

Grade 8 · Square Roots and Cube Roots · Worksheet Answer Key

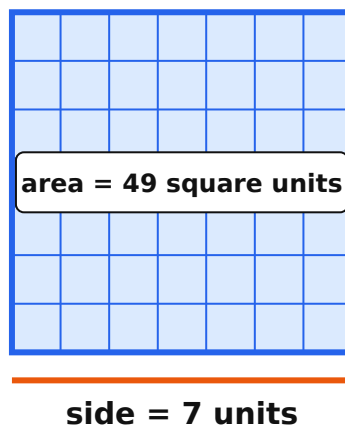
Common Core 8.EE.A.2 · mathovore.fr

This answer key shows every step for the 25 problems on the square roots and cube roots worksheet (8.EE.A.2). Check your thinking against each solution, and remember that an equation $x^2 = p$ has two solutions while $x^3 = p$ has one.

Grade 8 Common Core: 8.EE.A.2

Problem 1: Square root of 49

Ask which positive number times itself gives 49. Since $7 \cdot 7 = 49$, the side of the square is 7 units.



Seven rows of seven unit squares.

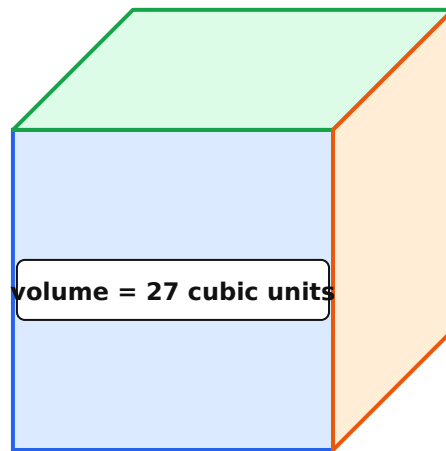
$$\sqrt{49} = 7$$

Problem 2: Square root of 144

Test nearby squares: $11^2 = 121$ is too small and $13^2 = 169$ is too big. Since $12 \cdot 12 = 144$, $\sqrt{144} = 12$.

Problem 3: Cube root of 27

Find a number used as a factor three times that makes 27. $3 \cdot 3 \cdot 3 = 27$, so the edge is 3 units.



edge = 3 units

The edge of the cube is 3 units.

$$\sqrt[3]{27}=3$$

Problem 4: Cube root of 125

$4^3=64$ is too small and $6^3=216$ is too big. $5 \cdot 5 \cdot 5=125$, so $\sqrt[3]{125}=5$.

Problem 5: Cube root of a negative

The cube of a negative number is negative. $(-4)(-4)=16$, and $16 \cdot (-4)=-64$. So $\sqrt[3]{-64}=-4$.

Problem 6: Two square roots

Both $9^2=81$ and $(-9)^2=81$. Take the square root of both sides: $x=\sqrt{81}$ or $x=-\sqrt{81}$.

$$x=9 \text{ or } x=-9$$

Problem 7: A cube equation

Take the cube root of both sides: $x=\sqrt[3]{216}$. Since $6 \cdot 6 \cdot 6=216$, $x=6$. There is only one solution.

Problem 8: Another square equation

$13 \cdot 13=169$, so $x=13$ or $x=-13$. Check: $(-13)^2=169$.

$$x=13 \text{ or } x=-13$$

Problem 9: A negative cube

$7^3=343$, so $(-7)^3=-343$. A cube equation has one solution: $x=-7$.

Problem 10: Fraction square

Take the square root of the numerator and the denominator: $\sqrt{4} = 2$ and $\sqrt{25} = 5$. Check: $\frac{2}{5} \cdot \frac{2}{5} = \frac{4}{25}$.

$$x = \frac{2}{5} \text{ or } x = -\frac{2}{5}$$

Problem 11: Fraction cube

$\sqrt[3]{8} = 2$ and $\sqrt[3]{27} = 3$. Check: $\frac{2}{3} \cdot \frac{2}{3} \cdot \frac{2}{3} = \frac{8}{27}$.

$$x = \frac{2}{3}$$

Problem 12: Decimal square

Since $0.64 = \frac{64}{100}$, the root is $\frac{8}{10} = 0.8$. Check: $0.8 \cdot 0.8 = 0.64$.

