LESSON MAKER PRO

Radical Remix

Simplify square roots and cube roots of numbers and monomials.

HIGH SCHOOL · A1.N.1.1

A1.N.1.1 "Write square roots and cube roots of constants and monomial algebraic expressions in simplest radical form."

NAME _____ DATE _____

FIND PERFECT POWERS

To simplify a square root, factor out the largest perfect square you can find. To simplify a cube root, factor out the largest perfect cube, including a negative cube when needed. Assume x is nonnegative throughout this worksheet.

WORKED EXAMPLE

Simplify $\sqrt{(180x^5)}$.

1. Factor the radicand: $180x^5 = 36x^4 \cdot 5x$.
2. Separate the factors: $\sqrt{(36x^4)} \cdot \sqrt{(5x)}$.
3. Simplify the perfect-square factor: $6x^2\sqrt{(5x)}$.

Answer: $6x^2\sqrt{(5x)}$

PRACTICE 6 problems

1 Simplify $\sqrt{48}$.

ANSWER _____

2 Simplify $\sqrt{(75x^3)}$.

ANSWER _____

3 Simplify $\sqrt[3]{(54x^5)}$.

ANSWER _____

4 Simplify $\sqrt[3]{(-128)}$.

ANSWER _____

5 Simplify $\sqrt{(98x^6)}$.

ANSWER _____

6 Simplify $\sqrt[3]{(250x^4)}$.

ANSWER _____

APPLY IT Show your work

1 A school dance floor is square. Its area is $80x^4$ square feet, where x is a positive scale factor. Write the length of one side in simplest radical form.

WORK SPACE

ANSWER _____

2 A cube-shaped box for a gaming event has a volume of $432x^6$ cubic inches, where x is a positive scale factor. Write its edge length in simplest radical form.

WORK SPACE

ANSWER _____

CHALLENGE One step up

A student writes $\sqrt[3]{(-432x^8)} = -6x^2\sqrt[3]{(2x)}$. Explain the error and give the correct simplest radical form in two sentences.

WORK SPACE AND ANSWER

ANSWER KEY # Radical Remix

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PART 1 · PRACTICE

#	PROBLEM	ANSWER
1	Simplify $\sqrt{48}$.	**$4\sqrt{3}$**
2	Simplify $\sqrt{(75x^3)}$.	**$5x\sqrt{(3x)}$**
3	Simplify $\sqrt[3]{(54x^5)}$.	**$3x\sqrt[3]{(2x^2)}$**
4	Simplify $\sqrt[3]{(-128)}$.	**$-4\sqrt[3]{2}$**
5	Simplify $\sqrt{(98x^6)}$.	**$7x^3\sqrt{2}$**
6	Simplify $\sqrt[3]{(250x^4)}$.	**$5x\sqrt[3]{(2x)}$**

PART 2 · APPLY IT

1. **$4x^2\sqrt{5}$ feet** The side length is the square root of the area. Factor $80x^4$ as $16x^4 \cdot 5$, then simplify.
2. **$6x^2\sqrt[3]{2}$ inches** The edge length is the cube root of the volume. Factor $432x^6$ as $216x^6 \cdot 2$, then simplify.

CHALLENGE

The student left one x inside the cube root, but $x^8 = x^6 \cdot x^2$. The correct form is $-6x^2\sqrt[3]{(2x^2)}$.

All radicals in the answers are in simplest form. The assumption $x \geq 0$ allows square roots of even powers of x to simplify without absolute value signs.