Exponents Rules Worksheet Answer Key PDF

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Part 1: Building a Foundation

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 are correct applications of the Product of Powers Rule? (Select all that apply)

undefined. x^3 \times x^2 = x^5 ✓

undefined. y^4 \times y^0 = y^4 ✓

undefined. z^2 \times z^3 = z^6

undefined. a^1 \times a^1 = a^2 ✓

The correct applications are those that correctly add the exponents.

Explain the Power of a Quotient Rule in your own words and provide an example.

The Power of a Quotient Rule states that when dividing powers with the same base, you subtract the exponents. An example is (a^m / a^n = a^(m-n)).

List the formulas for the following exponent rules:

1. Product of Powers

a^m * a^n = a^(m+n)

2. Quotient of Powers

a^m / a^n = a^(m-n)

3. Power of a Power

(a^m)^n = a^(m*n)

The formulas are: Product of Powers: a^m * a^n = a^(m+n), Quotient of Powers: a^m / a^n = a^(m-n), Power of a Power: (a^m)^n = a^(m*n).

Part 2: Comprehension and Application

If a^m \times a^n = a^{12} and m = 5, what is the value of n?

undefined. 6

undefined. 7 ✓

undefined. 8

undefined. 9

To find n, use the equation 5 + n = 12, which gives n = 7.

Which expressions are equivalent to (3x)^2? (Select all that apply)

undefined. 9x^2 ✓

undefined. 3x \times 3x ✓

undefined. 6x

undefined. x^2 \times 9

The equivalent expressions will correctly apply the square to both the coefficient and the variable.

Apply the exponent rules to simplify the expression (\frac{x^3y^2}{x^2y})^2.

The expression simplifies to x^2y^2 after applying the rules.

Simplify the expression (2^3 \times 2^4) \div 2^5.

undefined. 2^2 ✓

undefined. 2^3

undefined. 2^4

undefined. 2^5

The expression simplifies to 2^2 after applying the rules.

Part 3: Analysis, Evaluation, and Creation

Which of the following statements correctly analyzes the expression (x^2y)^3?

undefined. It simplifies to x^6y^3 ✓
undefined. It simplifies to x^5y^3
undefined. It simplifies to x^3y^6
undefined. It simplifies to x^6y^6

The correct analysis is that it simplifies to x^6y^3.

Analyze the following expressions and select those that are equivalent to a^{-2} b^3. (Select all that apply)

undefined. \frac{ b^3}{ a^2} ✓
undefined. \frac{1}{ a^2 b^{-3}}
undefined. \frac{ b^3}{ a^{-2}}
undefined. a^2 b^3

The equivalent expressions will correctly represent the negative exponent.

Evaluate the correctness of the statement: "The expression (a^3 b^{-2})^2 simplifies to a^6 b^{-4}." Explain your reasoning.

The statement is correct as it applies the Power of a Power Rule correctly.

Evaluate which of the following statements are true about the expression (\frac{2x}{y})^{-3}. (Select all that apply)

undefined. It is equivalent to \frac{y^3}{8x^3} ✓
undefined. It is equivalent to \frac{8x^3}{y^3}
undefined. It is equivalent to \frac{1}{(2x)^3} \times y^3
undefined. It is equivalent to \frac{y^3}{2^3 x^3} ✓

The true statements will correctly apply the negative exponent rule.

Create a real-world scenario where the Power of a Product Rule can be applied, and explain how you would solve it using the rule.

A scenario could involve calculating the area of a square with side length (2x). The area would be (2x)^2 = 4x^2.

Synthesize your understanding of exponent rules by solving the following:

1. Simplify (a^2 b^3)^2 \div a^4 b

Simplifies to b^2

2. Simplify \frac{(x^3 y^{-1})^2}{x^2 y}

Simplifies to x^4 y^{-3}

The simplified forms are: (a^2 b^3)^2 \div a^4 b = b^2 and \frac{(x^3 y^{-1})^2}{x^2 y} = x^4 y^{-3}.