10.3 a
Operations with Radicals

Adding & Subtracting Like Radicals

Vocab: like radicals

- radicals that contain the same radicand

Examples

$$2\sqrt{5} \text{ and } 5\sqrt{5}$$

$$5\sqrt{x-3} \text{ and } 4\sqrt{x-3}$$

Steps

1. Simplify each radical expression
2. Combine like radicals
- Note: This is extremely similar to combining like terms

$$5x + 4x = 9x \qquad 5x + 6y - 4x - 3y = x + 3y$$

$$5\sqrt{2} + 4\sqrt{2} = 9\sqrt{2}$$

$$5\sqrt{2} + 6\sqrt{3} - 4\sqrt{2} - 3\sqrt{3} = \sqrt{2} + 3\sqrt{3}$$

Example1

$$2\sqrt{20} + \sqrt{45}$$

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

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

$$4\sqrt{5} + 3\sqrt{5}$$

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

Example2

$$4\sqrt{27} - 5\sqrt{12}$$

$$4\sqrt{9}\sqrt{3} - 5\sqrt{4}\sqrt{3}$$

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

$$12\sqrt{3} - 10\sqrt{3}$$

$$\boxed{2\sqrt{3}}$$

Example3

$$7\sqrt{18} + 3\sqrt{50}$$

$$7\sqrt{9}\sqrt{2} + 3\sqrt{25}\sqrt{2}$$

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

$$21\sqrt{2} + 15\sqrt{2}$$

$$\boxed{36\sqrt{2}}$$