

6.2 Binomial Radical Expressions

Objectives:

- To add and subtract radical expressions.

_____ radicals are radical expressions that have the same index and radicand. You can combine them using properties of real numbers.

Take note**Property Combining Radical Expressions: Sums and Differences**

Use the Distributive Property to add or subtract like radicals.

$$a\sqrt[n]{x} + b\sqrt[n]{x} = (a + b)\sqrt[n]{x}$$

$$a\sqrt[n]{x} - b\sqrt[n]{x} = (a - b)\sqrt[n]{x}$$

Example 1: Adding and Subtracting Radical Expressions

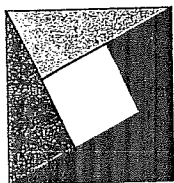
What is the simplified form of each expression?

a) $14a\sqrt{7bc} + 5a\sqrt{7bc}$

b) $3\sqrt[5]{x} - \sqrt[5]{3x}$

Example 2: Using Radical Expressions

This tile design is made of congruent right triangles with base 1 ft. and height 2 ft. Find the perimeter of the tile to the nearest tenth of a foot.



Example 3: Simplifying Before Adding or Subtracting

What is the simplified form of the expression $\sqrt{28} - \sqrt{175} + \sqrt{63}$?

You can use the FOIL method to multiply binomials that have radical expressions.

Example 4: Multiplying Binomial Radical Expressions

What is the product?

$$(1 + 2\sqrt{7})(4 - 3\sqrt{7})$$

Conjugates are expressions like $\sqrt{a} + \sqrt{b}$ and $\sqrt{a} - \sqrt{b}$, that differ only in the signs of the second terms.

Example 5: Multiplying Conjugates

What is the product?

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

Sometimes a denominator is a sum or difference involving radicals. If the radical expressions are square roots, you can rationalize the denominator by multiplying the numerator and the denominator by the conjugate of the denominator.

Example 6: Rationalizing the Denominator

How can you write the expression with a rationalized denominator?

$$\frac{11}{6+\sqrt{3}}$$

