

Root Power

Use square roots and cube roots to solve equations.

GRADE 8 • 8.NR.2.2

8.NR.2.2 "Use square root and cube root symbols to represent solutions to equations. Recognize that $x^2 = p$ (where p is a positive rational number and $|x| \leq 25$) has two solutions and $x^3 = p$ (where p is a negative or positive rational number and $|x| \leq \dots$)"

NAME _____

DATE _____

TWO SQUARES, ONE CUBE

For $x^2 = p$ with positive p , find the number whose square is p , then use both signs. For $x^3 = p$, use the cube root because each number has only one cube root.

WORKED EXAMPLE

Solve $x^2 = 169$.

1. Take the square root of both sides: $x = \pm\sqrt{169}$.
2. Evaluate the root: $\sqrt{169} = 13$.
3. Use both signs: $x = -13$ or $x = 13$.

Answer: $x = -13$ or $x = 13$

PRACTICE 6 problems

1 Evaluate $\sqrt{361}$.

ANSWER _____

2 Evaluate $\sqrt[3]{-512}$.

ANSWER _____

3 Solve $x^2 = 225$.

ANSWER _____

4 Solve $x^3 = -729$.

ANSWER _____

5 Evaluate $\sqrt{625}$.

ANSWER _____

6 Solve $x^2 = 1/4$.

ANSWER _____

APPLY IT Show your work

- 1** On a game design app, Maya makes a square icon with an area of 400 square pixels. What is the length of one side?

WORK SPACE

ANSWER _____

- 2** A cube-shaped speaker box has a volume of 1000 cubic inches. What is the length of each edge?

WORK SPACE

ANSWER _____

CHALLENGE One step up

CHALLENGE

A square photo has an area of 576 cm². The equation $x^2 = 576$ models the side length x . List both solutions to the equation. Then explain why the photo has only one possible side length.

PART 1 • PRACTICE

#	PROBLEM	ANSWER
1	Evaluate $\sqrt{361}$.	19
2	Evaluate $\sqrt[3]{-512}$.	-8
3	Solve $x^2 = 225$.	$x = -15$ or $x = 15$
4	Solve $x^3 = -729$.	$x = -9$
5	Evaluate $\sqrt{625}$.	25
6	Solve $x^2 = 1/4$.	$x = -1/2$ or $x = 1/2$

PART 2 • APPLY IT

1. **20 pixels** Let x be the side length. Since $x^2 = 400$, $x = 20$ because a length cannot be negative.
2. **10 inches** Let x be the edge length. Since $x^3 = 1000$, $x = 10$.

CHALLENGE

The equation has $x = -24$ or $x = 24$. The photo side length is 24 cm because a length cannot be negative.

Accept solutions in either order. For square equations, students must include both positive and negative solutions unless the context describes a length or other quantity that cannot be negative.