Power $\{ 2^{4}$ ← Exponent
Base ↖

Properties of Exponents

Definitions:

1. Product of Power Property - $a^m \cdot a^n = a^{m+n}$ ex. $5^3 \cdot 5^{-1} = 5^2$
2. Power of a Power Property - $(a^m)^n = a^{mn}$ ex. $(3^3)^2 = 3^6$
3. Power of a Product Property - $(ab)^m = a^m b^m$ ex. $(2 \cdot 3)^4 = 2^4 \cdot 3^4$
4. Negative Exponent Property - $a^{-m} = \frac{1}{a^m}$ ex. $7^{-2} b^3 = \frac{b^3}{7^2}$
5. Zero Exponent Property - $a^0 = 1, a \neq 0$ ex. $(-89m^2n^{-3})^0 = 1$
6. Quotient of Powers Property - $\frac{a^m}{a^n} = a^{m-n}$ ex. $\frac{6^{-3}}{6^{-6}} = 6^3$
7. Power of a Quotient Property - $\left(\frac{a}{b}\right)^m = \frac{a^m}{b^m}$ ex. $\left(\frac{4}{7}\right)^2 = \frac{4^2}{7^2}$

Example 1.) $(-4^1 \cdot 2^5)^2$

$(-4)^2 \cdot 2^{10}$

Example 2.) $\left(\frac{11^5}{11^8}\right)^{-1}$ $= (11^{-3})^{-1} = 11^3$

$\frac{11^{-5}}{11^{-8}} = 11^3$

$\frac{11^8}{11^5} = 11^3$

Example 3.) $b^{-4}b^6b^7$

b^9

Example 4.) $\left(\frac{r^{-2}}{s^3}\right)^{-3}$

$\frac{r^6}{s^{-9}} = r^6 s^9$

Example 5.) $\frac{16m^4n^{-5}}{2n^{-5}}$

$8m^4$

$\frac{4x^3+4x^2-4x+2}{-1}$

$-4x^3-4x^2+4x-2$

1. $\frac{1}{-3x^{-4}}$

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

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

$\frac{8x^6}{y^3}$

3. $4x^3 \cdot 5x^{-3} \cdot x^7$

$20x^7$

4. $\frac{w^{-4}}{w^4}$

5. $y \cdot y^5 \cdot y^3$

6. $(-x)^3(-x)^{13}$

7. $\frac{x^{12}}{1} \cdot \frac{3}{x^{20}}$ $\frac{3x^{12}}{x^{20}}$

$\frac{3}{x^8}$

8. $(7x^{-3}y^7z)^0$

1

9. $(-5x^6y)^2(-x^2)$

10. $\left(\frac{8w^6x^7y^2}{4w^6x^4y^5}\right)^3 \cdot \left(\frac{5x^9y}{x^3y^5}\right)^{-2}$

$\left(\frac{2x^3}{y^3}\right)^3 \cdot \left(\frac{5x^6}{y^4}\right)^{-2}$

$\frac{8x^9}{y^9} \cdot \frac{y^8}{25x^{12}} = \frac{8x^9y^8}{25x^{12}y^9} = \frac{8}{25x^3y}$

11. $\left[(x+3)^2\right]^4$

$(x+3)^8$

12. $\left(\frac{2x^3}{y}\right)^3 \cdot \frac{1}{-6x^3}$