

Adding and Subtracting Radical Expressions

Summary

1. We can add or subtract like radicals just as we can add or subtract like terms.

Just like we can add $2x + 3x$ to get $5x$, we can also add like radical expressions together.

Like Radicals

Radicals with the same root and the same radicand.

Like Radicals	Not Like Radicals
$2\sqrt{7} + 3\sqrt{7}$	$2\sqrt{7} + 3\sqrt[3]{7}$ (Different roots)
$5\sqrt[3]{10} - 9\sqrt[3]{10}$	$8\sqrt{10} - 3\sqrt{6}$ (Different radicands)

Example 1. Add or subtract each. Assume all variables represent positive real numbers.

(a) $4\sqrt{11} + 8\sqrt{11}$

(b) $5\sqrt[3]{3x} - 7\sqrt[3]{3x}$

(c) $4\sqrt{5} + 4\sqrt[3]{5}$

Sometimes you have to simplify before you can combine like radicals.

Example 2. Add or subtract each. Assume all variables represent positive real numbers.

(a) $\sqrt{20} + 2\sqrt{45}$

(b) $\sqrt[3]{54} - 5\sqrt[3]{16} + \sqrt[3]{2}$

(c) $\sqrt{27x} - 2\sqrt{9x} + \sqrt{72x}$

(d) $\sqrt[3]{48x^4} + \sqrt[3]{6x^4}$