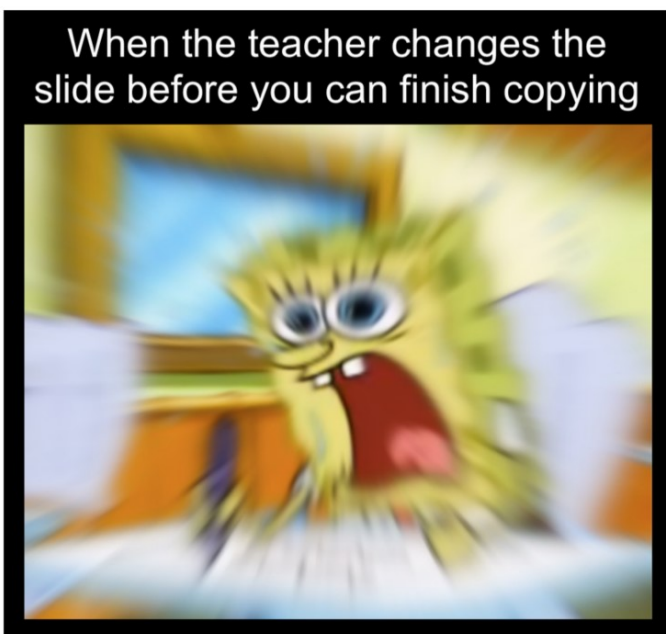


Chapter 8
Section 6

Adding, Subtracting, and
Multiplying Radicals



Add/Subtract

$$\begin{aligned}2\sqrt{3} + 3\sqrt{3} \\ = 5\sqrt{3}\end{aligned}$$

- Treat what is under the radical sign like a variable
- You can only add/subtract when what is under the radical sign is the same
- You are just combining like terms. Sometimes, you will need to simplify before you add/subtract.

$$1. 2\sqrt{5} + 4\sqrt{5} = 6\sqrt{5}$$

$$2. 5\sqrt{6} - 2\sqrt{6} = 3\sqrt{6}$$

$$3. \underline{5} + \underline{6\sqrt{7}} - \underline{2\sqrt{7}} - \underline{3} = 2 + 4\sqrt{7}$$

$$8x + 6y - x + 2y$$
$$4. \underline{8\sqrt{3}} + \underline{6\sqrt{2}} - \underline{\sqrt{3}} + \underline{2\sqrt{2}} = 7\sqrt{3} + 8\sqrt{2}$$

5. $\sqrt{12} + 3\sqrt{3}$

$$\begin{array}{c} \hat{4} \\ \times 3 \\ \hline \end{array}$$
$$\textcircled{22}$$

$$2\sqrt{3} + 3\sqrt{3} = \textcircled{5\sqrt{3}}$$

6. $\sqrt{8} - \sqrt{2}$

$$\begin{array}{c} \hat{4} \\ \times 2 \\ \hline \end{array}$$
$$\textcircled{22}$$

$$2\sqrt{2} - \sqrt{2} = \textcircled{\sqrt{2}}$$

$$7. 3\sqrt{6} + 3\sqrt{2} - \sqrt{50} + \sqrt{24}$$

$$\begin{array}{cc} \wedge & \wedge \\ \cancel{25} \boxed{2} & 6 \ 4 \\ \textcircled{55} & \textcircled{22} \end{array}$$

$$\underline{3\sqrt{6}} + \underline{3\sqrt{2}} - \underline{5\sqrt{2}} + \underline{2\sqrt{6}}$$

$$\boxed{5\sqrt{6} - 2\sqrt{2}}$$

$$8. \sqrt{80x} - 3\sqrt{20x} + 4\sqrt{180x}$$

$$\begin{array}{ccc} \begin{array}{c} \hat{4} \quad \hat{20} \\ \text{---} \quad \text{---} \\ \hat{22} \quad \hat{10} \quad \hat{2} \\ \text{---} \quad \text{---} \end{array} & \begin{array}{c} \hat{3} \quad \hat{5} \\ \text{---} \quad \text{---} \\ \hat{22} \end{array} & \begin{array}{c} \hat{18} \quad \hat{10} \\ \text{---} \quad \text{---} \\ \hat{2} \quad \hat{3} \quad \hat{5} \end{array} \end{array}$$

$$\begin{array}{c} \hat{2} \quad \hat{5} \\ \text{---} \quad \text{---} \end{array}$$

$$\begin{array}{c} \hat{3} \quad \hat{3} \\ \text{---} \quad \text{---} \end{array}$$

$$4\sqrt{5x} - 6\sqrt{5x} + 24\sqrt{5x} = \boxed{22\sqrt{5x}}$$

$$\textcircled{9.} \quad 3\sqrt{24} - 5\sqrt{12} + 4\sqrt{2} - 3\sqrt{3}$$

$\begin{array}{c} \wedge \\ 12 \\ \wedge \\ 6 \end{array} \sqrt{2} \quad \begin{array}{c} \wedge \\ 6 \\ \wedge \\ 3 \end{array} \sqrt{2}$

$$6\sqrt{6} - 10\sqrt{3} + 4\sqrt{2} - 3\sqrt{3}$$

$$\boxed{6\sqrt{6} - 13\sqrt{3} + 4\sqrt{2}}$$

Multiplication

- Multiply outside numbers together
- Multiply inside numbers together
- Never multiply outside to inside

* Don't forget to simplify

$$9. \sqrt{3} \cdot \sqrt{6} = \sqrt{18} = 3\sqrt{2}$$

Handwritten annotations: A box around 3 in $3\sqrt{2}$. A circle around 3 in $\sqrt{18}$. A triangle above 3 and 2 in $\sqrt{18}$ with a line connecting them. A circle around 3 and 2 in $\sqrt{18}$.

$$10. 5\sqrt{3} \cdot 7\sqrt{10} = 35\sqrt{30}$$

Handwritten annotations: A box around $35\sqrt{30}$. A triangle above 10 and 3 in $\sqrt{30}$ with a line connecting them. A circle around 5 and 2 below $\sqrt{30}$.

$$11. (5\sqrt{3})^2 \rightarrow (5\sqrt{3})(5\sqrt{3})$$

Handwritten annotations: A box around $(5\sqrt{3})^2$. A circle around 75. A circle around 33. A circle around 75.

12. $\sqrt{2}(6 + \sqrt{12})$

$$6\sqrt{2} + \sqrt{24}$$

$$\begin{array}{r} \sqrt{2} \\ 2 \sqrt{6} \\ \hline 2 \end{array}$$

$$6\sqrt{2} + 2\sqrt{6}$$

13. $\sqrt{3}(\sqrt{6} - 5)$

$$\sqrt{18} - 5\sqrt{3}$$

$$3\sqrt{2} - 5\sqrt{3}$$

$$3\sqrt{2} - 5\sqrt{3}$$

$$3\sqrt{2} - 5\sqrt{3}$$