Exponents and Exponent Rules

Learning Goal:

By the end of today, I will be able to evaluate powers that have a zero for an exponent, and powers that have a negative integer value for an exponent.

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Summary of Exponent Rules

$$a^m \times a^n = a^{m+n}$$

$$a^m \div a^n = a^{m-n}$$

$$\left(a^m\right)^n = a^{m\times n}$$

$$(ab)^m = a^m b^m \qquad \left(\frac{a}{b}\right)^n = \frac{a^n}{b^n}$$

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The Final Two Rules

$\frac{25}{25}$ = or $\frac{5^2}{5^2}$ =

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The Final Two Rules

$\frac{a^3}{a^3}$ = or $\frac{a \times a \times a}{a \times a \times a}$ =

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Shortcut for the Exponent being Zero

$$a^0 = 1$$

Example

$1000^0 =$

$(a+3b)^0 =$

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Simplify

$32^0 =$

$10{,}043^0 =$

$(34a - 1.9090435343)^0 =$

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By patterning....

$2^4 =$

$2^3 =$

$2^2 =$

$2^1 =$

$2^0 =$

$2^{-1} =$

$2^{-2} =$

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The Final Two Rules

Number	Exponent Rule	Expanded Form
$\frac{9}{27} =$	$\frac{3^2}{3^3} =$	$\frac{3 \times 3}{3 \times 3 \times 3}$

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Shortcut for the Exponent being Zero

$$a^{-n} = \frac{1}{a^n}$$

Example

$5^{-2} =$ $m^{-4} =$

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Simplify

$2^{-1} =$ $\left(\frac{3}{4}\right)^{-2} =$

$3^{-2} =$

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Simplify

$(5^3)(5^{-8})(5^{-2})$

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Simplify, leave your answer with positive exponents

$$\left(\frac{m}{b^5 v^{-6}}\right)^{-2} =$$

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Evaluate

$2^{-3} + 4^{-1} + 2^{-2} =$

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Evaluate

$$\frac{8^{-2}}{2^{-3}} =$$

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$$\left(a^m\right)^n = a^{m\times n}$$

$$(ab)^m = a^m b^m \qquad \left(\frac{a}{b}\right)^n = \frac{a^n}{b^n}$$

$$a^0 = 1 \qquad a^{-n} = \frac{1}{a^n}$$

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