LESSON MAKER PRO

# Power Up Exponents

*Find roots, powers, and reciprocals.*

**GRADE 7 · 7A.AF.B**

**7A.AF.B** "Apply concepts of rational and integer exponents"

NAME _____ DATE _____

## FRACTION EXPONENTS

For a positive base, the denominator of a fraction exponent tells you which root to take, and the numerator tells you which power to use. If the exponent is negative, find the value using the positive exponent, then take its reciprocal.

**WORKED EXAMPLE**

Evaluate $625^{3/4}$.

1. Take the fourth root of 625: 5.
2. Raise 5 to the third power: $5^3 = 125$.

**Answer: 125**

## PRACTICE 6 problems

**1** Evaluate $16^{3/2}$.

**ANSWER** _____

**2** Evaluate $27^{2/3}$.

**ANSWER** _____

**3** Evaluate $81^{-1/2}$.

**ANSWER** _____

**4** Evaluate $32^{2/5}$.

**ANSWER** _____

**5** Evaluate $(1/8)^{-2/3}$.

**ANSWER** _____

**6** Evaluate $9^{3/2}$.

**ANSWER** _____

## APPLY IT Show your work

**1** You make a square pixel-art icon that covers 196 pixels. Its side length is $196^{1/2}$ pixels. How many pixels long is one side?

WORK SPACE

**ANSWER** _____

**2** In a building game, you arrange 216 blocks into a cube. The number of blocks on one face is $216^{2/3}$. How many blocks are on one face?

WORK SPACE

**ANSWER** _____

## CHALLENGE One step up

Evaluate $8^{-2/3} \times 36^{3/2}$. Show how you handle the negative exponent.

WORK SPACE AND ANSWER

**ANSWER KEY**

# Power Up Exponents

**GRADE 7 · 7A.AF.B**

## PART 1 · PRACTICE

| # | PROBLEM | ANSWER |
|---|---|---|
| 1 | Evaluate $16^{3/2}$. | **64** |
| 2 | Evaluate $27^{2/3}$. | **9** |
| 3 | Evaluate $81^{-1/2}$. | **1/9** |
| 4 | Evaluate $32^{2/5}$. | **4** |
| 5 | Evaluate $(1/8)^{-2/3}$. | **4** |
| 6 | Evaluate $9^{3/2}$. | **27** |

## PART 2 · APPLY IT

1. **14 pixels** The square root of 196 is 14.
2. **36 blocks** The cube root of 216 is 6. Square 6 to get 36 blocks on one face.

## CHALLENGE

**54. Since $8^{2/3} = 4$, $8^{-2/3} = 1/4$. Also, $36^{3/2} = 216$, and $1/4 \times 216 = 54$.**

Accept equivalent exact fractions. For the challenge, look for a reciprocal when the student evaluates the negative exponent.