

Study Guide

Operations with Radical Expressions

When adding or subtracting radical expressions, use the distributive and commutative properties to simplify the expressions. If radical expressions are not in simplest form, first simplify.

Example 1: Simplify $10\sqrt{6} - 5\sqrt{3} + 6\sqrt{3} - 4\sqrt{6}$.

$$\begin{aligned} 10\sqrt{6} - 5\sqrt{3} + 6\sqrt{3} - 4\sqrt{6} &= 10\sqrt{6} - 4\sqrt{6} - 5\sqrt{3} + 6\sqrt{3} \\ &= (10 - 4)\sqrt{6} + (-5 + 6)\sqrt{3} \\ &= 6\sqrt{6} + \sqrt{3} \end{aligned}$$

Example 2: Simplify $3\sqrt{12} + 5\sqrt{75}$.

$$\begin{aligned} 3\sqrt{12} + 5\sqrt{75} &= 3\sqrt{2^2 \cdot 3} + 5\sqrt{5^2 \cdot 3} \\ &= 3 \cdot 2\sqrt{3} + 5 \cdot 5\sqrt{3} \\ &= 6\sqrt{3} + 25\sqrt{3} \\ &= (6 + 25)\sqrt{3} \\ &= 31\sqrt{3} \end{aligned}$$

Simplify. Then use a calculator to verify your answer.

1. $8 + 3\sqrt{2}$

2. $\sqrt{12} - \sqrt{27}$

3. $\sqrt{27} - 2\sqrt{3}$

4. $\sqrt{20} + 2\sqrt{5} - 3\sqrt{5}$

5. $-5\sqrt{6} + 8\sqrt{6}$

6. $\sqrt{200} - 3\sqrt{2}$

7. $\sqrt{54} + \sqrt{24}$

8. $\sqrt{18} - 3\sqrt{8} + \sqrt{50}$

9. $\sqrt{80} - \sqrt{20} + \sqrt{180}$

10. $2\sqrt{28} + 3\sqrt{63} - \sqrt{\frac{54}{3}}$

11. $\sqrt{12} + \sqrt{\frac{1}{3}}$

12. $\sqrt{54} - \sqrt{\frac{1}{6}} + \sqrt{24}$