

# Solving With Square and Cube Roots

## Grade 8 math · Worksheet · Standards: 8.EE.A.2

Name: \_\_\_\_\_ Date: \_\_\_\_\_ Class: \_\_\_\_\_

These 20 problems address Standard 8.EE.A.2: solving  $x^2 = p$  and  $x^3 = p$ , using square and cube root symbols, recognizing perfect squares and cubes, and knowing that  $\sqrt{2}$  is irrational.

Begin with the easy roots and move toward estimates and real measurements. Give exact answers first, then approximations when a question asks for them.

**Standards:** 8.EE.A.2 · **Level:** Grade 8

### Problem 1 Evaluate square roots (easy)

Evaluate: (a)  $\sqrt{64}$  (b)  $\sqrt{121}$  (c)  $\sqrt{0.09}$  (d)  $\sqrt[4]{25}$

### Problem 2 Evaluate cube roots (easy)

Evaluate: (a)  $\sqrt[3]{27}$  (b)  $\sqrt[3]{125}$  (c)  $\sqrt[3]{-8}$  (d)  $\sqrt[3]{\frac{1}{8}}$

### Problem 3 Spot the perfect squares (easy)

Which of these numbers are perfect squares: 48, 81, 100, 150, 196?

### Problem 4 Spot the perfect cubes (easy)

Which of these numbers are perfect cubes: 9, 64, 100, 216, 1,000?

### Problem 5 Two small equations (easy)

Solve: (a)  $x^2 = 49$  (b)  $x^3 = 125$

### Problem 6 Patio side length (easy)

A square patio has an area of 169 square feet. How long is each side?



side = ?

*Square patio.*

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**Problem 7 Fractions and decimals** (medium)

Solve: (a)  $x^2 = \frac{81}{100}$  (b)  $x^2 = 0.16$

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**Problem 8 Negative and fractional cubes** (medium)

Solve: (a)  $x^3 = -64$  (b)  $x^3 = \frac{27}{343}$

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**Problem 9 A root that is not whole** (medium)

Solve  $x^2 = 50$ . Give the exact solutions and approximate each to the nearest hundredth.

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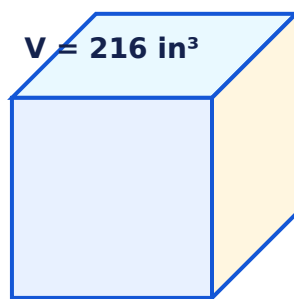
**Problem 10 A cube root estimate** (medium)

Solve  $x^3 = 30$  and estimate the answer to the nearest tenth.

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**Problem 11 Cube-shaped box** (medium)

A cube-shaped gift box holds 216 cubic inches. Find its edge length.



edge = ?

*Gift box.*

**Problem 12 Two-step equations** (medium)

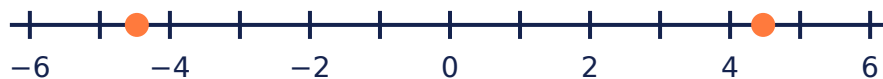
Solve: (a)  $2x^2 = 98$  (b)  $x^3 + 5 = 69$

**Problem 13 Estimate two roots** (medium)

Estimate to the nearest tenth: (a)  $\sqrt{200}$  (b)  $\sqrt[3]{100}$

**Problem 14 Solutions on a number line** (medium)

The two orange points show the solutions of  $x^2 = 20$ . Write the solutions exactly and estimate each to the nearest tenth.



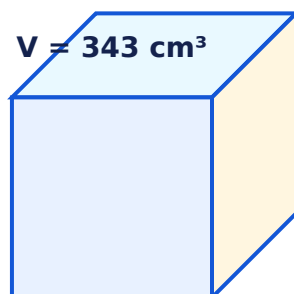
*Solutions of  $x^2 = 20$ .*

**Problem 15 Mural frame** (hard)

A square mural has an area of 289 square feet. A frame around its edge costs \$3.25 per foot. Find the side length, the perimeter and the cost of the frame.

**Problem 16 Storage cube surface** (hard)

A cube-shaped bin has a volume of 343 cubic centimeters. Find the edge length and the total surface area.



*Storage bin.*

**Problem 17 Garden fence** (hard)

A square garden has an area of 90 square feet. Estimate the amount of fencing needed to enclose it, to the nearest tenth of a foot.

**Problem 18 Why is  $\sqrt{2}$  irrational?** (hard)

Show that  $\sqrt{2}$  lies between 1.41 and 1.42, then explain what it means that  $\sqrt{2}$  is irrational.

**Problem 19 Two cubes** (hard)

Cube A has an edge of 6 inches. Cube B has a volume of 300 cubic inches. Which cube has the longer edge, and by about how much to the nearest tenth?

**Problem 20 Check a claim** (hard)

Dan says both  $x^2 = -16$  and  $x^3 = -64$  have the solution  $-4$ . Decide whether each claim is right and explain.