Chapter 8

Section 6

Adding, Subtracting, and

Multiplying Radicals

When the teacher changes the slide before you can finish copying

Add/Subtract
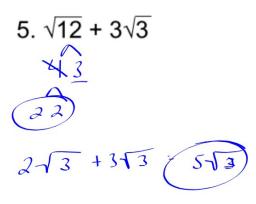
$$2\sqrt{3} + 3\sqrt{3}$$
$$= 5\sqrt{3}$$

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

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

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

$8x + 6y - x + 2y$

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

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

$\cancel{4}\,3$

$2\,2$

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

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

$\cancel{4}\,2$

$2\,2$

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

$= \boxed{\sqrt{2}}$

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

$25 \cdot \boxed{2}$ $6 \quad 4$

$\widehat{5 5}$ $\widehat{2\ 2}$

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

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

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

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

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

$12 \cdot 2$
$6 \cdot 2$

$6 \cdot 2$
$3 \cdot 2$

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

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

Multiplication

- Multiply outside numbers together

- Multiply inside numbers together

- Never multiply outside to inside

* Don't forget to simplify

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

$3\sqrt{2}$

$3 \quad 6$

$3 \quad 2$

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

$10 \quad 3$

$5 \quad 2$

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

$(5\sqrt{3})^2$

$25\sqrt{9}$

$\boxed{75}$

$3 \cdot 3$

$25 \cdot 3$

$\boxed{75}$

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

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

$2 \quad \sqrt{2}$

$2 \quad 6$

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

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

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

$9 \quad 2$

$3 \ 3$

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