LESSON MAKER PRO

Root Detective

Find exact roots and explain what they mean.

GRADE 7 · 7A.AF.B.15

7A.AF.B.15 "Use square root and cube root symbols to represent solutions to equations. a. Evaluate square roots of perfect squares (less than or equal to 225) and cube roots of perfect cubes (less than or equal to 1000). b..."

NAME _____ DATE _____

ROOTS AND SOLUTIONS

The symbol $\sqrt{}$ gives the nonnegative number that squares to the number inside. The symbol $\sqrt[3]{}$ gives the number that cubes to the number inside. If x^2 equals a positive number, x has both a positive and a negative solution. The square root of a whole number that is not a perfect square is irrational.

WORKED EXAMPLE

Solve $x^2 = 36$.

1. Take square roots: $x = \pm\sqrt{36}$.
2. Since $6 \times 6 = 36$, $\sqrt{36} = 6$.

Answer: x = -6 or x = 6

PRACTICE 6 problems

1 Evaluate $\sqrt{49}$.

ANSWER _____

2 Evaluate $\sqrt{225}$.

ANSWER _____

3 Solve $x^2 = 81$. Give both solutions.

ANSWER _____

_____

4 Evaluate $\sqrt[3]{125}$.

ANSWER _____

5 Solve $x^3 = 343$.

ANSWER _____

6 Evaluate $\sqrt[3]{1000}$.

ANSWER _____

APPLY IT Show your work

1 A square pixel-art icon contains 121 tiny square pixels. How many pixels long is each side? Write a square root expression, then evaluate it.

WORK SPACE

ANSWER _____

2 A cube-shaped package for a collectible has a volume of 729 cm³. How long is each edge? Write a cube root expression, then evaluate it.

WORK SPACE

ANSWER _____

CHALLENGE One step up

A square stage has an area of 98 m². Write its side length using a square root symbol. Explain why the length is irrational.

WORK SPACE AND ANSWER

ANSWER KEY # Root Detective

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PART 1 · PRACTICE

#	PROBLEM	ANSWER
1	Evaluate $\sqrt{49}$.	**7**
2	Evaluate $\sqrt{225}$.	**15**
3	Solve $x^2 = 81$. Give both solutions.	**x = -9 or x = 9**
4	Evaluate $\sqrt[3]{125}$.	**5**
5	Solve $x^3 = 343$.	**x = 7**
6	Evaluate $\sqrt[3]{1000}$.	**10**

PART 2 · APPLY IT

1. **$\sqrt{121}$ = 11 pixels** The number of pixels along one side is the square root of the total. Since 11 × 11 = 121, each side is 11 pixels long.
2. **$\sqrt[3]{729}$ = 9 cm** The edge length is the cube root of the volume. Since 9 × 9 × 9 = 729, each edge is 9 cm long.

CHALLENGE

The side length is $\sqrt{98}$ m. It is irrational because 98 is not a perfect square.

For the squared equation, accept x = ±9 or both solutions written separately. For the challenge, accept $\sqrt{98}$ m or $7\sqrt{2}$ m with an explanation that 98 is not a perfect square.