Algebra 1 7.3

Evaluate and rewrite expressions involving rational exponents

Solve equations with rational exponents

rational

inverse operation

radical sign

square root

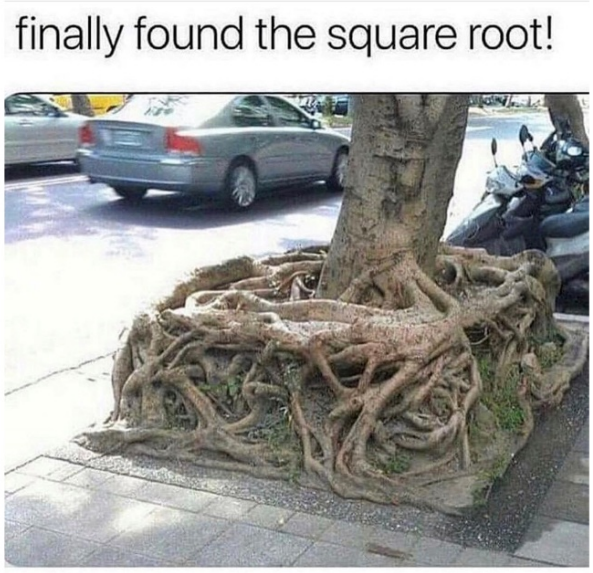
cube root

nth root

exponential equation

matching activity

whiteboards



**GuidedPractice**

**1A.** $a^{\frac{1}{2}}$

$\sqrt{a}$

$\sqrt{a}$

**1B.** $\sqrt{22}$

$(22)^{\frac{1}{2}}$

$22^{\frac{1}{2}}$

**1C.** $(7w)^{\frac{1}{2}}$

$7w^{\frac{1}{2}}$

$\sqrt{7w}$

$7 \cdot \sqrt{w}$

**1D.** $2\sqrt{x}$

$2x^{\frac{1}{2}}$

$2(x)^{\frac{1}{2}}$

## GuidedPractice

**2A.** $\sqrt[3]{64} = 4$

**2B.** $\sqrt[4]{10{,}000}$

$(\ ?\ )^3 = 64$

$(\ ?\ )^4$

$3^{x} = 3^{5}$

$3^{?} = 3 \cdot 3 \cdot 3 \cdot 3 \cdot 3$

$x = 5$

$3 = \frac{6}{2}$

$3 = 3$

Are the numbers equal?
Are the bases the same?
Well then....

$5^{x-1} = 125$

**Example 5** Solve Exponential Equations

**Solve each equation.** $5^{(x-1)} = (5)^3$

**a.** $6^x = 216$

$6^x = (6)^3$

$x = 3$

$x - 1 = 3$

$+1 \quad +1$

$x = 4$

**b.** $25^{x-1} = 5^1$

$(5^2)^{(x-1)} = 5^1$

$2x - 2 = 1$

$+2 \quad +2$

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

Hint: can both sides be written using the same base?
(If the numbers are equal, and the bases are the same...)

## GuidedPractice

**5A.** $5^x = 125$ ?

$(5)$

$5^x = 5^3$

$x = 3$

**5B.** $12^{2x+3} = 144$

$12^{2x+3} = 12^2$

$2x+3 = 2$

$-3 \quad -3$

$2x = -1$

$\frac{2x}{2} = \frac{-1}{2}$

$x = -\frac{1}{2}$

$x = 12$

**Solve each equation.**

**79.** $2^{5x} = 8^{2x-4}$

$2^{5x} = (2^3)^{2x-4}$

$2^{5x} = 2^{6x-12}$

$5x = 6x - 12$

$-6x \quad -6x$

$-x = -12$

$x = 12$

**80.** $81^{2x-3} = 9^{x+3}$

**82.** $16^x = \frac{1}{2}$

**83.** $25^x = \frac{1}{125}$

WB prac. 1–15

$(5^2)^x = (5^{-3})$

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

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

$$4^{x} = 32^{2x-5}$$

$$\downarrow \qquad \downarrow$$

$$\left(2^{2}\right)^{x} = \left(2^{5}\right)^{2x-5}$$

$$2x = 10x - 25$$