

Algebra RH

Essential Question: How do we multiply radical expressions?

Do Now: Using your calculator, multiply the following radical expressions.

a. $(4\sqrt{2})(5\sqrt{3}) \rightarrow 48.9897\dots$

b. $(3\sqrt{6})(5\sqrt{2}) \rightarrow 51.9615\dots$

Multiplying Square-Root Radicals

Rule: $a\sqrt{b} \cdot c\sqrt{d} = ac\sqrt{bd}$

- Multiply the coefficients to find the coefficient of the product.
- Multiply the radicands to find the radicand product.
- Simplify the result, if possible.

Examples:

a. $(4\sqrt{2})(5\sqrt{3})$

$$\boxed{20\sqrt{6}}$$

b. $(3\sqrt{6})(5\sqrt{2})$

$$\begin{aligned} & 15\sqrt{12} \\ & 15\sqrt{4}\sqrt{3} \\ & 15 \cdot 2\sqrt{3} \\ & \boxed{30\sqrt{3}} \end{aligned}$$

Simplify the expression.

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

$$\begin{aligned} & \sqrt{9} \\ & 3 \end{aligned}$$

2. $\sqrt{7} \cdot \sqrt{7}$

$$\begin{aligned} & \sqrt{49} \\ & 7 \end{aligned}$$

3. $\sqrt{a} \cdot \sqrt{a}$

$$\begin{aligned} & \sqrt{a^2} \\ & a \end{aligned}$$

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

$$\begin{aligned} & (2\sqrt{3})(2\sqrt{3}) \\ & 4\sqrt{9} \\ & \boxed{4 \cdot 3} \\ & 12 \end{aligned}$$

5. $\sqrt{12} \cdot \sqrt{4}$

$$\begin{aligned} & \sqrt{48} \rightarrow \sqrt{16}\sqrt{3} \\ & \sqrt{4}\sqrt{12} \quad 4\sqrt{3} \\ & 2\sqrt{4}\sqrt{3} \\ & 2 \cdot 2\sqrt{3} \\ & 4\sqrt{3} \end{aligned}$$

6. $\sqrt{60} \cdot \sqrt{5}$

$$\begin{aligned} & \sqrt{300} \\ & \sqrt{100}\sqrt{3} \\ & 10\sqrt{3} \end{aligned}$$

7. $3\sqrt{6} \cdot \sqrt{3}$

$$\begin{aligned} & 3\sqrt{18} \\ & 3\sqrt{9}\sqrt{2} \\ & 3 \cdot 3\sqrt{2} \\ & 9\sqrt{2} \end{aligned}$$

$$8. (2\sqrt{27})(\sqrt{3})$$

$$2\sqrt{81}$$

$$2 \cdot 9$$

$$18$$

$$9. \sqrt{25x} \cdot \sqrt{4x}$$

$$\sqrt{100x^2}$$

$$10x$$

$$10. (\sqrt{y})^2$$

$$\left(y^{\frac{1}{2}}\right)^2$$

$$\sqrt{y^2}$$

$$y$$

$$11. 2\sqrt{x} \cdot \sqrt{x^2y}$$

$$2\sqrt{x^3y}$$

$$2\sqrt{x^2} \cdot \sqrt{xy}$$

$$2x\sqrt{xy}$$

$$12. x\sqrt{5x^3y} \cdot x\sqrt{5x^2y}$$

$$x^2\sqrt{25x^5y^2}$$

$$x^2\sqrt{25x^4y^2} \sqrt{x}$$

$$x^2 \cdot 5x^2y \sqrt{x}$$

$$5x^4y\sqrt{x}$$

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HW #

Multiplying Radicals

Recopy each expression onto a separate sheet of paper and simplify.

$$1. \sqrt{9} \cdot \sqrt{32}$$

$$2. 3\sqrt{5} \cdot 2\sqrt{4}$$

$$3. 4\sqrt{3x} \cdot 4\sqrt{4x}$$

$$4. 5\sqrt{4a} \cdot 2\sqrt{6a}$$

$$5. 3\sqrt{8a} \cdot 8\sqrt{3a}$$

$$6. 6\sqrt{9xy} \cdot 4\sqrt{2xy}$$

$$7. 2\sqrt{4x^3y} \cdot 3\sqrt{3a^2b^2}$$

$$8. 4\sqrt{9a^6b} \cdot 4\sqrt{9a^4b^4}$$

$$9. 2\sqrt{2a^6} \cdot 5\sqrt{3a^3b^5}$$

$$10. 3\sqrt{4x^3y} \cdot 4\sqrt{5x^5y^7}$$

$$11. \sqrt{2x^4} \cdot \sqrt{10x^2y^2}$$

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

$$13. \sqrt{xy} \cdot 2\sqrt{xy}$$

$$14. x\sqrt{81} \cdot y\sqrt{36}$$

$$15. 2\sqrt{9x^2} \cdot 2\sqrt{4x^2}$$

$$16. x\sqrt{3x} \cdot x\sqrt{2x^2}$$

$$17. 3\sqrt{2x^3} \cdot 3\sqrt{3x^2y^2}$$

$$18. x\sqrt{5x^3y} \cdot x\sqrt{5x^2y}$$

$$19. 5\sqrt{2x^6y} \cdot 3\sqrt{3x^3y^5}$$

$$20. 2\sqrt{4x^3y} \cdot y\sqrt{x^5y^7}$$