LESSON MAKER PRO

Roots in Action

Find real solutions for square and cube equations.

GRADE 8 · MA.8.AR.2.3

MA.8.AR.2.3 "Given an equation in the form of $x^2=p$ and $x^3=q$, where p is a whole number and q is an integer, determine the real solutions."

NAME _____ DATE _____

SQUARE AND CUBE ROOTS

For x^2 = p, a positive whole number p has two real solutions, one positive and one negative. If p is 0, x = 0 is the only real solution. For x^3 = q, there is exactly one real solution, even when q is negative.

WORKED EXAMPLE

Solve x^3 = -125.

1. Start with x^3 = -125.
2. Take the cube root of both sides.
3. x = -5.

Answer: x = -5

PRACTICE 6 problems

1 Solve x^2 = 36.

ANSWER _____

2 Solve x^3 = 64.

ANSWER _____

3 Solve x^2 = 0.

ANSWER _____

4 Solve x^3 = -27.

ANSWER _____

5 Solve x^2 = 81.

ANSWER _____

6 Solve x^3 = 8.

ANSWER _____

APPLY IT Show your work

1 In a coding club's game, x represents an integer change to a character's power level. The game rule is x^3 = -216. What is the real value of x?

WORK SPACE

ANSWER _____

2 A square photo backdrop has an area of 196 square inches. Its side length is x inches. What is x?

WORK SPACE

ANSWER _____

CHALLENGE One step up

CHALLENGE

A number x makes one of these equations true: x^2 = 144 or x^3 = -512. List every possible real value of x.

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ANSWER KEY

Roots in Action

GRADE 8 · MA.8.AR.2.3

PART 1 · PRACTICE

#	PROBLEM	ANSWER
1	Solve x^2 = 36.	**x = -6 or x = 6**
2	Solve x^3 = 64.	**x = 4**
3	Solve x^2 = 0.	**x = 0**
4	Solve x^3 = -27.	**x = -3**
5	Solve x^2 = 81.	**x = -9 or x = 9**
6	Solve x^3 = 8.	**x = 2**

PART 2 · APPLY IT

1. **x = -6** Take the cube root of both sides. The cube root of -216 is -6.
2. **x = 14** Write x^2 = 196 and find the square roots, -14 and 14. Because x is a side length, accept only the positive value, 14.

CHALLENGE

x = -12, x = -8, or x = 12

Accept solutions in any order. For positive square equations, students must include both positive and negative roots, except when a context such as a length limits the answer to a positive value.