EXPONENT RULES

Graphic Organizer

ZERO EXPONENT

$$x^0 =$$

Examples:

- $12^0 =$
- $5x^0 =$
- $(-2)^3 n^0 =$

NEGATIVE EXPONENTS

$$x^{-a} =$$

Examples:

- $3^{-2} =$
- $a^{-7} =$
- $p^4 q^{-1} =$

ADDING & SUBTRACTING MONOMIALS

▶ COMBINE LIKE TERMS! ◀

(DO NOT CHANGE common variables and exponents.)

Examples:

- $10x + 3x =$
- $7k - 2k^2 + 6k^2 =$
- $-5m^2 n - 4m^2 n =$

PRODUCT RULE

$$x^a \cdot x^b =$$

Examples:

- $9^5 \cdot 9^7 =$
- $a^7 \cdot a^{-1} \cdot b^3 \cdot b^{-5} =$
- $-2x^3 y^7 \cdot 9x^4 y =$

QUOTIENT RULE

$$\frac{x^a}{x^b} =$$

Examples:

- $\frac{(-2)^{20}}{(-2)^5} =$
- $\frac{x^{12}}{x^3} =$
- $\frac{r^2 s^2}{r^2 s^3} =$
- $\frac{28m^5}{4m^3} =$

POWER RULE

$$(x^a)^b =$$

Examples:

- $(7^2)^9 =$
- $(w^4)^3 =$
- $(-4r^3 s^7)^2$

Name:	Date:
Topic:	Class:

Main Ideas/Questions	Notes/Examples	
Monomials	• A **monomial** is a _____, a _____ or a _____. • **Examples:** _____ • Monomials with the **same variables and exponents** are _____ _____!	
Adding & Subtracting Monomials	• To **add or subtract monomials**, _____ _____ _____! • **DO NOT CHANGE** the variables and exponents!	
	Directions: Add or subtract the following monomials.	
	1. $4x+5x$	**2.** $-12ab-2ab$
	3. $7m^2-9m^2$	**4.** $-8k-(-8k)$
	5. $-3r^2s+11r^2s$	**6.** $10pqr+pqr$
	7. $15ab^3-(-15ab^3)$	**8.** $10x^5y^2-14x^5y^2$
	9. $-5m-2n+n-3m$	**10.** $8xy-2x+3y-5xy+8x$
	11. $7k^2-k+12k^2+4k$	**12.** $-r^3-2r^2-8r^2+5r^3$
	13. $8c^2-4cd+3d^2-cd$	**14.** $a^2b^2+9ab-12ab+3a^2b^2$
	15. Find the sum of $8m^3n^2$ and $-3m^3n^2$.	**16.** Subtract $-4xy$ from $2xy$.

MULTIPLYING MONOMIALS

To multiply monomials, use the **PRODUCT RULE:** $x^a \cdot x^b =$

NUMERICAL BASES

Directions: Find each product. Express your final answers using only positive exponents.

17. $4^3 \cdot 4^8$	**18.** $(-7)^4 \cdot (-7)^5$	**19.** $2^{-6} \cdot 2^2$
20. $15 \cdot 15^6$	**21.** $5^9 \cdot 5^{-1}$	**22.** $(-1)^{-2} \cdot (-1)^{-3}$

VARIABLE BASES

23. $x^2 \cdot x^5$	**24.** $m^{-1} \cdot m^3$	**25.** $k^{-7} \cdot k^7$
26. $a \cdot a^3 \cdot a^{-9}$	**27.** $x^4 \cdot y \cdot x^{-1}$	**28.** $s \cdot r^{-2} \cdot r^{-4} \cdot s$

- **Examples with Coefficients:**
  - MULTIPLY the coefficients.
  - SIMPLIFY the variables with the product rule.

29. $4a^7 \cdot 2a^3$	**30.** $(5m) \cdot (-3m^2)$
31. $2w^{-1} \cdot -7w^4 \cdot 3w^5$	**32.** $8p^{-5} \cdot 2p^{-1} \cdot p$
33. $(-2ab) \cdot (6a^2b^3)$	**34.** $-12p^8q^{-2} \cdot \frac{1}{3}p^3q^2$
35. $7c^3d^2 \cdot 2cd \cdot -c^3d^8$	**36.** $(-ab) \cdot (4a^8b^2) \cdot (7ab^6)$
37. $-8k^4 \cdot 2k + 3k^2 \cdot k^3$	**38.** $9m^6 \cdot 2mn^4 - 4m^2n^3 \cdot 3m^5n$

Name: _____ **Unit 2:** Algebraic Expressions

Date: _____ **Per:** _____ **Homework 5:** Add, Subtract, and Multiply Monomials

Directions: Simplify the following monomials.

1. $7k+4k$	**2.** $11x^2-3x^2$	**3.** $-2m^2n^2-3m^2n^2$
4. $3p^5+(-4p^5)$	**5.** $-14c^7d^2+7c^7d^2$	**6.** $-10rs-(-14rs)$
7. $-8a-b-2b+3a$	**8.** $6x-4x^2-x-7+5x^2$	**9.** $10cd+2c^2-d^2+4d^2-11cd$

10. Find the difference of $9p^3q^2$ and $13p^3q^2$.	**11.** Subtract $-2x^2$ from the sum of $4x^2$ and $15x^2$.

Directions: Simplify the following monomials. Express final answers using only positive exponents.

12. $2^9\cdot 2^{13}$	**13.** $8\cdot 8^{-5}$	**14.** $(-10)^6\cdot(-10)^{-6}$
15. $a^4\cdot a^2$	**16.** $k^3\cdot k^{-8}$	**17.** $x^8\cdot x^{-1}$
18. $w^5\cdot w^{-7}\cdot w$	**19.** $c^{-5}\cdot d^{-1}\cdot c^4$	**20.** $p^{-2}\cdot q^{-1}\cdot p^{11}\cdot q^{-6}$
21. $5x^4\cdot 7x^3$	**22.** $(9k^5)\cdot(-2k^{-2})$	**23.** $-4v^3\cdot -3v^{-10}$
24. $(2xy)\cdot(5x^8y^3)$	**25.** $\frac{2}{3}a^{-2}b^{-1}\cdot -18a^{-3}b^1$	**26.** $(-4m^5n^7)(mn)(-2m^2n^6)$

27. $abc^3\cdot a^6b^4+9a^7b^5c^3$	**28.** $10h^{10}\cdot 2h^{-1}-3h^5\cdot h^4$