L3 Exponent Review

Tuesday, September 6, 2022 6:08 PM

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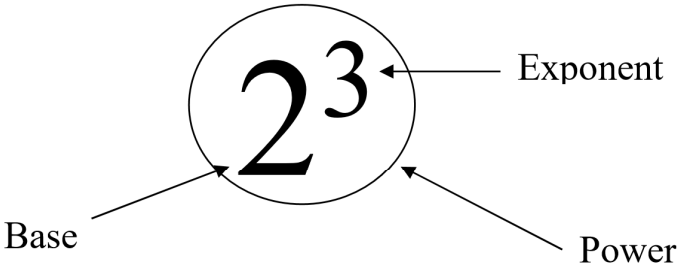
Lesson 3 Exponent Review



Exponent Laws

Product Law

$$a^m \cdot a^n = a^{m+n} \text{ , } a \neq 0$$

Example 1

$x^3 \cdot x^4 =$ x^7

$x \cdot x \cdot x \cdot x \cdot x \cdot x \cdot x$ (x^3, x^4)

Example 2

Simplify.

a) $x^5 \cdot x^2 \cdot x^1$

x^8

b) $(-2)^3 \cdot (-2)^7$

$(-2)^{10}$

c) $(x^2y^1)(x^3y^6)$

x^5y^7

Quotient Law

$$\frac{a^m}{a^n} = a^{m-n}\ ,\ a \neq 0$$

Example 3

$\frac{3^8}{3^6} =$ 3^2

$\frac{3\cdot3\cdot3\cdot3\cdot3\cdot3\cdot3\cdot3}{3\cdot3\cdot3\cdot3\cdot3\cdot3}$

$\frac{3^2}{3^5} = 3^{-3}$

$\frac{3\cdot3}{3\cdot3\cdot3\cdot3\cdot3}$

$\frac{1}{3^3}$

Example 4

a) $\frac{x^{17}}{x^5}$

x^{12}

b) $\frac{(-5)^{11}}{(-5)^5}$

$(-5)^6$

* Keep the same base, subtract exponents

c) $16x^4y^3 \div 8x^3y$

or $\frac{16x^4y^3}{8x^3y}$ $2xy^2$

Power Law

$$(a^m)^n = a^{mn}$$

Example 5

$(2^3)^2 =$ 2^6 multiply exponents

or $2^3 \cdot 2^3 = 2^6$

Example 6

a) $(x^{13})^4$

x^{52}

b) $((x^3)^2)^5$

$(x^6)^5$

x^{30}

Product to a Power

$$(ab)^n = a^n \cdot b^n$$

Example 7

$(xy)^3 =$ x^3y^3

*Apply the exponent to each part of the product

Example 8

a) $(-2xy)^2$ $= 4x^2y^2$

$(-2xy)(-2xy)$

b) $(-4p^3q^2)^3$

$-64p^9q^6$

Fraction to a Power

$$\left(\frac{a}{b}\right)^n = \frac{a^n}{b^n}, b \neq 0$$

Example 9

$\left(\frac{2}{3}\right)^2$ $= \frac{4}{9}$

$\left(\frac{2}{3}\right)\left(\frac{2}{3}\right)$

Example 10

a) $\left(\frac{2x}{3y}\right)^2$

$\frac{4x^2}{9y^2}$

b) $\left(\frac{1}{2x}\right)^5$

$\frac{1}{32x^5}$

Zero Power Law

$$a^0 = 1\ ,\ a \neq 0$$

Example 11

$4^0 = 1$

$\frac{4^3}{4^3} = 4^{3-3}$

$1 = 4^0$

Example 12

a) $(6x)^0$

1

b) $6x^0$ ← exponent only applies to x

$6 \cdot 1$

6

$(-5)^0 = 1$

$-5^0 = -1$

$-(1)$

Example 13

$$\frac{(2a^3b^2)^3(2ab^4c^4)}{-(4abc^2)}$$

$\frac{(8a^9b^6)(2ab^4c^4)}{-(4abc^2)}$

$\frac{16a^{10}b^{10}c^4}{-4abc^2}$

$-4a^9b^9c^2$