# 2.4 Exponents Laws I

Wednesday, November 18, 2015 12:13 PM

**2.4 – Exponent Laws I** **Name**_____ _____
**Math 9** **Blk**____
**Notes**

**Warmup:**
Complete the table and see if you can find a pattern:

| Product of Powers | Product as Repeated Multiplication | Product as a Power |
|---|---|---|
| $5^4 \times 5^2$ | (5x5x5x5) x (5x5) | $5^6$ |
| $3^5 \times 3^4$ | 3x3x3x3x3x3x3x3x3 | $3^7$ |
| $2^3 \times 2^3$ | ..... | $2^6$ |
| $4^6 \times 4$ | | $4^7$ |

What is the Exponent Law for a Product of Powers?

To multiply powers with the same base, add the exponents. $a^x \cdot a^y = a^{x+y}$

Ex1
Write each expression as a power:

a) $3^5 \times 3^2$

$3^{5+2}$
$= 3^7$

b) $6 \times 6^3 \times 6^4$

$6^{1+3+4}$
$= 6^8$

What is $8^7 \div 8^4$? $= \frac{8^7}{8^4} = \frac{8\times8\times8\times8\times8\times8\times8}{8\times8\times8\times8} = 8^3$

So, $8^7 \div 8^4 = 8^{7-4} = 8^3$

What is the Exponent Law for a Quotient of Powers?

To divide powers with the same, subtract the exponents. $a^m \div a^n = \frac{a^m}{a^n} = a^{m-n}$

Ex2
Write each expression as a power:

**2.4 – Exponent Laws I**
**Math 9**
**Notes**

**Name**_____ _____
**Blk**____

a) $4^8 \div 4^3$

$4^{8-3}$

$= 4^5$

b) $\frac{(-5)^6}{(-5)^4}$ $(-5)^{6-4}$

$= (-5)^2$

c) $3^2 \times 3^4 \div 3^3$

$3^{2+4}$

$3^6 \div 3^3$

$= 3^3$

d) $\frac{2^3}{2^3} = 2^{3-3}$ $\frac{2\times2\times2}{2\times2\times2}$

$= 2^0$

$= 1$ verifies $a^0 = 1$

Ex3 – Evaluate: Order of operations and exponent laws

a) $2^3 \times 3^2$

$8 \times 9$

$= 72$

b) $(-10)^4[(-10)^6 \div (-10)^7] - 10^7$

$(-10)^{6-4} = (-10)^2$

$(-10)^4(-10)^2 - 10^7$

$(-10)^6 - 10^7$

$1{,}000000 - 10{,}000{,}000$

$-9000{,}000$

assignment 2.4 worksheet - Due Monday

**Reflection:** When can you use the exponent laws to evaluate an expression with powers? When can you *not* use these laws? Include examples.