Adding & Subtracting Radicals

- **To add or subtract radicals, they must be like radicals. For radicals to be like radicals, they must have the same radicand!**

For Example:

$\sqrt{2}$ $\quad 6\sqrt{2}$ $\quad -\sqrt{2}$ $\quad \frac{1}{2}\sqrt{2}$

Like Radicands, therefore like radicals

$\sqrt{2}$ $\quad 2\sqrt{4}$ $\quad -2\sqrt{7}$ $\quad -\frac{1}{2}\sqrt{11}$

Unlike Radicands, therefore unlike radicals

#1

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

$$= (3 + 5)\sqrt{2}$$

$$= 8\sqrt{2}$$

#2

$$7\sqrt{3} - 4\sqrt{3}$$

$$= (7 - 4)\sqrt{3}$$

$$= 3\sqrt{3}$$

#3 $3\sqrt{2} - 2\sqrt{3} + 4\sqrt{2} + 5\sqrt{3}$

** Group like radicals**

$= 7\sqrt{2} + 3\sqrt{3}$

#4 $5\sqrt{8} - \sqrt{27} + \sqrt{50} - 2\sqrt{12}$

$4\times2 \quad 9\times3 \quad 25\times2 \quad 4\times3$

** Simplify each into lowest terms**

$$= 5\sqrt{4\times2} - \sqrt{9\times3} + \sqrt{25\times2} - 2\sqrt{4\times3}$$

$$= (5\times2)\sqrt{2} - 3\sqrt{3} + 5\sqrt{2} - (2\times2)\sqrt{3}$$

$$= 10\sqrt{2} - 3\sqrt{3} + 5\sqrt{2} - 4\sqrt{3}$$

$$= 15\sqrt{2} - 7\sqrt{3}$$