

# UNIT 5: RULES OF EXPONENTS FOLDABLE

## EXPONENT RULES

What it looks like:

$$\begin{aligned}(x^a)(x^b) &= \\ (2^3)(2^4) &= \\ (5^{-2})(5^6) &= \end{aligned}$$

Product  
( $\times$ )  
Rule

What it looks like:

$$\begin{aligned}\frac{x^a}{x^b} \\ \frac{2^7}{2^3} \text{ or } \frac{3^{-4}}{3^{-2}}\end{aligned}$$

Quotient  
( $\div$ )  
Rule

What it looks like:

$$\begin{aligned}x^{-n} \\ 4^{-2} \quad -5^{-2} \\ (-3)^{-2}\end{aligned}$$

Negative  
Exponent  
Rule

What it looks like:

$$\begin{aligned}x^0 \\ 19^0 \quad -9^0 \\ (-7)^0\end{aligned}$$

Zero  
Exponent  
Rule

What it looks like:

$$\begin{aligned}\text{Integer Results} &\left\{ \begin{array}{l} 1.234 \times 10^7 \\ -4.321 \times 10^5 \end{array} \right. \\ \text{(Fraction) Decimal Results} &\left\{ \begin{array}{l} 3.124 \times 10^{-4} \\ -2.314 \times 10^{-5} \end{array} \right.\end{aligned}$$

Scientific  
Notation  
Rule

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## EXPONENT RULES

What it looks like:

$$\begin{aligned} (x^a)(x^b) &= x^{a+b} \\ (2^3)(2^4) &= 2^7 \\ (5^{-2})(5^6) &= 5^4 \end{aligned}$$

What to do:

Keep the Base,  
ADD the exponents

What it looks like:

$$\begin{aligned} \frac{x^a}{x^b} &= x^{a-b} \\ \frac{2^7}{2^3} &= 2^5 \\ \frac{3^{-4}}{3^{-2}} &= 3^{-2} \end{aligned}$$

What to do:

Keep the Base,  
SUBTRACT the exponents

What it looks like:

$$\begin{aligned} x^{-n} \\ 4^{-2} \quad -5^{-2} \\ (-3)^{-2} \end{aligned}$$

$$\begin{aligned} \frac{1}{x^n} &= x^{-n} \\ \frac{1}{16} &= \frac{1}{4^2} \\ \frac{1}{25} &= \frac{1}{5^2} \\ \frac{1}{9} &= \frac{1}{(-3)^2} \end{aligned}$$

What to do:

**FRACTIONS result!**  
• Put base over 1  
• Flip the fraction  
• Change sign of exponent

What it looks like:

$$\begin{aligned} x^0 \\ 19^0 \quad -9^0 \\ (-7)^0 \end{aligned}$$

$$\begin{aligned} x^0 &= 1 \\ 19^0 &= 1 \\ -9^0 &= -1 \\ (-7)^0 &= 1 \end{aligned}$$

What to do:

Any number raised to the zero power is **ONE**

What it looks like:

Integer Results

$$\begin{aligned} 1.234 \times 10^7 \\ -4.321 \times 10^5 \end{aligned}$$


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Fractional Results

$$\begin{aligned} 3.124 \times 10^{-4} \\ -2.314 \times 10^{-5} \end{aligned}$$

What to do:

**Positive Exponent**  
Move decimal to the **RIGHT**

**Negative Exponent**  
Move decimal to the **LEFT**

# UNIT 5: RULES OF EXPONENTS FOLDABLE

Back of Foldable

## Power to a Power Rule

What it looks like:

$$(x^a)^b \rightarrow x^{a \cdot b}$$

$$(3^1 a^2)^3 \rightarrow 3^{(1 \cdot 3)} a^{(2 \cdot 3)} = 3^3 a^6$$

$$(2x^3y^4)^3 \rightarrow 2^{(1 \cdot 3)} x^{(3 \cdot 3)} y^{(4 \cdot 3)} = 2^3 x^9 y^{12}$$

What to do:

Keep the Base(s),

**MULTIPLY** the outside exponent with all exponents on inside bases

$(3^1 x^2 \cdot 2x^2)^2$  ← simplify inside parenthesis first!

$$(6x^4)^2 \rightarrow 6^{(1 \cdot 2)} x^{(4 \cdot 2)} = 6^2 x^8$$

Use Products Rule

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