

Algebra 1 7.1

Multiply monomials using the properties of exponents

Simplify expressions using properties of exponents

monomial *number, variable, product*

constant

linear

nonlinear

exponent

base

activity: triangle puzzles (if time)

5 in a row

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

21. 122

yes

22. $3a^4$

yes

23. $2c + 2$

no

—

Simplify each expression.

27. $(q^2)(2q^4)$

↓

$1 \cdot q \cdot q \cdot 2 \cdot q \cdot q \cdot q \cdot q$

$2q^6$

28. $(-2u^2)(6u^6)$

$-2u \cdot u \cdot 6u \cdot u \cdot u \cdot u \cdot u \cdot u$

$-12u^8$

29. $(9w^2x^8)(w^6x^4)$

$9w \cdot w \cdot x \cdot x \cdot x \cdot x \cdot x \cdot x \cdot x \cdot x \cdot w \cdot w \cdot w \cdot w \cdot w \cdot w \cdot x \cdot x \cdot x \cdot x$

$9w^8x^{12}$

5 in a row

KeyConcept Power of a Power

Words To find the power of a power, multiply the exponents.

Symbols For any real number a and any integers m and p , $(a^m)^p = a^{m \cdot p}$.

Examples $(b^3)^5 = b^{3 \cdot 5}$ or b^{15} $(g^6)^7 = g^{6 \cdot 7}$ or g^{42}

$$\left(x^3\right)^4 = (x \cdot x \cdot x) \cdot (x \cdot x \cdot x) \cdot (x \cdot x \cdot x) \cdot (x \cdot x \cdot x)$$
$$| x^{12} = x^{12}$$

$$33. (j^5 k^7)^4$$

$$34. (n^3 p)^4$$

$$\underbrace{(\underbrace{j j j j j}_{k k k k k})}_{k k k} \underbrace{(\underbrace{j j j j}_{k k k})}_{k} \underbrace{(\underbrace{j j j}_{k k k})}_{k k k} \underbrace{(\underbrace{j j j j}_{k k k k k})}_{k k k k k}$$

$$| \int j^{20} k^{28}$$

$$\underbrace{(n n n p)}_{n^3 p} \underbrace{(n n n p)}_{n^3 p} \underbrace{(n n n p)}_{n^3 p} \underbrace{(n n n p)}_{n^3 p}$$

$$n^{12} p^4$$

Simplify $[(2^3)^2]^4$. $2^4 = 16, 777, 216$

$$[(222)(222)] \cdot [(22)(222)] \cdot [(222)(222)] \cdot [(222)(222)]$$

KeyConcept Simplify Expressions

To simplify a monomial expression, write an equivalent expression in which:

- each variable base appears exactly once,
- there are no powers of powers, and
- all fractions are in simplest form.

$$\frac{2}{14} a^3 b a^2$$

$$\frac{1}{7} a^5 b$$

Example 5 Simplify Expressions

Simplify $(3xy^4)^2[(-2y)^2]^3$.

Triangle puzzles

4B. Express the area of a triangle with height $4a$ and base $5ab^2$ as a monomial.

Order of operations...

Guided Practice

5. Simplify $\left(\frac{1}{2} a^2 b^2\right)^3 [(-4b)^2]^2$.