

Properties of Exponents

Property	Definition	Examples
Product of Powers	$x^n \cdot x^m = x^{n+m}$	$x^2 \cdot x^2 = x^4$
Quotient of Powers	$\frac{x^m}{x^n} = x^{m-n}$	$\frac{x^4}{x^2} = x^2$
Negative Exponent	$x^{-n} = \frac{1}{x^n}$	$x^{-2} = \frac{1}{x^2}$
Power of a Power	$(x^n)^m = x^{n \cdot m}$	$(x^2)^2 = x^4$
Zero Power	$x^0 = 1$	$2^0 = 1$

Monomials

Monomial: ONE TERM

MUST MEET THESE CONDITIONS!

1. No Negative Exp.
2. No Rational Exp.
(fractions)

Ex. Which of these are monomials?

X $2+x$ 2 terms	✓ 2^1
X $\frac{9}{x} = 9x^{-1}$ neg. x exp.	✓ <u>$\frac{5}{3}y^2$</u>
X $\sqrt{x} = x^{\frac{1}{2}}$ Fractional exp.	✓ <u>$9a^2b^3c^7$</u>

Degree: *of Monomial*

The sum of the exponents on the variables only

Monomial	Degree
$2x^1$	1
$\frac{5}{3}y^2$	2
$-8.5xy^2$	3

EX # 1: SIMPLIFY

$$(6a^{-3}b^2)^{-3}$$

$$6^{-3} a^9 b^{-6} = \frac{a^9}{6^3 b^6}$$

MONOMIAL: ~~Y~~ OR NDEGREE: N/A

$$= \frac{a^9}{216b^6}$$

EX # 2: SIMPLIFY

$$(6x^2y^3)(xyz)^3$$

$$6x^2y^3 \cdot \underbrace{1x^3y^3z^3}$$

$$6x^5y^6z^3$$

$$5+6+3=14$$

MONOMIAL: Y OR NDEGREE: 14

EX # 3: SIMPLIFY

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

$$(-3x^{-2}y^8)^2$$

$$= -3^2 x^{-4} y^{16}$$

MONOMIAL: Y OR N

DEGREE: N/A

$$= \frac{-3^2 y^{16}}{x^4} = \frac{9y^{16}}{x^4}$$