

4.5: Simplify Radicals

“I WILL ...

Simplify and Operate Radicals.”

I. Definitions

- A. Square Roots are a number that when squared (multiplied by itself) is equal to the given number
- B. Radicals are a way to symbolized a number being rooted

II. Steps

- A. Identify the root and the base
- B. Breakdown the base to prime and group them into roots OR perfect roots into radical form
- C. Combine all the same radicals; *(for example if $\sqrt{5}$ and $\sqrt{5}$ comes out, drop off the radical and keep the number [5])*
- D. Multiply the bases and radicals together

III. Steps for Multiplying/Dividing

- A. Multiply only with the same indexes
- B. Reduce radicals to proper simplified form
- C. Simplify

IV. Steps from Adding/Subtracting

- A. Reduce radicals to proper simplified form
- B. Combine like terms
- C. Simplify, if needed

V. Model Problems

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| Ex 1: Simplify $\sqrt{48}$ | Your Turn: Simplify $\frac{5}{6}\sqrt{45}$ | Ex 2: Simplify $\sqrt{\frac{25}{9}}$ |
| Ex 3: Simplify $\sqrt[3]{40}$ | Ex 4: Simplify $\sqrt[3]{135}$ | Your Turn: Simplify $\sqrt[3]{16}$ |

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| Ex 5: Simplify $\sqrt[3]{-27}$ | Your Turn: Simplify $\sqrt[3]{-\frac{1}{64}}$ | Ex 6: Simplify $\sqrt[3]{27a^3b^7}$ | Your Turn: $\sqrt[3]{54x^6y^2}$ |
| Ex 7: Simplify $3\sqrt{2} \cdot 2\sqrt{2}$ | Ex 8: Simplify $2\sqrt{3} \cdot 4\sqrt{5}$ | Your Turn: Simplify $\sqrt[3]{5y} \cdot \sqrt[3]{3x^2}$ | |
| Ex 9: Simplify $\sqrt{3}(\sqrt{6} + \sqrt{8})$ | Ex 10: Simplify $(2\sqrt[3]{6})(5\sqrt[3]{4})$ | Ex 11: Simplify $\sqrt{\frac{81}{10}}$ | |
| Ex 12: Add $3\sqrt{2} + 2\sqrt{2}$ | Ex 13: Add $\sqrt{5} + \sqrt{20}$ | Ex 14: Subtract $\sqrt{5} - \sqrt{25}$ | Your Turn: Subtract $\sqrt{98} - \sqrt{200}$ |
| Ex 15: Simplify $\sqrt[3]{16} - \sqrt[3]{64}$ | Ex 16: Simplify $5\sqrt[3]{2} - 2\sqrt[3]{16} - 6\sqrt[3]{54}$ | Your Turn: Simplify $\frac{1}{2}\sqrt[3]{24} + \frac{2}{3}\sqrt[3]{108}$ | |
| Ex 17: Simplify $\sqrt{\frac{75}{2}} - \sqrt{\frac{3}{2}}$ | Ex 18: Simplify $\sqrt[3]{\frac{5}{9}}$ | Your Turn: Simplify $\sqrt[3]{\frac{5}{16}}$ | |

Assignment: WKST