

# Adding & Subtracting

- ① Simplify Radicals
- ② Combine like Radicals  
(similar to combining like terms)

Ex 1    $\underline{3}\sqrt{6} + \underline{4}\sqrt{6}$    ex.  $\frac{3x+4x}{7x}$

Ex 2    $\overset{7\sqrt{6}}{\textcircled{2\sqrt{7}}} + 9\sqrt{3} \textcircled{-8\sqrt{7}}$

$$9\sqrt{3} - 6\sqrt{7}$$

$$-6\sqrt{7} + 9\sqrt{3}$$

# Multiplying

- ① Multiply the radicands (# inside  $\sqrt{\quad}$ )
- ② Multiply the coefficients (# outside  $\sqrt{\quad}$ )
- ③ Simplify Radical (Factor Tree)

Ex 3  $\sqrt{18} \cdot \sqrt{8}$   
 $\sqrt{144}$   
 12

Ex 4  $4\sqrt{20} \cdot \sqrt{20}$   
 $4\sqrt{400}$   
 $4 \cdot 20$   
 80

Ex 5  $\sqrt{162}$   
 $2 \sqrt{81}$   
 $9\sqrt{2}$   
3 3 3 3 3

Ex 6  $2\sqrt{48}$   
 $4\sqrt{12}$   
 $8\sqrt{3}$

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

Ex 7  $7\sqrt{5} - \sqrt{125}$   
 $25 \cdot 5$   
 $5\sqrt{5}$   
 $7\sqrt{5} - 5\sqrt{5}$

Ex 8  $2\sqrt{3}$   
 $4\sqrt{3}(2 + 3\sqrt{12})$

$8\sqrt{3} + 12\sqrt{36}$   
12 · 6

$8\sqrt{3} + 72$

$8\sqrt{3} + 72$

$72 + 8\sqrt{3}$

$$8. \sqrt{18ab} + \sqrt{2ab}$$

$\begin{array}{c} \wedge \\ 9 \quad 2 \\ \text{A} \\ \textcircled{33} \end{array}$

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

$$4\sqrt{2ab}$$

$$9. 5y\sqrt{3} - \sqrt{12y^2}$$

$\begin{array}{c} \wedge \\ 4 \quad 3 \\ \text{A} \\ \textcircled{22} \end{array}$

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

$$3y\sqrt{3}$$

1.  $3\sqrt{10}$       2.  $12\sqrt{2}$       3.  $30\sqrt{2}$

4.  $20\sqrt{2}-5\sqrt{6}$       5.  $6$       6.  $\sqrt{10}+\sqrt{5}$

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

4.  $5\sqrt{5}$       5.  $x\sqrt{5}$       6.  $4\sqrt{x}+\sqrt{2}$

7.  $\sqrt{2y}$       8.  $4\sqrt{2ab}$       9.  $3y\sqrt{3}$

4)  $5\sqrt{2}(4-\sqrt{3})$

$20\sqrt{2} - 5\sqrt{6}$

1.  $\sqrt{18} \cdot \sqrt{5}$

$\sqrt{90} = \sqrt{3 \cdot 3 \cdot 5 \cdot 2}$   
 $\begin{matrix} \wedge & \wedge \\ 9 & 10 \\ \wedge & \wedge \\ 3 & 3 & 5 & 2 \end{matrix}$        $3\sqrt{10}$

3       $15\sqrt{8}$        $15\sqrt{2 \cdot 2 \cdot 2}$   
 $\begin{matrix} \wedge \\ 4 & 2 \\ \wedge \\ 2 & 2 \end{matrix}$        $30\sqrt{2}$

7.  $\sqrt{8y} - \sqrt{2y}$

$\begin{matrix} \wedge \\ 4 & 2 \\ \wedge \\ 2 & 2 \end{matrix}$

$2\sqrt{2y} - \sqrt{2y}$   
 $\sqrt{2y}$