



NAME _____

Module 17 Simplifying Radical Expressions
Lesson 2 Adding and Subtracting Radicals

Simplify.

- | | |
|---|--|
| 1. $2\sqrt{3} + 4\sqrt{3}$ $6\sqrt{3}$ _____ | 2. $5\sqrt{7} - 3\sqrt{7}$ $2\sqrt{7}$ _____ |
| 3. $-4\sqrt{6} - 2\sqrt{6}$ $-6\sqrt{6}$ _____ | 4. $\sqrt{32} + \sqrt{18}$ $7\sqrt{2}$ _____ |
| 5. $\sqrt{12} - \sqrt{27}$ $-\sqrt{3}$ _____ | 6. $\sqrt{75} + \sqrt{48}$ $9\sqrt{3}$ _____ |
| 7. $-\sqrt{20} + \sqrt{45}$ $\sqrt{5}$ _____ | 8. $\sqrt{54} - \sqrt{24} + 2\sqrt{6}$ $3\sqrt{6}$ _____ |
| 9. $-\sqrt{72} + \sqrt{32} - 3\sqrt{2}$ $-5\sqrt{2}$ _____ | 10. $\sqrt[3]{5} - 3\sqrt[3]{5} + 4\sqrt[3]{5}$ $2\sqrt[3]{5}$ _____ |
| 11. $\sqrt{80} - \sqrt{12} + \sqrt{48}$ $4\sqrt{5} + 2\sqrt{3}$ _____ | 12. $-\sqrt{75} + \sqrt{27} + \sqrt{3}$ $-\sqrt{3}$ _____ |
| 13. $\sqrt{20x^2} - \sqrt{45x^2}$ $-\sqrt{5} x $ _____ | 14. $-\sqrt{27x^2} + \sqrt{75x^2}$ $2\sqrt{3} x $ _____ |
| 15. $\sqrt[3]{54} + \sqrt[3]{16}$ $5\sqrt[3]{2}$ _____ | 16. $\sqrt[3]{81} - \sqrt[3]{24}$ $\sqrt[3]{3}$ _____ |
| 17. $\sqrt[3]{8} + \sqrt[3]{40}$ $2 + 2\sqrt[3]{5}$ _____ | 18. $\sqrt[3]{128} - \sqrt[3]{56}$ $4\sqrt[3]{2} - 2\sqrt[3]{7}$ _____ |
| 19. $\sqrt[3]{-8x^3} + 2\sqrt[3]{8x^3}$ $2x$ _____ | 20. $\sqrt[3]{40x^3} + \sqrt[3]{135x^3}$ $5x\sqrt[3]{5}$ _____ |

Journal

1. What are like radicals? Give an example and explain.
2. Explain how to add or subtract radicals.
3. Anwar simplified $-\sqrt{50} + \sqrt{18}$ to $-2\sqrt{2}$. Is he correct? Why or why not?
4. Explain how to simplify $\sqrt{28} - \sqrt{112} + \sqrt{63}$.
5. Explain how to simplify $\sqrt[3]{16x^3} + \sqrt[3]{54x^3}$.

Cumulative Review

Solve.

- | | |
|---|--|
| 1. $\frac{x}{5} = 2$ $x = 10$ _____ | 2. $\frac{x}{3} + \frac{x}{4} = 14$ $x = 24$ _____ |
| 3. The variable y varies directly as x :
y is 18 when x is 6.
Find y when x is 2.
$y = 6$ when $x = 2$ _____ | 4. The variable y varies inversely as x :
y is 16 when x is 6.
Find x when y is 12.
$x = 8$ when $y = 12$ _____ |

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5. Determine whether y varies inversely as x .
If so, find the constant of variation.

x	y
14	3
6	7
84	$\frac{1}{2}$
-7	-6

The variable y varies inversely as x . The constant of variation, k , is 42.

6. Working together, Pablo and Diana can mow their lawn in 35 minutes. If it takes Diane one hour alone, how long would it take Pablo alone?
7. Katerina can paint a room in 40 minutes. Scott can paint the same room in 60 minutes. How long would it take to paint the entire room if they work together?

It takes Pablo 84 minutes or 1 hour and 24 minutes to mow the lawn.

If Katerina and Scott work together, they can paint the room in 24 minutes.

Simplify.

8. $\sqrt{125}$

$5\sqrt{5}$

9. $\sqrt{-70}$

not a real number

10. $\sqrt[3]{648}$

$6\sqrt[3]{3}$

Possible Journal Answers

1. Like radicals are radicals that have the same radicand and the same index. For example, $\sqrt[3]{2}$ and $4\sqrt[3]{2}$ are like radicals because they are both cube roots, and the number under the cube root symbols is the same, two.
2. Simplify the radicals. Then, add or subtract the coefficients of like radicals but keep the radicands the same.
3. Anwar is correct. The value $-\sqrt{50}$ equals $-5\sqrt{2}$. The value $\sqrt{18}$ equals $3\sqrt{2}$. Anwar remembered the negative sign when she simplified the radicals.
4. Simplify each radical: $\sqrt{28} - \sqrt{112} + \sqrt{63} = 2\sqrt{7} - 4\sqrt{7} + 3\sqrt{7}$ The radicals are all the same, $\sqrt{7}$. Combine the like radicals by adding or subtracting the coefficients to get $\sqrt{7}$.
5. Simplify each radical. Simplify $\sqrt[3]{16x^3}$ to $2x\sqrt[3]{2}$. Simplify $\sqrt[3]{54x^3}$ to $3x\sqrt[3]{2}$. The result is $5x\sqrt[3]{2}$. These terms contain radicals with the same index and the same radicand, as well as a like variable, making these like terms, which can be combined.