

4.3

Adding/Subtracting with Radical Expressions

Date: _____

After this lesson and practice, I will be able to ...

- add and subtract radical expressions. (LT 5)
- multiply and rationalize binomial radical expressions. (LT 6)

In your studies with quadratics and polynomials, several of your solutions to quadratic equations were in the form of a simplified radical expression. Examples of these are: $4\sqrt{2}$ or $i\sqrt{37}$

In today's lesson, you will learn how to perform the ^{two}~~four~~ major operations with these expressions.

Adding and Subtracting Radical Expressions (LT 5)

Just as like terms can only be added or subtracted if they are like terms, radical expressions can be added or subtracted only if they are like radicals.

Definition 1: Like Radicals – Radical expressions that have the same index and the same radicand (the # under the radical).

LIKE RADICALS OR NOT?!

- | | | | |
|---|---|---|--|
| A) $6\sqrt[3]{11}, 2\sqrt[3]{11}$
YES | B) $6\sqrt[3]{11}, 2\sqrt{11}$
NO
index indices not same | C) $5\sqrt{7}, 3\sqrt{7}$
YES | D) $5\sqrt{7}, 3\sqrt{2}$
NO
radicands not same |
|---|---|---|--|

Example 1: Add or subtract, if possible.

- | | |
|--|---|
| A) $5\sqrt[3]{x} - 3\sqrt[3]{x}$
$2\sqrt[3]{x}$ | B) $4\sqrt{2} + 4\sqrt{3}$
cannot be simplified |
|--|---|

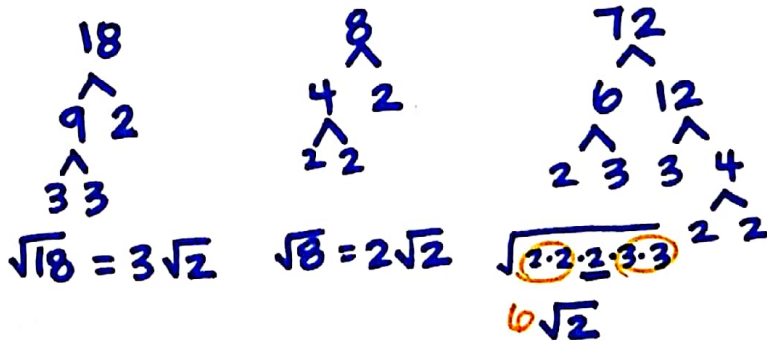
When possible, you should simplify radicals before adding or subtracting so that you can see all of the like radicals.

Example 2: Simplify $6\sqrt{18} + 4\sqrt{8} - 3\sqrt{72}$.

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

$$18\sqrt{2} + 8\sqrt{2} - 18\sqrt{2}$$

$$8\sqrt{2}$$



Example 3: Simplify each radical expression, if possible.

- | | | | |
|--|---|---|--|
| A) $6\sqrt{3} + 5\sqrt{3}$
$11\sqrt{3}$ | B) $2\sqrt{3} - 8\sqrt{32}$
$2\sqrt{3} - 32\sqrt{2}$ | C) $\sqrt[3]{24} + 5\sqrt[3]{3}$
$2\sqrt[3]{3} + 5\sqrt[3]{3}$
$7\sqrt[3]{3}$ | D) $\sqrt{50} - \sqrt{75} + \sqrt{98} + \sqrt{27}$ |
|--|---|---|--|