

Multiplying Monomials

Multiply Monomials A **monomial** is a number, a variable, or a product of a number and one or more variables. An expression of the form x^n is called a **power** and represents the product you obtain when x is used as a factor n times. To multiply two powers that have the same base, add the exponents.

Product of Powers

For any number a and all integers m and n , $a^m \cdot a^n = a^{m+n}$.

Example 1

Simplify $(3x^6)(5x^2)$.

$$\begin{aligned}(3x^6)(5x^2) &= (3)(5)(x^6 \cdot x^2) && \text{Associative Property} \\ &= (3 \cdot 5)(x^{6+2}) && \text{Product of Powers} \\ &= 15x^8 && \text{Simplify.}\end{aligned}$$

The product is $15x^8$.

Example 2

Simplify $(-4a^3b)(3a^2b^5)$.

$$\begin{aligned}(-4a^3b)(3a^2b^5) &= (-4)(3)(a^3 \cdot a^2)(b \cdot b^5) \\ &= -12(a^{3+2})(b^{1+5}) \\ &= -12a^5b^6\end{aligned}$$

The product is $-12a^5b^6$.

Exercises

Simplify.

1. $y(y^5)$
 y^6

2. $n^2 \cdot n^7$
 n^9

3. $(-7x^2)(x^4)$
 $-7x^6$

4. $x(x^2)(x^4)$
 x^7

5. $m \cdot m^5$
 m^6

6. $(-x^3)(-x^4)$
 x^7

7. $(2a^2)(8a)$
 $16a^3$

8. $(rs)(rs^3)(s^2)$
 r^2s^6

9. $(x^2y)(4xy^3)$
 $4x^3y^4$

10. $\frac{1}{3}(2a^3b)(6b^3)$
 $4a^3b^4$

11. $(-4x^3)(-5x^7)$
 $20x^{10}$

12. $(-3j^2k^4)(2jk^6)$
 $-6j^3k^{10}$

13. $(5a^2bc^3)\left(\frac{1}{5}abc^4\right)$
 $a^3b^2c^7$

14. $(-5xy)(4x^2)(y^4)$
 $-20x^3y^5$

15. $(10x^3yz^2)(-2xy^5z)$
 $-20x^4y^6z^3$