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Laws Of Exponents Worksheet Answer Key PDF

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Part 1: Foundational Knowledge

What is the result of any non-zero number raised to the power of zero?

undefined. 0

undefined. 1 ✓

undefined. The number itself

undefined. Undefined

Any non-zero number raised to the power of zero equals one.

Which of the following statements are true about exponents? (Select all that apply)

undefined. a^0 = 1 for any non-zero a ✓

undefined. a^1 = a ✓

undefined. 1^n = n

undefined. a^{-n} = 1/a^n ✓

The true statements include the properties of exponents related to zero and negative exponents.

Explain in your own words what an exponent represents in a mathematical expression.

An exponent represents the number of times a base is multiplied by itself.

Provide the formulas for the following laws of exponents: Product of Powers, Quotient of Powers.

1. Product of Powers

$a^m * a^n = a^{(m+n)}$

2. Quotient of Powers

$a^m / a^n = a^{(m-n)}$

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The Product of Powers law states a^m * a^n = a^(m+n), and the Quotient of Powers law states a^m / a^n = a^(m-n).

Which law of exponents is used in the expression (a^3)^2 = a^6?

undefined. Product of Powers

undefined. Quotient of Powers

undefined. Power of a Power ✓

undefined. Power of a Product

The law used is the Power of a Power, which states that (a^m)^n = a^(m*n).

Part 2: comprehension

What is the simplified form of (2^3 × 2^4)?

undefined. 2^7 ✓

undefined. 2^{12}

undefined. 2^{14}

undefined. 2^1

The simplified form is 2^7, as you add the exponents.

Which of the following expressions are equivalent to a^5/a^2? (Select all that apply)

undefined. a^3 ✓

undefined. a^{-3}

undefined. a^{10}

undefined. a^{2.5}

The equivalent expression is a^3, as you subtract the exponents.

Describe how the power of a product rule can be applied to simplify the expression (3x)^4.

The power of a product rule states that (ab)^n = a^n * b^n, so (3x)^4 = 3^4 * x^4.

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Part 3: Application and Analysis

If $x^3 = 8$, what is x^{-3}?

undefined. 1/8 ✓

undefined. 8

undefined. 1/2

undefined. 2

x^{-3} is equal to 1/8, as it is the reciprocal of x^3.

Simplify the expression $(2^2 \times 3^3)^2$ and select the correct answers. (Select all that apply)

undefined. $2^4 \times 3^6$ ✓

undefined. 4 × 27

undefined. 16 × 81

undefined. 256 × 729

The simplified expression is $2^4 \times 3^6$, as you apply the power to each factor.

Apply the laws of exponents to simplify the expression $(x^2 y^3)^2 / x^3 y$.

The expression simplifies to $x^{(2-3)} y^{(6-1)} = y^5/x$.

Which expression is equivalent to $(a^3 b^{-2})^2$?

undefined. $a^6 b^{-4}$ ✓

undefined. $a^5 b^{-3}$

undefined. $a^6 b^4$

undefined. $a^3 b^{-2}$

The equivalent expression is $a^6 b^{-4}$, as you apply the power to both a and b.

Analyze the following expressions and identify which are equivalent to $a^4 \times a^{-2}$. (Select all that apply)

undefined. a^2 ✓

undefined. $1/a^2$

undefined. a^6

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undefined. a^6/a^4

The equivalent expression is a^2, as you subtract the exponents.

Break down the expression (x^2 y^{-1})^3 and explain each step of the simplification process.

The expression simplifies to x^6 y^{-3}, applying the power to both x and y.

Part 4: Evaluation and Creation

Which of the following statements best evaluates the expression (2^3 × 3^{-1})^2/6?

undefined. The expression simplifies to 1

undefined. The expression simplifies to 4 ✓

undefined. The expression simplifies to 8

undefined. The expression simplifies to 16

The expression simplifies to 4, after evaluating the components.

Evaluate the correctness of the following simplifications and select the correct ones. (Select all that apply)

undefined. (a^2 b^3)^0 = 1 ✓

undefined. a^{-2} b^2 = b^2/a^2 ✓

undefined. (ab)^{-1} = a^{-1} b^{-1} ✓

undefined. (a^3 b^{-3})^{-1} = a^{-3} b^3 ✓

The correct simplifications include those that accurately apply the laws of exponents.

Create a real-world scenario where the laws of exponents could be applied to solve a problem. Describe the scenario and explain how you would use the laws of exponents to find a solution.

A scenario could involve population growth, where the population doubles every year, and you can use exponents to model this growth.

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