Unit 5 Day 3: The Product Rule of Exponents

Focus Question: How do I multiply bases with different exponents?

A. Exponential Form using variables

Exponential Form and Expanded Form also work when variables are used in place of numbers.

Write each of the following in expanded form.

1. 485

2. $7x^{\sqrt{3}}$

3. $15m^{8}$

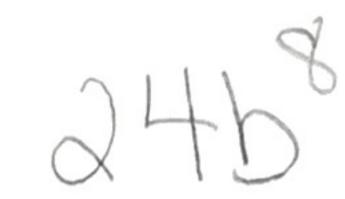
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Write each of the following in exponential form.

4. $3 \cdot j \cdot j \cdot j \cdot j$

3.4

5. $24 \cdot b \cdot b \cdot b \cdot b \cdot b \cdot b \cdot b$



6. $10 \cdot d \cdot d$

102

B. The Product Rule of Exponents

1. Write each of the following in expanded form. Then write the answer in exponential form.

Problem	Expanded Form	Exponential Form
22024	2.2.2.2	26
$a)$ 3^4 $\odot 3^3$	3.3.3.3.3.3	3
b) 6 ⁵ · 6 ⁴		6
$c)$ $x^3 \odot x^7$	X·X·X·X·X·X·X·X	X10:
$d) y^2 0 y^1$	y.y.y	3
$e)$ $a^4 \cdot a^6$		210

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2. Finish the following equation to express **The Product Rule** of exponents. a^m

 $a^m \cdot a^n = 0$ \uparrow

3. Explain when you can use the product rule.

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Problem	Work	Exponential form	
$4^2 \cdot 4^3$	42+3	45	
$10^{7} \cdot 010^{-4}$	107+-4	103	
$x^8 \odot x^7$	X 8+7	X 15	
$y^{13}Qy^{-5}$	13+-5	8	

If you ever forget the short cut...use expanded form!

5. Either simplify each expression or fill in the boxes to make the equation true. (Some problems are almost algebra 1 level: Hint, re-write the problem using the commutative property so that the same bases are next to each other.)

a.
$$3^5 \cdot 3^2 = 3^{5+2} + 37$$
b. $m^{2} \cdot m^{8} = m^{10}$

b.
$$m^{2} = m^{10}$$

c.
$$g^3 \cdot g^2 \cdot g^8$$
 $3 + 2 + 8 = 13$ d. $5 = 5^{12}$

d.
$$5^{11} \cdot 5^{15} \cdot 5^{3} = 5^{12}$$

e.
$$4x^2 \cdot 3x^4$$

 $4 \cdot 3 \cdot x^2$, $x^4 = 12 \times 2^{+1}$ $2x^4$ $-3 \cdot 5 \cdot m^2$ $= -15 \cdot m^2$
g. $2n^{3} \cdot 8n^{5} = 16n^8$ h. $8k^4 \cdot k^4 = 8 \times 4^{+1} = 8 \times 5$

i.
$$6y^3 \cdot 4y^5$$

j.
$$10^{\frac{4}{11}}$$
 $10^{\frac{1}{11}}$