Radicals Example

To simplify a square root, factor out the largest perfect square. For nonnegative a and b, $\sqrt{ab} = \sqrt{a} \cdot \sqrt{b}$.

WORKED EXAMPLE

Simplify $\sqrt{72}$.

$$\sqrt{ab} = \sqrt{a} \cdot \sqrt{b} \text{ (for } a, b \geq 0)$$

Step-by-step solution

Step 1: Factor the radicand

Write 72 as a perfect square times a remaining factor.

$$72 = 36 \times 2$$

Step 2: Separate the factors

Apply the product rule for square roots.

$$\sqrt{72} = \sqrt{36} \cdot \sqrt{2}$$

Step 3: Extract the square

Since $\sqrt{36} = 6$, take 6 outside the radical.

$$\sqrt{72} = 6\sqrt{2}$$

ANSWER

$$6\sqrt{2}$$

Check

Square the result: $(6\sqrt{2})^2 = 36 \times 2 = 72$. The exact form is irrational, so $6\sqrt{2}$ is preferable to a rounded decimal.