

Lesson 2 Adding & Subtracting Radicals

The strategies for adding/subtracting polynomials can be used to add/subtract radicals. *Like terms* or *like radicals* in a sum or difference of radicals have the same radicand and the same index.

$$\frac{\sqrt{2} + 2\sqrt{7} + 3\sqrt{2}}{4\sqrt{2} + 2\sqrt{7}}$$

(numbers in front of the radicals)

*If the radicands are the same, we add the coefficients.

↳ radical stays the same

Examples

$$1. 6\sqrt{2} - 4\sqrt{2} + \sqrt{2} - 3\sqrt{2}$$

$$0\sqrt{2}$$

$$0$$

$$2. \underline{4\sqrt{10}} - \underline{2\sqrt{5}} + \underline{3\sqrt{10}} + \underline{5\sqrt{5}}$$

$$7\sqrt{10} + 3\sqrt{5}$$

$$3. \sqrt{18} - \sqrt{2}$$

complex radical

$$\sqrt{9 \cdot 2} - \sqrt{2}$$

$$3\sqrt{2} - \sqrt{2}$$

$$2\sqrt{2}$$

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$$4. \sqrt{63} + \sqrt{40} - \sqrt{90} - \sqrt{28}$$

$$3\sqrt{7} + 2\sqrt{10} - 3\sqrt{10} - 2\sqrt{7}$$

$$\sqrt{7} - \sqrt{10}$$

$$2^2 = 4$$

$$3^2 = 9$$

$$4^2 = 16$$

$$5^2 = 25$$

Identify the values of the variables for which each radical is defined, then simplify.

$$5. 6\sqrt{x} + 5\sqrt{x} - \sqrt{x}$$

$$10\sqrt{x}$$

$$x \geq 0$$

$$6. \sqrt[3]{27p^3q} + 8\sqrt[3]{p^3q}$$

$$3p\sqrt[3]{q} + 8p\sqrt[3]{q}$$

$$11p\sqrt[3]{q}$$

$$p, q \in \mathbb{R}$$