

Jan. 10, 2018

Sect. 1-3

Properties of Integer Exponents

Zero

Negative

Multiply

Divide

Powers

Exponents

$$2^3 \quad \leftarrow \text{exponent}$$

base \rightarrow

$$2^3 = 2 \cdot 2 \cdot 2 = 8$$

$$\text{Evaluate } 3^2 \Rightarrow 3^2 = 3 \cdot 3 = 9$$

Zero Exponent

Rule: anything⁰ = 1

$$2^0 = 1$$

$$x^0 = 1$$



Be Careful

$$-3^0 = -1$$

$$(-3)^0 = 1$$

Negative Exp.

$$5^{-1} = \frac{1}{5^{-1}} = \frac{1}{5}$$

$$2^{-3} = \frac{1}{2^3} = \frac{1}{8}$$

$$x^2 y^{-3} = \frac{x^2}{y^3}$$

$$\frac{a^2}{b^{-4}} = a^2 b^4$$

Multiplication

$$\text{Rule: } x^a \cdot x^b = x^{a+b}$$

$$2^3 \cdot 2^2 = 2^{3+2} = 2^5$$

$$3^2 \cdot 3^{-1} \cdot 3^5 = 3^6$$

$$3x^2 \cdot 2x^5 = 6x^7$$

Division

$$\text{Rule: } \frac{x^a}{x^b} = x^{a-b}$$

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

$$\frac{6x^5y^3}{2xy^6} = 3x^4y^{-3}$$
$$= \frac{3x^4}{y^3}$$

Powers

$$\text{Rule: } (x^a)^b = x^{ab}$$

$$(2^3)^2 = 2^{3 \cdot 2} = 2^6$$

$$(2x^2y^3)^3 = 2^3 x^6 y^9$$
$$= 8x^6y^9$$

$$\begin{aligned} & (3m^5n^7)^2 \\ &= 3^2 m^{10} n^{14} \\ &= 9 m^{10} n^{14} \end{aligned}$$