Lesson 3: Numbers in Exponential Form Raised to a Power

Classwork

For any number x and any positive integers m and n,		
$(x^m)^n = x^{nm}$ because		
$(x^{m})^{n} = \underbrace{(x \cdot x \cdots x)^{n}}_{m \text{ times}}$ $= \underbrace{(x \cdot x \cdots x)}_{m \text{ times}} \times \cdots \times \underbrace{(x \cdot x \cdots x)}_{m \text{ times}}$		
$= x^{nm}.$		

Exercise 1	Exercise 3
$(15^3)^9 =$	$(3.4^{17})^4 =$
Exercise 2	Exercise 4
$((-2)^5)^8 =$	Let <i>s</i> be a number.

Exercise 5

Sarah wrote $(3^5)^7 = 3^{12}$. Correct her mistake. Write an exponential expression using a base of 3 and exponents of 5, 7, and 12 that would make her answer correct.

 $(s^{17})^4 =$

Exercise 6

A number y satisfies $y^{24} - 256 = 0$. What equation does the number $x = y^4$ satisfy?



Numbers in Exponential Form Raised to a Power

Creative Commons Attribution-NonCommercial-ShareAlike 3.0 Unported License.

Lesson 3

8•1

For any numbers x and y, and positive integer n,

Lesson 3 8•1

$(xy)^{n} = \underbrace{(xy)\cdots(xy)}_{n \text{ times}}$ $= \underbrace{(x \cdot x \cdots x)}_{n \text{ times}} \cdot \underbrace{(y \cdot y \cdots y)}_{n \text{ times}}$ $= x^{n}y^{n}.$		
Exercise 7	Exercise 10	
$(11 \times 4)^9 =$	Let <i>x</i> be a number.	
	$(5x)^7 =$	
Exercise 8	Exercise 11	
$(3^2 \times 7^4)^5 =$	Let x and y be numbers.	
	$(5xy^2)^7 =$	
Exercise 9	Exercise 12	

 $(xy)^n = x^n y^n$

Let a, b, and c be numbers.	Let <i>a</i> , <i>b</i> , and <i>c</i> be numbers.
$(3^2a^4)^5 =$	$(a^2bc^3)^4 =$

Exercise 13

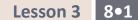
because

Let x and y be numbers, $y \neq 0$, and let n be a positive integer. How is $\left(\frac{x}{y}\right)^n$ related to x^n and y^n ?



Numbers in Exponential Form Raised to a Power





Problem Set

- 1. Show (prove) in detail why $(2 \cdot 3 \cdot 7)^4 = 2^4 3^4 7^4$.
- 2. Show (prove) in detail why $(xyz)^4 = x^4y^4z^4$ for any numbers *x*, *y*, *z*.
- 3. Show (prove) in detail why $(xyz)^n = x^n y^n z^n$ for any numbers x, y, and z and for any positive integer n.



Numbers in Exponential Form Raised to a Power



