

Beginning &
INTERMEDIATE Algebra

10.4—Add, Subtract & Multiply Radicals

Nov 19-9:14 AM

May 16-12:05 PM

What are LIKE TERMS?

Like terms have the **SAME COMBINATION of VARIABLES** with the **SAME EXPONENTS**

EXAMPLE

$$\begin{matrix} 2x + 3x \\ 5x \end{matrix}$$

Nov 19-9:14 AM

What are LIKE RADICALS?

Like radicals have the **SAME ROOT** and the **SAME RADICAND**

EXAMPLE

$$\begin{matrix} 2\sqrt{7} + 3\sqrt{7} \\ 5\sqrt{7} \end{matrix}$$

You can add or subtract **LIKE RADICALS**.

Nov 19-9:14 AM

Example

$$\begin{matrix} 5\sqrt{6} + 2\sqrt{6} \\ 7\sqrt{6} \end{matrix} \qquad \begin{matrix} 5\sqrt[4]{5x^2} + 1\sqrt[4]{5x^2} \\ 6\sqrt[4]{5x^2} \end{matrix}$$

Nov 19-9:14 AM

You Try...

$$\begin{matrix} 9x\sqrt{5x} - 2y\sqrt{3y} - 6x\sqrt{5x} + 7y\sqrt{3y} \\ 3x\sqrt{5x} + 5y\sqrt{3y} \end{matrix}$$

Nov 19-9:14 AM

Example

$$7\sqrt{3} + \sqrt{12}$$

$$\begin{array}{r} \sqrt{4 \cdot 3} \\ 7\sqrt{3} + 2\sqrt{3} \\ 9\sqrt{3} \end{array}$$

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Let's work some together

$$3\sqrt[3]{24} - 2\sqrt[3]{3}$$

$$\begin{array}{r} \sqrt[3]{8 \cdot 3} \\ 6\sqrt[3]{3} - 2\sqrt[3]{3} \\ 4\sqrt[3]{3} \end{array}$$

$$\sqrt{48x^3} + \sqrt{12x^3}$$

$$\begin{array}{r} \sqrt{16 \cdot 3x^2} + \sqrt{4 \cdot 3x^2} \\ 4x\sqrt{3x} + 2x\sqrt{3x} \\ 6x\sqrt{3x} \end{array}$$

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Now it's your turn

$$4\sqrt{24} - 6\sqrt{54}$$

$$\begin{array}{r} \sqrt{4 \cdot 6} \quad \sqrt{9 \cdot 6} \\ 4 \cdot 2\sqrt{6} - 6 \cdot 3\sqrt{6} \\ 8\sqrt{6} - 18\sqrt{6} \\ -10\sqrt{6} \end{array}$$

$$4\sqrt{50x^5} - 2\sqrt{18x^5}$$

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How do you multiply radicals?

$$\sqrt{5} \cdot \sqrt{6} \quad \sqrt{5 \cdot 6} = \sqrt{30}$$

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Examples

$$\sqrt{3}(\sqrt{3} + \sqrt{15})$$

$$\begin{array}{r} \sqrt{3 \cdot 3} + \sqrt{3 \cdot 15} \\ \sqrt{9} + \sqrt{45} \\ 3 + 3\sqrt{5} \end{array}$$

$$(2\sqrt{a+3\sqrt{b}})(\sqrt{a-3\sqrt{b}})$$

$$2a - 6\sqrt{ab} + 3\sqrt{ab} - 9b$$

$$2a - 3\sqrt{ab} - 9b$$

$$\begin{array}{l} \sqrt{3} \cdot \sqrt{3} = \sqrt{9} = 3 \\ \sqrt{4} \cdot \sqrt{4} = 4 \\ \sqrt{2} \cdot \sqrt{2} = 2 \end{array}$$

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You Try...

$$2\sqrt{11(3-3\sqrt{6})}$$

$$6\sqrt{11} - 6\sqrt{66}$$

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What is the product of conjugates?

$$(2 + \sqrt{3})(2 - \sqrt{3}) \quad (x+5)(x-5)$$

$$(2)^2 - (\sqrt{3})^2 \quad x^2 - 5^2$$

$$4 - 3 = 1 \quad x^2 - 25$$

-76

$$(6 + 4\sqrt{7})(6 - 4\sqrt{7})$$

$$(6)^2 - (4\sqrt{7})^2$$

$$36 - 16 \cdot 7$$

$$36 - 112$$

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10.1 $f(x) = \sqrt{-4x+16}$
FIND DOMAIN

10.2 $16^{-3/4}$ SIMPLIFY

10.3  $\Rightarrow$ AREA

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