rational

$(49)^{\frac{1}{2}} = \sqrt{49} = 7$

radical

Algebra 1 7.3

Evaluate and rewrite expressions involving rational exponents

Solve equations with rational exponents

rational

inverse operation

radical sign

square root (8th grade standard)

cube root

nth root

exponential equation

whiteboards

$(25)^{\frac{1}{2}} = \sqrt{25} = 5$

$(\ )^2 = 25$

Quiz 7.1-7.2

Square root $\sqrt{(\quad)}$

$\sqrt{25} = 5$

$\sqrt{49} = 7$

$\sqrt{36} = 6$

8th grade standard
perfect square
irrational

$\sqrt{42} = 6.480740698$

≈ 6.48

You have to know the code:

KeyConcept $b^{\frac{1}{2}}$

Words	For any nonnegative real number b, $b^{\frac{1}{2}} = \sqrt{b}$.
Examples	$16^{\frac{1}{2}} = \sqrt{16}$ or 4 $\qquad$ $38^{\frac{1}{2}} = \sqrt{38}$

$16^{\frac{1}{2}}$ $\qquad$ $16\frac{1}{2}$

Example 1 Radical and Exponential Forms

Write each expression in radical form, or write each radical in exponential form.

a. $25^{\frac{1}{2}} = \sqrt{25}$

b. $\sqrt{18}$ $(18)^{\frac{1}{2}}$

c. $5x^{\frac{1}{2}}$ $5\sqrt{x}$

d. $\sqrt{(8p)}$ $(8p)^{\frac{1}{2}}$ $8p^{\frac{1}{2}}$

Reminder: radical $\sqrt[3]{\sqrt{}}$ is also a grouping symbol

$\sqrt{(2 \cdot 5 \cdot 6)} = \sqrt{60}$

$\sqrt[3]{18}$

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1A. $a^{\frac{1}{2}}$ **1B.** $\sqrt{22}$ **1C.** $(7w)^{\frac{1}{2}}$ **1D.** $2\sqrt{x}$

$\sqrt{a}$ $(22)^{\frac{1}{2}}$ $\sqrt{7w}$ $2\cdot(x)^{\frac{1}{2}}$

Grouping symbol

KeyConcept *n*th Root

Words	For any real numbers a and b and any positive integer n, if $a^n = b$, then a is an nth root of b.
Example	Because $2^4 = 16$, 2 is a fourth root of 16; $\sqrt[4]{16} = 2$.

index

index

Example 2 *n*th roots

Simplify.

a. $\sqrt[3]{27}$ What's the number?

$= 3$

$(\quad)^3 = 27$

b. $\sqrt[5]{32} = 2$

$(\quad)^5 = 32$

guess & check

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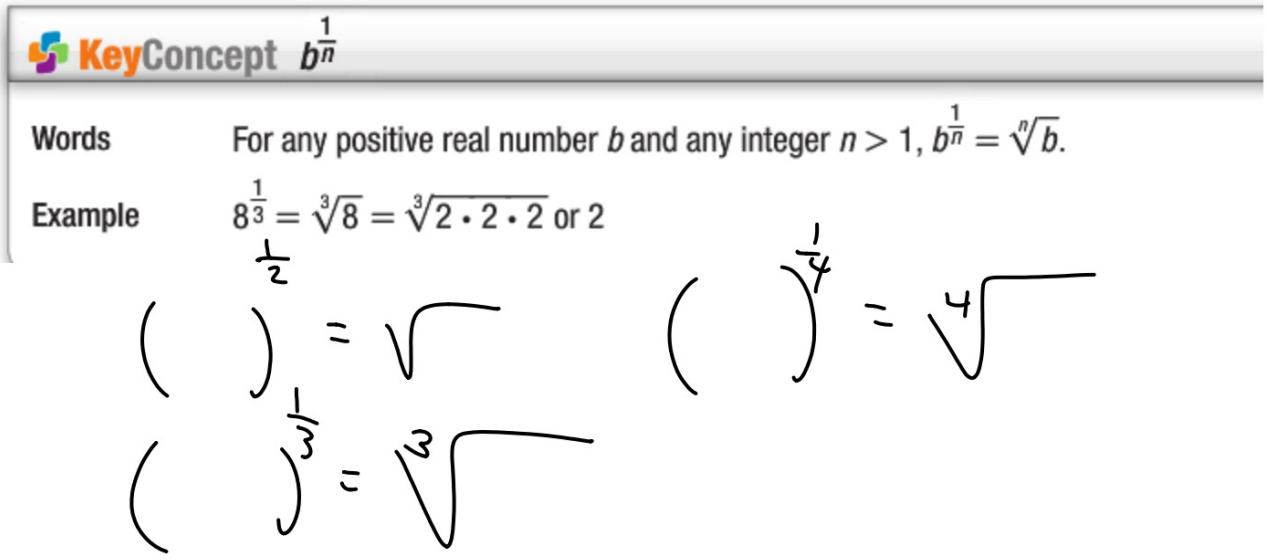
2A. $\sqrt[3]{64} = 4$

$(\ \ )^3 = 64$

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

$(\ \ )^4 = 10{,}000$

if 1/2 means square root...



Might be easier to see if written in radical form first...

Simplify.

a. $125^{\frac{1}{3}}$ $\sqrt[3]{125} = 5$ $(\ )^3 = 125$

b. $1296^{\frac{1}{4}}$ $\sqrt[4]{1296} = 6$ $(\ )^4 = 1296$

Groups of 3...
(triplets)

Groups of 4
(quads)

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3A. $27^{\frac{1}{3}} = 3$

3B. $256^{\frac{1}{4}} = 4$

*2 different ways...

Example 4 Evaluate $b^{\frac{m}{n}}$ Expressions

Simplify.

a. $64^{\frac{2}{3}}$

b. $36^{\frac{3}{2}}$

*root first

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4A. $27^{\frac{2}{3}}$

4B. $256^{\frac{5}{4}}$