

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

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

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

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

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

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The Final Two Rules

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

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The Final Two Rules

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

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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

$$\frac{9}{27} =$$

Exponent Rule

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

Expanded Form

$$\frac{3 \times 3}{3 \times 3 \times 3}$$

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Shortcut for the Exponent being Zero

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

Example

$$5^{-2} =$$

$$m^{-4} =$$

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Simplify

$$2^{-1} =$$

$$3^{-2} =$$

$$3^{-4} =$$

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

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

$$a^0 = 1 \quad a^{-1} = \frac{1}{a^1}$$

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