Multiplying Monomials

vocabulary	ex.
a constant	-7 (usually a #)
a variable	x (unknown)
a product of a constant and one or more variables	$4x^3$ or $-5xy$
base	the "thing" that is repeatedly multiplied
exponent	amt. of times to repeat the base.
base w/ exponent AKA. base raised to a power.	x^n (x: base, n: exponent) or 3^4

3^4

$3 \cdot 3 \cdot 3 \cdot 3$

x^5

$x \cdot x \cdot x \cdot x \cdot x$

Vocabulary

monomial — a variable or a product of a numerical & one or more variables

ex. $2x$ $-3xy^2z$

binomial — a polynomial w/ 2 terms

ex $2x + 3y$

trinomial — a polynomial w/ 3 terms

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

polynomial — a monomial or the sum of 2 or more monomials.

$-4xy$ or $-4xy + 2x + 3y$

multiply monomial

multiply like bases

add the exponents

$x^2 \cdot x^5$

$x \cdot x \cdot x \cdot x \cdot x \cdot x \cdot x$

x^8

for all real #'s b & all positive integers m & n, $b^m \cdot b^n = b^{m+n}$

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ex

$x^2 y^3$

$xxyyy$

$x^2 \quad y^3$

} only add exponents when bases are the same

Power of a Power

multiply powers

$(x^2)^5$

$x^2 \cdot x^2 \cdot x^2 \cdot x^2 \cdot x^2$

$x \cdot x \cdot x \cdot x \cdot x \cdot x \cdot x \cdot x \cdot x \cdot x$

x^{10}

for all real #'s a & b and all positive integers m, $(b^m)^n = b^{mn}$

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Power of a Product

give exponent to each factor

$(2x)^3$

$2x \cdot 2x \cdot 2x$ rearranged

$2 \cdot 2 \cdot 2 \cdot x \cdot x \cdot x$

$2^3 \cdot x^3$ simplified

$8x^3$ simplified

For all real #'s a & b and all ⊕ integers m, $(ab)^m = a^m b^m$

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Quotient of Power

subtract exponents of like bases

$\frac{x^7}{x^3}$

$\frac{xxxxxxx}{xxx}$

$\frac{xxxxxxx}{xxx}$

$xxxx$

x^4

zero exponent & Negative exponents

Watch the pattern

as you reduce # it is like you are dividing by the base.

$2^4 = 2 \cdot 2 \cdot 2 \cdot 2$

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

$2^2 = 2 \cdot 2$

$2^1 = 2$

$2^0 = 1$

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

$2^{-2} = \frac{1}{2 \cdot 2}$

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

negative exponents

Rules

$$b^{-n} = \frac{1}{b^n}$$

And

$$\frac{1}{b^{-n}} = b^n$$

when you have a negative exponent if you move it to the other height (top/bottom) it becomes positive

ex

$$x^{-3} = \frac{1}{x^3}$$

or

$$\frac{1}{x^{-4}} = \frac{x^4}{1}$$

zero exponent

$b^0 = 1$

Any base to the zero power equals 1