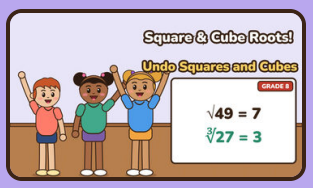
HAKILLO KIDS · TEACHER GUIDE · VIRGINIA SOL EDITION · GRADE 8 · LESSON 2

Square Roots and Cube Roots



VIRGINIA SOL (2023)
8.NS.1

VIDEO LENGTH
4:28 · Common Core edition also available

WATCH THE LESSON FREE
hakillokids.org/math/grade-8#G8-02

PRACTICE ONLINE
learn.hakillokids.org · videos stop for each question, scored automatically

8.NS.1 The student will compare and order real numbers and determine the relationships between real numbers.

Materials: Square tiles, unit cubes, a table of squares and cubes, calculators.

Students will

- Find square roots of perfect squares.
- Find cube roots of perfect cubes, including negatives.
- Estimate square roots between two whole numbers.
- Connect roots to the side of a square and the edge of a cube.

Key words

square root	a number that multiplied by itself gives the original
cube root ($\sqrt[3]{}$)	a number that used as a factor three times gives the original
perfect square	1, 4, 9, 16, 25 …
perfect cube	1, 8, 27, 64, 125 …

Before the video 2 minutes

Give students 27 unit cubes. Ask: “Can you build one big cube with all of them? How long is each edge?”

What happens in the video

0:00	Welcome and today's goal: square roots and cube roots
0:19	$\sqrt{49} = 7$
0:39	$\sqrt[3]{27} = 3$
0:58	$\sqrt{30}$ is about 5.5
1:16	Spot the mistake: a square root is not half
1:39	Your turn! Students answer during each pause (see below)
4:07	Recap and goodbye

Spot the mistake at 1:16

> **Sam:** The square root of sixteen is eight. Half of sixteen!
> **Ivy:** Hmm... does eight times eight make sixteen?
> **Mia:** Eight times eight is sixty-four. Four times four is sixteen, so the square root of sixteen is four.
> **Sam:** Oops! A square root is not half. It's four!

- Ask: “Does 8 × 8 make 16?” (No, 64.)
- Build a square of 16 tiles: 4 by 4.
- Contrast half (÷ 2) with square root.

Your-turn pauses students answer out loud, then the characters give the answer

TIME	QUESTION	ANSWER IN THE VIDEO
1:40	What is the square root of sixty-four?	Eight! Eight times eight is sixty-four.
1:55	What is the cube root of eight?	Two! Two times two times two is eight.
2:08	What is the square root of one hundred twenty-one?	Eleven!
2:22	What is the cube root of sixty-four?	Four! Four times four times four.
2:37	The square root of fifty is between which two whole numbers?	Seven and eight! Forty-nine and sixty-four.
2:53	What is the cube root of one hundred twenty-five?	Five!
3:06	What is the square root of one hundred forty-four?	Twelve!
3:20	What is the cube root of negative eight?	Negative two! Negative times negative times negative is negative.
3:37	The square root of twenty is between which two whole numbers?	Four and five! Sixteen and twenty-five.
3:54	What is the cube root of one thousand?	Ten! Ten times ten times ten.

Tip: pause the video a little longer on any question your class finds hard, and ask a student to explain how they know.

After the video: talk about it

1. Why can a cube root be negative but a square root of a negative is not a real number?
2. How do you estimate √80?
3. What is the edge of a cube with volume 1,000?

Go further

Root table: students build a table of squares to 20^2 and cubes to 10^3 and look for patterns in the last digits.

Answer key for the practice page

1. 9
2. 4
3. -3
4. 13
5. 6 and 7
6. 6 inches (6 × 6 × 6 = 216)

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HAKILLO KIDS · GRADE 8 · LESSON 2 · PRACTICE

Square Roots and Cube Roots

Name: _____ **Date:** _____

1. **$\sqrt{81}$ =**

   Answer: _____

2. **$\sqrt[3]{64}$ =**

   Answer: _____

3. **$\sqrt[3]{-27}$ =**

   Answer: _____

4. **$\sqrt{169}$ =**

   Answer: _____

5. **$\sqrt{40}$ is between which two whole numbers?**

   Answer: _____

6. **A cube-shaped box has a volume of 216 cubic inches. How long is each edge? Explain.**

   Answer: _____