

Laws of Exponents

1. **Do Now**: Simplify.

a) $(-6x^2y)(2xy)$

b) $\frac{8x^3y}{2xy}$

c) $(x^2)^3$

d) $(2x)^3$

e) $(-3)^2$

f) -3^2

2. Multiplication Rule: $x^a \cdot x^b =$ _____

Division Rule: $\frac{x^a}{x^b} =$ _____

Power Rule: $(x^a)^b =$ _____

3. Simplify.

a) $(-4xy^2)^3$

b) $\left(\frac{a^3}{b^2}\right)^3$

c) $\left(\frac{-x}{3y^2}\right)^3$

4. Power of a Product Rule: $(xy)^a =$ _____

Power of a Quotient Rule: $\left(\frac{x}{y}\right)^a =$ _____

5. Use the Division Rule to simplify.

a) $\frac{x^3}{x^3}$

b) $\frac{x^4}{x^3}$

c) $\frac{x^3}{x^4}$

6. What can you conclude about zero exponents and negative exponents?

a) _____

b) _____

Examples

7. Find the value of $3a^0 + a^{-2}$ if $a = 4$.

8. Write the expression $\frac{2c^2}{a^3c^{-2}}$ without a denominator.

9. Using only positive exponents, write an expression equivalent to $\frac{5x^{-4}}{y^{-2}}$.

10. If $P(t) = 3000\left(\frac{1}{2}\right)^{-t}$ represents the population of a certain microorganism after t days, find the population after 2 days.