Adding and Subtracting Radicals With Unlike Radicands

Remember you can only combine like radicals.

Like radicals have the same radicand. (inside)

Always Simplify first (Factor trees!)

Examples:

1. $\sqrt{8}+2\sqrt{2}$
   4 2
   2 2
2. $3\sqrt{3}-\sqrt{12}$
   6·2
   3 2
3. $\sqrt{18}-\sqrt{8}$
   2·9 4 2
   3·3 2 2
4. $\sqrt{27}+3\sqrt{12}$
   9 3 6 2
   3 3 3·2
5. $9\sqrt{2}-2\sqrt{50}$
   5 10
   5 2
6. $4\sqrt{20}-\sqrt{5}$
   10 2
   5 2

① $\sqrt{8}+2\sqrt{2}$

$\sqrt{2\cdot2}\,2+2\sqrt{2}$

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

$\boxed{4\sqrt{2}}$

② $3\sqrt{3}-\sqrt{12}$

$3\sqrt{3}-\sqrt{3\cdot2\cdot2}$

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

$\boxed{1\sqrt{3}}$

③ $\sqrt{18}-\sqrt{8}$

$\sqrt{2\cdot3\cdot3}-\sqrt{2\cdot2}\,2$

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

$\boxed{1\sqrt{2}}$

④ $\sqrt{27}+3\sqrt{12}$

$\sqrt{3\cdot3}\,3+3\sqrt{2\cdot2\cdot3}$

$3\sqrt{3}+3\cdot2\sqrt{3}$

$3\sqrt{3}+6\sqrt{3}$

$\boxed{9\sqrt{3}}$

⑤ $9\sqrt{2}-2\sqrt{50}$

$9\sqrt{2}-2\sqrt{5\cdot5}\,2$

$9\sqrt{2}-2\cdot5\sqrt{2}$

$9\sqrt{2}-10\sqrt{2}$

$\boxed{-1\sqrt{2}}$

⑥ $4\sqrt{20}-\sqrt{5}$

$4\sqrt{5\cdot2\cdot2}-\sqrt{5}$

$4\cdot2\sqrt{5}-\sqrt{5}$

$8\sqrt{5}-\sqrt{5}$

$\boxed{7\sqrt{5}}$