NAME Key DATE ____________ PERIOD _____

8-1 Study Guide and Intervention *(continued)*

Multiplying Monomials

Powers of Monomials An expression of the form $(x^m)^n$ is called a **power of a power** and represents the product you obtain when x^m is used as a factor n times. To find the power of a power, multiply exponents.

Power of a Power	For any number a and all integers m and n, $(a^m)^n = a^{mn}$.
Power of a Product	For any number a and all integers m and n, $(ab)^m = a^m b^m$.

Example **Simplify $(-2ab^2)^3(a^2)^4$.**

$(-2ab^2)^3(a^2)^4 = (-2ab^2)^3(a^8)$	Power of a Power
$= (-2)^3(a^3)(b^2)^3(a^8)$	Power of a Product
$= (-2)^3(a^3)(a^8)(b^2)^3$	Commutative Property
$= (-2)^3(a^{11})(b^2)^3$	Product of Powers
$= -8a^{11}b^6$	Power of a Power

The product is $-8a^{11}b^6$.

Exercises

Simplify.

1. $(y^5)^2$ $= y^5 \cdot y^5$
y^{10}

2. $(n^7)^4$
n^{28}

3. $(x^2)^5(x^3)$
x^{13}

4. $-3(ab^4)^3$
$-3a^3b^{12}$

5. $(-3ab^4)^3$
$-27a^3b^{12}$

6. $(4x^2b)^3$
$64x^6b^3$

7. $(4a^2)^2(b^3)$
$16a^4b^3$

8. $(4x)^2(b^3)$
$16x^2b^3$

9. $(x^2y^4)^5$
$x^{10}y^{20}$

10. $(2a^3b^2)(b^3)^2$
$2a^3b^8$

11. $(-4xy)^3(-2x^2)^3$
$512x^9y^3$

12. $(-3j^2k^3)^2(2j^2k)^3$
$72j^{10}k^9$

13. $(25a^2b)^3\left(\frac{1}{5}abc\right)^2$
$625a^8b^5c^2$

14. $(2xy)^2(-3x^2)(4y^4)$
$-48x^4y^6$

15. $(2x^3y^2z^2)^3(x^2z)^4$
$8x^{17}y^6z^{10}$

16. $(-2n^6y^5)(-6n^3y^2)(ny)^3$
$12n^{12}y^{10}$

17. $(-3a^3n^4)(-3a^3n)^4$
$-243a^{15}n^8$

18. $-3(2x)^4(4x^5y)^2$
$-768x^{14}y^2$