U2D1_T- Exponent Laws Part I

Saturday, February 10, 2018 9:36 AM

U2D1_T-
Exponent ...

Unit 2: Polynomials (Chapter 3 in Textbook!)

Day 1 - Exponent Laws Part I

A: Simplifying Exponential Expressions - Product Law

Complete the following table:

Product	Expanded Form	Single Power
a) $(3^2)(3^4)$ ($2+4=6$)	$3\cdot3\cdot3\cdot3\cdot3\cdot3$	3^6
b) $(5^3)(5^4)$	$5\cdot5\cdot5\cdot5\cdot5\cdot5\cdot5$	5^7
c) $(7^2)(7^4)(7^3)$	$7\cdot7\cdot7\cdot7\cdot7\cdot7\cdot7\cdot7\cdot7$	7^9
d) $(x^3)(x^4)$	$x\cdot x\cdot x\cdot x\cdot x\cdot x\cdot x$	x^7
e) $(x^2)(x^7)(x^1)$	$x\cdot x\cdot x\cdot x\cdot x\cdot x\cdot x\cdot x\cdot x\cdot x$	x^{10}

(or multiplication rule)
PRODUCT RULE: When multiplying powers with the same base . . . $x^a \cdot x^b = x^{a+b}$

Keep the BASE the SAME and ADD the EXPONENTS

B: Simplifying Exponential Expressions - Quotient Law

Complete the following table:

Quotient	Expanded Form	Single Power
a) $(5^3) \div (5^2)$	$\frac{5\cdot5\cdot5}{5\cdot5} = 5$	$5^1 = 5$
b) $(4^3) \div (4)$	$\frac{4\cdot4\cdot4}{4} = 4\cdot4$	4^2
c) $(3^6) \div (3^4)$	$\frac{3\cdot3\cdot3\cdot3\cdot3\cdot3}{3\cdot3\cdot3\cdot3} = 3\cdot3$	3^2
d) $(x^4) \div (x^2)$	$\frac{x\cdot x\cdot x\cdot x}{x\cdot x} = x\cdot x$	x^2
e) $(x^7) \div (x^3)$	$\frac{x\cdot x\cdot x\cdot x\cdot x\cdot x\cdot x}{x\cdot x\cdot x} = x\cdot x\cdot x\cdot x$	x^4

QUOTIENT RULE: When dividing powers with the same base . . .

$$x^a \div x^b = x^{a-b}$$

Keep the BASE the SAME and SUBTRACT the EXPONENTS

Examples: Simplify and evaluate the following:

*ADD exponents
*BASE stays the same

a) $3^1 \times 3^3$

$= 3^{1+3}$

$= 3^4 = 81$

b) $2^2 \times 2^2 \times 2$

$= 2^{2+2+1}$

$= 2^5 = 32$

c) $y^2\, y^3\, y$ for (i) y = 2 (ii) y = -1

$= y^{2+3+1}$

$= y^6$

(i) $(2)^6 = 64$

(ii) $(-1)^6 = 1$

d) $4x^3x^2$ for x = 10

$= 4x^5$

$4(10)^5$

$= 4 \times 100\,000$

$= 400\,000$

e) $3^5 \div 3^4$

$= 3^{5-4}$

$= 3^1 = 3$

*SUBTRACT EXPONENTS
*BASE stays the same

f) $4^6 \div 4^3$

$= 4^{6-3}$

$= 4^3$

$= 64$

g) $3x^5 \div x^3$ for x = 4

$= 3x^{5-3}$

$= 3x^2$

$3(4)^2$

$= 3(16)$

$= 48$

} follow BEDMAS

h) $(3m^3n^2)(-m^4n^5)$

$= (3)(-1)\,m^{3+4}\,n^{2+5}$

$= -3m^7n^7$

*multiply the coefficients → 3, −1
*add the exponents on the m's
*add the exponents on the n's

i) $\frac{-48a^3b^5}{-4ab^2}$

*divide the coefficients
*subtract the exponents on the a's
*subtract the exponents on the b's

$= \left(\frac{-48}{-4}\right)\left(\frac{a^3}{a}\right)\left(\frac{b^5}{b^2}\right)$

$= 12a^{3-1}b^{5-2}$

$= 12a^2b^3$

$\frac{-8m^4n^7}{16n^2}$

$= \frac{-1m^4n^5}{2}$

$= -\frac{m^4n^5}{2}$

Page 126 #1-4

(#2 only evaluate b,c,d, #4 only evaluate b,c,d)

NOTE: $a\frac{2}{5}b^3 = \frac{2}{5}ab^3$

+ "Why are Babies Like Hinges..."
see web-page