

Algebra 1 7.1

Multiply monomials using the properties of exponents

Simplify expressions using properties of exponents

monomial

constant

linear

nonlinear

exponent

base

whiteboards

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

21. 122



22. $3a^4$



23. $2c + 2$



Simplify each expression.

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

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

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

$$1 \cdot q \cdot q \cdot 2q \cdot q \cdot q \cdot q$$
$$2q^6$$

$$-2uu \cdot 6uuuuuu$$
$$-12u^8$$

$$9wwxxxxxxx \cdot |wwwwwwxxxx$$

$$9w^8x^{12}$$

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}

$$(b b b)(b b b)(b b b)(b b b)(b b b)$$
$$b^{15}$$

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

$$(j^5 k^7)(j^5 k^7)(j^5 k^7)(j^5 k^7)$$

$$j^{20} k^{28}$$

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

$$(n^3 p)(n^3 p)(n^3 p)(n^3 p)$$

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

Simplify $[(2^3)^2]^4$.

$$\underbrace{[(2^3)(2^3)] [(2^3)(2^3)] [(2^3)(2^3)] [(2^3)(2^3)]}_{2^8}$$

Triangle puzzles

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

$$A = \frac{1}{2}bh = \frac{1}{2}(5ab^2)(4a)$$

$$A = \frac{bh}{2}$$

$$\frac{40}{2}$$

$$\begin{aligned} &= 10a^2b^2 \\ &\frac{1}{2} \cdot 5c^3d \cdot 8c^2d^4 \\ &= 20c^5d^5 \end{aligned}$$

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.

$$(2)^2$$

Example 5 Simplify Expressions

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

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

$$576x^2y^{14}$$

Order of operations...

GEMAS

Guided Practice

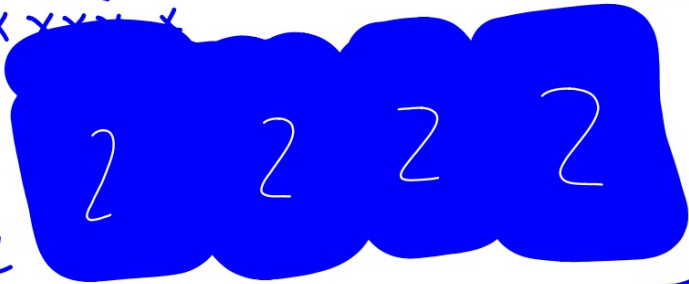
5. Simplify $\left(\frac{1}{2}a^2b^2\right)^3[(-4b)^2]^2$.

$$\left(\frac{1}{2}a^2b^2\right)\left(\frac{1}{2}a^2b^2\right)\left(\frac{1}{2}a^2b^2\right) \left[\underline{-4b}\right]\left[\underline{-4b}\right] \left[\underline{-4b}\right]\left[\underline{-4b}\right]$$

$$32 a^6 b^{10}$$

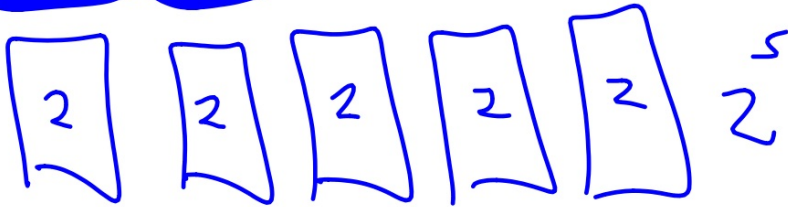
$$x^4 x^1 = x^5$$

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



$$\uparrow (2^4)(2)$$

(2)



2