

- Reduce first
 - Add/subtract last
 *can't combine if
 not the same radical

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 Pre-Calculus

Adding and Subtracting Radicals

Add or subtract the following radicals

1. $\sqrt{63} + \sqrt{7}$

B PC
 1
 4 8
 9 27
 16 64
 25 125
 36
 49
 64
 81
 100

$\sqrt{9 \cdot 7} + \sqrt{1 \cdot 7}$
 $3\sqrt{7} + 1\sqrt{7}$
 $4\sqrt{7}$

2. $\sqrt[3]{192} - \sqrt[3]{81}$

$\sqrt[3]{64 \cdot 3} - \sqrt[3]{27 \cdot 3}$
 $4\sqrt[3]{3} - 3\sqrt[3]{3}$
 $1\sqrt[3]{3}$

3. $4\sqrt{18} + 2\sqrt{72}$

$4\sqrt{9 \cdot 2} + 2\sqrt{36 \cdot 2}$
 $4(3)\sqrt{2} + 2(6)\sqrt{2}$
 $12\sqrt{2} + 12\sqrt{2}$
 $24\sqrt{2}$

4. $4\sqrt[3]{320} - 2\sqrt[3]{135}$

$4\sqrt[3]{64 \cdot 5} - 2\sqrt[3]{27 \cdot 5}$
 $4(4)\sqrt[3]{5} - 2(3)\sqrt[3]{5}$
 $16\sqrt[3]{5} - 6\sqrt[3]{5}$
 $10\sqrt[3]{5}$

5. $\sqrt{200k} - 2\sqrt{18k}$

$\sqrt{100 \cdot 2k} - 2\sqrt{9 \cdot 2k}$
 $10\sqrt{2k} - 2(3)\sqrt{2k}$
 $10\sqrt{2k} - 6\sqrt{2k}$
 $4\sqrt{2k}$

6. $5\sqrt[3]{16x} + 2\sqrt[3]{250x}$

$5\sqrt[3]{8 \cdot 2x} + 2\sqrt[3]{125 \cdot 2x}$
 $5(2)\sqrt[3]{2x} + 2(5)\sqrt[3]{2x}$
 $10\sqrt[3]{2x} + 10\sqrt[3]{2x}$
 $20\sqrt[3]{2x}$

7. $2\sqrt{12y} + 3\sqrt{27y}$

$2\sqrt{4 \cdot 3y} + 3\sqrt{9 \cdot 3y}$
 $2(2)\sqrt{3y} + 3(3)\sqrt{3y}$
 $4\sqrt{3y} + 9\sqrt{3y}$
 $13\sqrt{3y}$

8. $-2\sqrt[3]{162x} + 2\sqrt[3]{384x}$

$-2\sqrt[3]{27 \cdot 6x} + 2\sqrt[3]{64 \cdot 6x}$
 $-2(3)\sqrt[3]{6x} + 2(4)\sqrt[3]{6x}$
 $-6\sqrt[3]{6x} + 8\sqrt[3]{6x}$
 $2\sqrt[3]{6x}$

$$9. \sqrt{50x^2} + \sqrt{98x^2}$$

$$\begin{aligned} & \sqrt{25x^2} \sqrt{2} + \sqrt{49x^2} \sqrt{2} \\ & 5x\sqrt{2} + 7x\sqrt{2} \\ & \underline{12x\sqrt{2}} \end{aligned}$$

$$11. 5\sqrt{4x^3} - 2\sqrt{9x^3}$$

$$\begin{aligned} & 5\sqrt{4x^2} \sqrt{x} - 2\sqrt{9x^2} \sqrt{x} \\ & 5(2x^2)\sqrt{x} - 2(3x^2)\sqrt{x} \\ & 10x^2\sqrt{x} - 6x^2\sqrt{x} \\ & \underline{4x^2\sqrt{x}} \end{aligned}$$

$$13. 2\sqrt{50} + 3\sqrt{75} - \sqrt{8}$$

$$\begin{aligned} & 2\sqrt{25} \sqrt{2} + 3\sqrt{25} \sqrt{3} - 2\sqrt{2} \\ & 2(5)\sqrt{2} + 3(5)\sqrt{3} - 2\sqrt{2} \\ & 10\sqrt{2} + 15\sqrt{3} - 2\sqrt{2} \\ & \underline{8\sqrt{2} + 15\sqrt{3}} \end{aligned}$$

$$15. 5\sqrt{294} - 3\sqrt{216} - 4\sqrt{180}$$

$$\begin{aligned} & 5\sqrt{49} \sqrt{6} - 3\sqrt{36} \sqrt{6} - 4\sqrt{36} \sqrt{5} \\ & 5(7)\sqrt{6} - 3(6)\sqrt{6} - 4(6)\sqrt{5} \\ & 35\sqrt{6} - 18\sqrt{6} - 24\sqrt{5} \\ & \underline{17\sqrt{6} - 24\sqrt{5}} \end{aligned}$$

$$10. -2\sqrt[3]{256x^2} - \sqrt[3]{32x^2}$$

$$\begin{aligned} & -2\sqrt[3]{64} \sqrt[3]{4x^2} - \sqrt[3]{8} \sqrt[3]{4x^2} \\ & -2(4)\sqrt[3]{4x^2} - 2\sqrt[3]{4x^2} \\ & -8\sqrt[3]{4x^2} - 2\sqrt[3]{4x^2} \\ & \underline{-10\sqrt[3]{4x^2}} \end{aligned}$$

$$12. 5\sqrt[3]{56x^4} - 2\sqrt[3]{189x^4}$$

$$\begin{aligned} & 5\sqrt[3]{8x^3} \sqrt[3]{7x} - 2\sqrt[3]{27x^3} \sqrt[3]{7x} \\ & 5(2x)\sqrt[3]{7x} - 2(3x)\sqrt[3]{7x} \\ & 10x\sqrt[3]{7x} - 6x\sqrt[3]{7x} \\ & \underline{4x\sqrt[3]{7x}} \end{aligned}$$

$$14. 3\sqrt[3]{40} + 2\sqrt[3]{625} - 2\sqrt[3]{32}$$

$$\begin{aligned} & 3\sqrt[3]{8} \sqrt[3]{5} + 2\sqrt[3]{125} - 2\sqrt[3]{8} \sqrt[3]{4} \\ & 3(2)\sqrt[3]{5} + 2(5)\sqrt[3]{5} - 2(2)\sqrt[3]{4} \\ & 6\sqrt[3]{5} + 10\sqrt[3]{5} - 4\sqrt[3]{4} \\ & \underline{16\sqrt[3]{5} - 4\sqrt[3]{4}} \end{aligned}$$

$$15. 7\sqrt[3]{500} + \sqrt[3]{250} - 6\sqrt[3]{32}$$

$$\begin{aligned} & 7\sqrt[3]{125} \sqrt[3]{4} + \sqrt[3]{125} \sqrt[3]{2} - 6\sqrt[3]{8} \sqrt[3]{4} \\ & 7(5)\sqrt[3]{4} + 5\sqrt[3]{2} - 6(2)\sqrt[3]{4} \\ & 35\sqrt[3]{4} + 5\sqrt[3]{2} - 12\sqrt[3]{4} \\ & \underline{23\sqrt[3]{4} + 5\sqrt[3]{2}} \end{aligned}$$