

Lesson 3 Reteach

Multiplying and Dividing Monomials

When multiplying powers with the same base

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|----------------|------------------------------------|
| Symbols | $a^m \cdot a^n = a^{m+n}$ |
| Example | $4^2 \cdot 4^5 = 4^{2+5}$ or 4^7 |

Example 1: Find the product $5^7 \cdot 5$.

$$\begin{aligned} 5^7 \cdot 5 &= 5^7 \cdot 5^1 && 5 = 5^1 \\ &= 5^{7+1} && \text{Product of Powers Property; the common base is 5.} \\ &= 5^8 && \text{Add the exponents.} \end{aligned}$$

Example 2: Find the product $2a^{-2} \cdot 3a$.

$$\begin{aligned} 2a^{-2} \cdot 3a &= 2 \cdot 3 \cdot a^{-2} \cdot a && \text{Commutative Property of Multiplication} \\ &= 2 \cdot 3 \cdot a^{-2+1} && \text{Product of Powers Property; the common base is } a. \\ &= 2 \cdot 3 \cdot a^{-1} && \text{Add the exponents.} \\ &= 6a^{-1} && \text{Multiply.} \end{aligned}$$

When dividing powers with the same base, subtract the exponents.

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|----------------|--|
| Symbols | $\frac{a^m}{a^n} = a^{m-n}$, where $a \neq 0$ |
| Example | $\frac{5^6}{5^2} = 5^{6-2}$ or 5^4 |

Example 3: Find the quotient $\frac{(-8)^4}{(-8)^2}$.

$$\begin{aligned} \frac{(-8)^4}{(-8)^2} &= (-8)^{4-2} && \text{Quotient of Powers Property; the common base is } (-8). \\ &= (-8)^2 && \text{Subtract the exponents.} \end{aligned}$$

HOMework

Find each product. Express using positive exponents.

1. $4^7 \cdot 4^6$

2. $v^5 \cdot v^4$

3. $(f^3)(f^9)$

4. $(-31^4)(-31^2)$

5. $(-cr^{-5})(-r^2)$

6. $9z^3 \cdot 2z$

7. $3^8 \cdot 3^3$

8. $-7u^6(-6u^5)$

9. $-5m^3(4m^6)$

Find each quotient. Express using positive exponents.

10. $\frac{7^5}{7^2}$

11. $\frac{1^8}{1^6}$

12. $\frac{(-12)^3}{(-12)^3}$

13. $\frac{(-p^{18})}{(-p^{12})}$

14. $\frac{2w^{-3}}{2w}$

15. $\frac{e^{10}}{e^{-3}}$