Algebra 1 7.1

Multiply monomials using the properties of exponents

Simplify expressions using properties of exponents

monomial number, variable, product

constant 7 x $3n$ $5x^2y$

linear

nonlinear

exponent

base

whiteboards

activity: 5 in a row

Monomial examples:

$3x^2$

$5n$

$28abc$

nonexamples:

$2 + 5x$ not a product

$\frac{3}{n}$ not a product

1.
2.
3.
4. No variables in denominator

Example 1 Identify Monomials

Determine whether each expression is a monomial. Write *yes* or *no*. Explain your reasoning.

a. 10 yes

b. $f + 24$ no

c. h^2 yes

d. j yes

whiteboards

GuidedPractice

1A. $-x + 5$ no

1B. $23abcd^2$

1C. $\frac{xyz^2}{2} = \frac{1}{2}xyz^2$

1D. $\frac{mp}{n}$

$2 \cdot 2 \cdot 2 \cdot 2 \cdot 2 = 2^5$

$3^5 \times 3^4 = (3 \cdot 3 \cdot 3 \cdot 3 \cdot 3)(3 \cdot 3 \cdot 3 \cdot 3) = 3^9$

$243 \cdot 81 = 19{,}683$

KeyConcept Product of Powers

Words

Symbols

Examples

$x^5 \cdot x^4$

$(x \times x \times x \times x \times x)(x \times x \times x \times x) = x^9$

$a^3 b^2 a^4 b^3$

$aaabbaaaabbb = a^7 b^5 = b^5 a^7$

Is it OK to rearrange factors in a multiplication problem?

Example 2 Product of Powers

Simplify each expression.

a. $(6n^3)(2n^7)$

$6 \cdot nnn \cdot 2 \cdot nnnnnnn \quad 12n^{10}$

b. $(3pt^3)(p^3t^4)$

$3 \cdot p \cdot t \cdot t \cdot t \cdot 1 \cdot ppp \cdot t \cdot t \cdot t \cdot t = 3p^4t^7$

GuidedPractice

2A. $(3y^4)(7y^5)$

$3yyyy \cdot 7yyyyy$

$21y^9$

2B. $(-4rx^2t^3)(-6r^5x^2t)$

$rxttt \quad rrrrr \quad xxt$

$24r^6x^2t^4$

$24r^6t^4x^2$

activity: 5 in a row

KeyConcept Power of a Power

Words

Symbols

Examples

$(5^2)^3 = (5 \cdot 5)(5 \cdot 5)(5 \cdot 5) = 5^6$

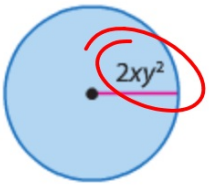
$(x^3)^2 = (x \cdot x \cdot x)(x \cdot x \cdot x) = x^6$

Example 4 Power of a Product

GEOMETRY Express the area of the circle as a monomial.

$A = \pi r^2 = \pi (2xyy)(2xyy)$

$= 4\pi x^2 y^4$



Do we know circle formulas?

Circle Song

(Are You Sleeping?)

A equals Pi R^2 Area, Area
C equals Pi times diameter, Circumference, Circumference!

GuidedPractice

4A. Express the area of a square with sides of length $3xy^2$ as a monomial.