$$x = 0.8 \text{ or } x = -0.8$$

Problem 13: Decimal cube

$0.001 = \frac{1}{1000}$ and $\sqrt[3]{1000} = 10$, so $x = \frac{1}{10}$. Check: $0.1 \cdot 0.1 \cdot 0.1 = 0.001$.

$$x = 0.1$$

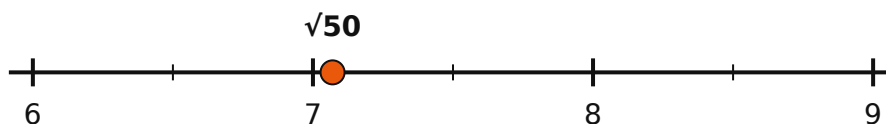
Problem 14: Undo, then take the root

Subtract 6 from both sides: $x^2 = 64$. Then take square roots: $x = 8$ or $x = -8$. Check: $8^2 + 6 = 70$.

$$x = 8 \text{ or } x = -8$$

Problem 15: Between two integers

$7^2 = 49$ and $8^2 = 64$. Since $49 < 50 < 64$, $\sqrt{49} < \sqrt{50} < \sqrt{64}$.



The root of 50 is just above 7.

$\sqrt{50}$ is between 7 and 8, a little closer to 7.

Problem 16: Cube root estimate

$4^3 = 64$ and $5^3 = 125$. Since $64 < 100 < 125$, the cube root is between them.

Between 4 and 5

Problem 17: Which number is irrational?

$\sqrt{36} = 6$, $\sqrt[3]{8} = 2$ and $\sqrt{100} = 10$ are whole numbers, so they are rational. The number $\sqrt{2}$ is not a whole number, and no fraction squares to exactly 2. Its decimal, 1.41421356 and more digits, never ends or repeats.

$\sqrt{2}$ is irrational.

Problem 18: Compare a root and a decimal

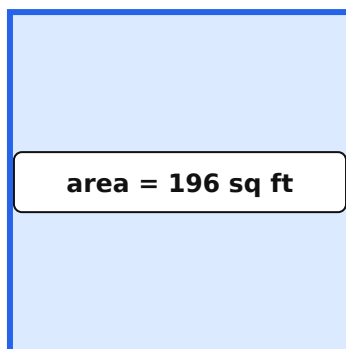
Square 5.5: $5.5^2 = 30.25$. Because 30 is less than 30.25, the number whose square is 30 is less than 5.5.

$$\sqrt{30} < 5.5$$

Problem 19: Square garden fence

The side is $\sqrt{196}$. Since $14 \cdot 14 = 196$, each side is 14 ft.

Fence: $4 \cdot 14 = 56$ ft.



14 ft

Each side is 14 feet.

Side 14 ft; fence 56 ft

Problem 20: Gift box

The edge is $\sqrt[3]{343} = 7$ in because $7^3 = 343$. One face is a 7 in by 7 in square: $7^2 = 49$ square inches.

Edge 7 in; face area 49 sq in

Problem 21: Square rug fringe

Side: $\sqrt{20.25} = 4.5$, since $4.5 \cdot 4.5 = 20.25$.

Perimeter: $4 \cdot 4.5 = 18$ ft. Cost: $18 \cdot 1.50 = 27$.

Side 4.5 ft; fringe costs \$27.00

Problem 22: Storage cube

The edge is $\sqrt[3]{1728}$. Since $12^3 = 12 \cdot 144 = 1728$, the edge is 12 inches. There are 12 inches in a foot, so the edge is 1 foot.

12 in, which is 1 ft

Problem 23: Playground laps

Side: $\sqrt{2500} = 50$ ft, since $50 \cdot 50 = 2500$. One lap: $4 \cdot 50 = 200$ ft. Three laps: $3 \cdot 200 = 600$ ft.

600 ft

Problem 24: Side of a square patio

The side is $\sqrt{50}$, between 7 and 8. Try 7.0: $7.0^2 = 49$. Try 7.1: $7.1^2 = 50.41$. Since 50 is 1.00 above 49 but only 0.41 below 50.41, 7.1 is closer.

About 7.1 ft

Problem 25: Edge of a small cube

The edge is $\sqrt[3]{40}$, between 3 and 4. Try 3.4: $3.4^3 = 39.304$. Try 3.5: $3.5^3 = 42.875$. The number 40 is only 0.696 above 39.304, but 2.875 below 42.875.

About 3.4 in