

## Adding and Subtracting Radicals

- In order to add or subtract radicals they must be "like terms" and have the same radicand

Decide whether the following radicals are like terms or unlike terms.

- $\sqrt{3}$  &  $4\sqrt{3}$  like
- $\sqrt{50}$  &  $4\sqrt{20}$  unlike
- $\sqrt{18}$  &  $-\sqrt{2}$  like
- $5\sqrt{15}$  &  $-12\sqrt{15}$  like
- $\sqrt{5}$  &  $\sqrt{2}$  unlike
- $x\sqrt{x^5}$  &  $\sqrt{x^6}$  unlike

To add or subtract radicals:

- Simplify the radicals
- Add or subtract like terms
- Combine the "coefficients" but do not combine the radicands

EX:  $4\sqrt{3}$  ← radicand  
↑  
Coefficients

Examples:

1)  $\underline{5}\sqrt{3} + \underline{6}\sqrt{3} + \underline{2}\sqrt{7} - \underline{4}\sqrt{7}$

$$\boxed{11\sqrt{3} - 2\sqrt{7}}$$

2)  $-5\sqrt{5} + 4\sqrt{5}$

$$\boxed{-1\sqrt{5}}$$

or

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

3)  $7\sqrt{3} - \sqrt{27}$

$$\begin{array}{c} \wedge \\ 9\ 3 \\ \wedge \\ (3\ 3) \end{array}$$

$$7\sqrt{3} - 3\sqrt{3}$$

$$\boxed{4\sqrt{3}}$$

4)  $\sqrt{45} + \sqrt{20}$

$$\begin{array}{c} \wedge \quad \wedge \\ 9\ 5 \quad 10\ 2 \\ \wedge \quad \wedge \\ (3\ 3) \quad (5\ 2) \end{array}$$

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

$$\boxed{5\sqrt{5}}$$

$$5) \sqrt{54} + 2\sqrt{27} - 5\sqrt{18}$$

$$\begin{array}{c} \hat{9} \hat{6} \quad \hat{9} \hat{3} \quad \hat{9} \hat{2} \\ \textcircled{33} \quad \textcircled{23} \quad \textcircled{33} \quad \textcircled{33} \end{array}$$

$$3\sqrt{6} + 6\sqrt{3} - 15\sqrt{2}$$

$$6) \sqrt{45} - \sqrt{20} + 2\sqrt{5}$$

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

$$3\sqrt{5}$$

$$7) 5\sqrt{3km} + 2\sqrt{3km}$$

$$7\sqrt{3km}$$

$$8) 2\sqrt{20x^5} + 3\sqrt{5x^5}$$

$$\begin{array}{c} \hat{4} \hat{5} \\ \textcircled{22} \end{array}$$

$$4x^2 \sqrt{5x} + 3x^2 \sqrt{5x}$$

$$7x^2 \sqrt{5x}$$