Algebra 1 7.3

Evaluate and rewrite expressions involving rational exponents

Solve equations with rational exponents

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

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

rational

inverse operation

radical sign

square root

cube root

nth root

exponential equation

matching activity

whiteboards

GuidedPractice

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

1B. $\sqrt{22}$ $(22)^{\frac{1}{2}}$

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

1D. $2\sqrt{x}$ $2(x)^{\frac{1}{2}}$

GuidedPractice

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

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

$(64)^{\frac{1}{3}}$

$(10{,}000)^{\frac{1}{4}}$

Dominoes activity:
Shuffle face down
Each person takes 5 dominoes. The others remain face down.
Player 1 places a domino face up on the table.
Player 2 matches either end of the domino.
    If unable to do so, draws one from the unused pile.
    If player 2 can play the domino drawn, they may do so.
Players alternate turns until all dominoes are played.

10 min.

=

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

$x = 5$

$(49)^{\frac{3}{2}}$

$7^{3} = 343$

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

Example 5 Solve Exponential Equations

Solve each equation.

a. $6^x = 216$

$6^x = 6^3$

$x = 3$

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

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

$2x - 2 = 1$

$+2 \quad +2$

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

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

GuidedPractice

5A. $5^x = 125$

$5^x = 5^3$

$x = 3$

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

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

$2x + 3 = 2$

$-3 \quad -3$

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

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

2·2·2

Solve each equation.

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

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

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

$5x = 6x - 12$

$-6x \quad -6x$

$-x = -12$

$\frac{-x}{-1} = \frac{-12}{-1}$ $\quad x = 12$

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

$(9^2)^{2x-3} = 9^{x+3}$

$9^{4x-6} = 9^{x+3}$

$4x - 6 = x + 3$

$-x \quad +6 \quad -x + 6$

$3x = 9$

$\frac{3x}{3} = \frac{9}{3}$ $\quad x = 3$

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

$(2^4)^x = 2^{-1}$

$2^{4x} = 2^{-1}$

$\frac{4x}{4} = \frac{-1}{4}$

$x = -\frac{1}{4}$

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

$(5^2)^x = \frac{1}{5^3}$

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

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

$x = -1.5$