Divide the coefficients and divide the radicands. Simplify the result completely.

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| 1. $\frac{\sqrt{18}}{\sqrt{2}}$ | 6. $\frac{12\sqrt{75}}{3\sqrt{3}}$ | 11. $\frac{\sqrt[3]{189xy^3}}{\sqrt[3]{7y}}$ |
| 2. $\frac{\sqrt{45}}{\sqrt{5}}$ | 7. $\frac{8^3\sqrt[3]{54}}{2^3\sqrt[3]{2}}$ | 12. $\frac{\sqrt[3]{432x^7y^4}}{\sqrt[3]{2xy}}$ |
| 3. $\frac{\sqrt[3]{24}}{\sqrt[3]{3}}$ | 8. $\frac{12^3\sqrt[3]{128}}{3^3\sqrt[3]{2}}$ | 13. $\frac{18x^2\sqrt[3]{360x^7y^5}}{3x\sqrt[3]{5xy}}$ |
| 4. $\frac{\sqrt[3]{54}}{\sqrt[3]{2}}$ | 9. $\frac{\sqrt{72x^3}}{\sqrt{2x}}$ | 14. $\frac{-12x^2\sqrt[3]{250x^7y^5}}{3x^3\sqrt[3]{2xy^2}}$ |
| 5. $\frac{6\sqrt{50}}{2\sqrt{2}}$ | 10. $\frac{8x\sqrt{48x^3}}{2\sqrt{6x}}$ | |

Area Word Problems with Radicals

1. A rectangular rug is $2\sqrt{5}$ m long and $3\sqrt{5}$ m wide. Draw the rug and find its area.
2. A square patio has side length $4\sqrt{3}$ m. Draw the patio and find its area.
3. A triangular banner has a base of $3\sqrt{2}$ m and a height of $5\sqrt{8}$ m. Draw the triangle and find its area.
4. A parallelogram sign has a base of $3\sqrt{3}$ m and a height of $4\sqrt{12}$ m. Draw the parallelogram and find its area.
5. A trapezoidal flower bed has bases of $2\sqrt{6}$ m and $5\sqrt{6}$ m, and a height of $3\sqrt{2}$ m. Draw the trapezoid and find its area.
6. A rectangular floor section has length $2x\sqrt{3}$ m and width $3x\sqrt{12}$ m. Draw the rectangle and find its area.
7. A garden is made of a rectangle with length $3\sqrt{5}$ m and width $4\sqrt{5}$ m, with a triangular section attached to one short side. The triangle has base $4\sqrt{5}$ m and height $2\sqrt{20}$ m. Draw and label the full shape, then find the total area.