

Algebra 1

Chapter 7

Section 7-1

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Review: Evaluate the expressions using exponents

$$7^2$$
$$7 \cdot 7$$

$$49$$

$$9^3$$
$$9 \cdot 9 \cdot 9$$

$$729$$

$$2^6$$
$$2 \cdot 2 \cdot 2 \cdot 2 \cdot 2 \cdot 2$$

$$64$$

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Negative and Zero Exponents

What do you do?

5^{-3}

11^0

3^{-4}

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Exponents: Finding a pattern

Fill in the table using the equation: $y = 2^x$

x	y
4	$2^4 = 16$
3	$2^3 = 8$
2	$2^2 = 4$
1	$2^1 = 2$
0	1
-1	.5 $\rightarrow \frac{1}{2}$
-2	.25 $\rightarrow \frac{1}{4}$

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Exponents: Finding a pattern

Fill in the table using the equation: $y = 10^x$

x	y
4	$10^4 = 10,000$
3	$10^3 = 1,000$
2	$10^2 = 100$
1	$10^1 = 10$
0	1
-1	0.1 $\rightarrow \frac{1}{10}$
-2	0.01 $\rightarrow \frac{1}{100}$

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take note

Properties Zero and Negative Exponents

Zero as an Exponent For every nonzero number a , $a^0 = 1$.

Examples $4^0 = 1$ $(-3)^0 = 1$ $(5.14)^0 = 1$

Negative Exponent For every nonzero number a and integer n , $a^{-n} = \frac{1}{a^n}$.

Examples $7^{-3} = \frac{1}{7^3}$ $(-5)^{-2} = \frac{1}{(-5)^2}$

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Evaluate Using Negative and Zero Exponents

$$5^{-3} = \frac{1}{5^3}$$

$$\frac{1}{125}$$

$$11^0 = 1$$

$$3^{-4} = \frac{1}{3^4}$$

$$\frac{1}{81}$$

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Simplify Variable Expressions

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

$$a^0 = 1$$

$$y^{-1} = \frac{1}{y^1} = \frac{1}{y}$$

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Simplify Variable Expressions

$$\begin{array}{c} 5x^0 \\ \hline 5 \cdot 1 = 5 \end{array}$$

$$\begin{array}{c} 7b^{-2}c^4 \\ \hline 7c^4 \\ \downarrow \end{array}$$

$$(xy)^0 = 1$$

$$\frac{7c^4}{b^2}$$

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Simplify Variable Expressions

$$\left(\frac{5x}{7y}\right)^0 = 1$$

$$\cancel{7b^{-2}c^4}$$

$$(xy)^{-1}$$

$$\frac{1}{(xy)^1} = \frac{1}{xy}$$

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Simplify Variable Expressions

$$(-2)^{-4}$$

$$\frac{1}{(-2)^4}$$

$$\frac{1}{16}$$

$$-2^{-4}$$

$$-\left(\frac{1}{2^4}\right)$$

$$-\frac{1}{16}$$

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Simplify Variable Expressions

$$\left(\frac{xy}{z^2}\right)^{-1}$$

$$(xyz^2)^{-1}$$

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

$$\frac{b^5c^{-7}}{d^{-2}}$$

$$\frac{b^5d^2}{c^7}$$

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Evaluate Variable Expressions

$$b = 2, c = 3, d = 8$$

$$\frac{c^0 d^2}{b^5} = \frac{d^2}{b^5}$$

$$\frac{b^{-5} c^0}{d^{-2}}$$

OR...

$$\frac{2^{-5} 3^0}{8^{-2}}$$

$$\frac{8^2}{2^5} = \frac{64}{32} = 2$$

$$\frac{8^2}{2^5} = \frac{64}{32} = 2$$

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