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Adding and Subtracting Radical Expressions

<ol style="list-style-type: none">1 Assign a different letter for each root in the equation.2 Replace all instances of the root with the same variable.3 Solve the equation with the same rules for adding variables.4 Re-replace the variables with the original square roots.	$8\sqrt{6} + 3\sqrt{7} - 9\sqrt{6} + 2\sqrt{7}$ $\sqrt{6} = x \quad \sqrt{7} = y$ $8x + 3y - 9x + 2y$ $-x + 5y$
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- 1 **Determine when radical expressions can be added or subtracted.**
- 2 Explain how to add and subtract radical expressions.
- 3 Simplify the following expression.
- 4 Decide which terms can be added or subtracted.
- 5 Find the errors in the calculation.
- 6 Add or subtract the following radical expressions.
- + with lots of tips, answer keys, and detailed answer explanations for all of the problems.



The complete package, including all problems, hints, answers, and detailed answer explanations is available for all [sofatutor.com](https://www.sofatutor.com) subscribers.



Determine when radical expressions can be added or subtracted.

Choose the correct statements.

- A
We can add all radical expressions together.
- B
We can only add or subtract radical expressions if the numbers under the square roots are the same.
- C
To subtract two radical expressions we subtract the numbers under the square root.
- D
To add two radical expressions we find the multiple of the different numbers under the square roots.
- E
We add two radical expressions by adding the coefficients as well as the numbers under the square roots.



Hints for solving these problems

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Determine when radical expressions can be added or subtracted.

Hint #1

You can only combine like terms. For example:

- $3x + 4x = 7x$
 - $3x + 4y$ can't be simplified.
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Hint #2

You can't simplify an expression like $3\sqrt{3} + 4\sqrt{4}$.

Hint #3

Remember Maxine's hint on the tape: "Stop combining things that shouldn't be combined."



Answers and detailed answer explanations for these problems

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Determine when radical expressions can be added or subtracted.

Answer key: B

What radical expressions can be added or subtracted?

- Could $3\sqrt{3}$ and $2\sqrt{4}$ be added or subtracted? No!
- Could $3\sqrt{3}$ and $2\sqrt{3}$ be added or subtracted? Yes!

What's the difference?

In the first example the numbers under the square roots are different, while in the second both are the same.

You can only add or subtract radical expressions if the numbers under the square roots are the same.

Let's simplify the example above:

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