

number	-3	$2x + 3$
variable	n	
product	$5x$	$\frac{5}{x}$
	$\frac{1}{2}a$	

$$a^2 b c^2 a b^3 c = a^3 b^4 c^3$$

$$a \cancel{a} \cancel{b} \cancel{c} \cancel{a} \cancel{b} \cancel{b} \cancel{c}$$

$$2x^3y^4 \cdot 5xy^2$$

$$\cancel{2} \cancel{x} \cancel{x} \cancel{x} y y y y \cdot \cancel{5} x y y$$

$$10x^4y^6$$

$$\frac{x^3y^2a}{a \times y}$$

$$a \times y$$

$$\frac{\cancel{2} \cancel{x} \cancel{x} \cancel{x} y y \cancel{a}}{\cancel{3} \cancel{b} \cancel{a} \cancel{x} y}$$

$$\frac{x^2y}{1} = \frac{x^2y}{3}$$

$$\frac{4 x^4 y^{-2} a^2 b^3 b^4}{10 x^2 y a^4 b^{-5} y y}$$

$$3 x^1 y^4 a^3 = 3 y^4 a^3$$

$$2 x^{-4} y^3 a^2$$

$$\frac{2 \cancel{4} \cancel{x} \cancel{x} \cancel{x} \cancel{x} \cancel{a} \cancel{a} b b b b b b b}{5 \cancel{10} \cancel{x} \cancel{x} y \cancel{a} \cancel{a} \cancel{a} \cancel{a} y y}$$

$$= \frac{2 x^2 b^7}{5 a^2 y^3}$$

$$\frac{2 y^3 a^2}{x^4}$$

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

X exponential equation

whiteboards

$$\sqrt[3]{125} = 5$$

$$\sqrt[4]{(3n^3)} = (3n^3)^{\frac{1}{4}}$$

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

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

$$3x^{\frac{1}{2}}$$

$$3\sqrt{x}$$



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

$$x = 5$$

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

Example 5 Solve Exponential Equations

Solve each equation.

a. $6^x = 216$

$$6^x = 6^{\downarrow 3}$$

$$x = 3$$

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

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

$$2x - 2 = 1 \quad \frac{2x}{2} = \frac{3}{2}$$

Hint: can both sides be written using the same base?

(If the numbers are equal, and the bases are the same...)

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

Guided Practice

5A. $5^x = 125$

$$5^x = 5^3$$

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

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

$$\begin{array}{r} 2x + 3 = 2 \\ -3 \quad -3 \\ \hline 2x = -1 \\ \frac{2}{2} \quad \frac{2}{2} \\ x = -\frac{1}{2} \end{array}$$

Solve each equation.

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

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

$$\begin{aligned} 4^{2x} &= 32^2 \\ (2^2)^{2x} &= (2^5)^2 \\ 2^{4x} &= 2^{10} \end{aligned} \quad \begin{aligned} \frac{4x}{4} &= \frac{10}{4} \\ x &= 2.5 \end{aligned}$$

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

$$16^x = 2^{-1}$$

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

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

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

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

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

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

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1-SS eoo

1, 5, 9, 13 . . .