Square and Cube Roots

8th Grade

The numbers worth knowing by sight, and how to simplify the rest.

A square root asks what number times itself gives this. A cube root asks what number used three times gives this.

$$\sqrt{144} = 12 \cdot \sqrt[3]{27} = 3$$

Perfect squares — 1 4 9 16 25 36 49 64 81 100 121 144

Know these on sight.

Perfect cubes — 1 8 27 64 125 216

Fewer to learn, and they come up often.

$\sqrt{50}$ — $5\sqrt{2}$

Pull out the largest perfect square: $\sqrt{25} \times \sqrt{2}$.

$\sqrt{2}$ — irrational ≈ 1.414

It never terminates and never repeats.

THE COMMON MISTAKE

× $\sqrt{(9+16)} = 3 + 4$

✓ $\sqrt{25} = 5$

You cannot split a root over addition. Only over multiplication and division.

Any square root of a non-perfect square is irrational. That is where irrational numbers come from.