

# Notes



**Be prescriptive and directive, tell student what to write and where to write it. Those directions ensure white space and no visual overload so students can study more effectively and efficiently.**

**Notes should support and reflect instruction.**

**Should include a title, date, objective, identifications, vocabulary & notation, how to say it, pattern or concept development that lead to rules, formulas, procedures, examples using the rules, guided practice, and variations with explanations.**

# EXPONENTIALS

1/2 OBJ: TO SIMPLIFY EXPONENTIALS BEING MULTIPLIED BY THE SAME BASE

EXPONENT - TELLS YOU HOW MANY TIMES TO USE THE BASE AS A FACTOR

$$\begin{array}{c} 2^3 - \text{EXPONENT} \\ 2 \\ \cdot \\ \text{BASE} \end{array}$$

$2^3$ , READ 2 to the THIRD POWER or 2 cubed

$$\begin{array}{l} \text{BY DEFINITION;} \quad 2^3 = 2 \cdot 2 \cdot 2 \\ \quad \quad \quad \quad \quad = 8 \end{array}$$

EX. SIMPLIFY IN STANDARD FORM -  $3^4$

$$\begin{array}{l} 3^4 = 3 \cdot 3 \cdot 3 \cdot 3 \\ \quad = 81 \end{array}$$

EX. SIMPLIFY IN EXPONENTIAL FORM

$$2^3 \cdot 2^4$$

$$(2 \cdot 2 \cdot 2) \cdot (2 \cdot 2 \cdot 2 \cdot 2)$$

HOW MANY TIMES IS 2 BEING USED AS A FACTOR? - 7 times.  $2^3 \cdot 2^4 = 2^7$

Ex. Simplify in exponential notation

$$\begin{aligned} & 3^2 \cdot 3^5 \\ &= (3 \cdot 3) \cdot (3 \cdot 3 \cdot 3 \cdot 3 \cdot 3) \\ &= 3^7 \end{aligned}$$

Ex. Simplify  $5^2 \cdot 5^8$  in exponential notation

$$\begin{aligned} & 5^2 \cdot 5^8 \\ &= (5 \cdot 5) \cdot (5 \cdot 5 \cdot 5 \cdot 5 \cdot 5 \cdot 5 \cdot 5) \\ &= 5^{10} \end{aligned}$$

? Is there a pattern?

**Rule 1.** WHEN YOU MULTIPLY EXPONENTIALS WITH THE SAME BASE, YOU ADD THE EXPONENTS

$$\begin{aligned} \text{Ex. } 3^4 \cdot 3^5 &= 3^{4+5} \\ &= 3^9 \end{aligned}$$

$$\begin{aligned} \text{Ex } x^4 \cdot x^2 &= x^{4+2} \\ &= x^6 \end{aligned}$$

GENERALIZING:  $A^x \cdot A^y = A^{x+y}$

$$\begin{aligned} \text{Ex. } 7 \cdot 7^4 &= \\ &= 7^5 \end{aligned}$$



IF A NUMBER DOES NOT HAVE AN EXPONENT, IT IS UNDERSTOOD TO BE 1;  
 $7 \cdot 7^4 = 7^1 \cdot 7^4$

WHEN YOU MULTIPLY EXPONENTIALS WITH THE SAME BASE, YOU ADD THE EXPONENTS

$$\text{EX } 3^2 \cdot 3^5 = 3^7$$

$$\text{EX } 5^2 \cdot 5^8 = 5^{10}$$

$$\text{EX } 7 \cdot 7^4 = 7^5$$

$$\text{EX } 2^3 \cdot 5^2 \cdot 2^4 \cdot 5^6 = 2^7 \cdot 5^8$$

$$\text{EX } 3^4 \cdot 7^2 \cdot 3 \cdot 7^8 = 3^5 \cdot 7^{10}$$