

EXPONENT RULES

Graphic Organizer

Name	Rule	Examples
ADDING & SUBTRACTING MONOMIALS	COMBINE LIKE TERMS!!! (DO NOT CHANGE common variables and exponents!)	1. $9x^2y - 10x^2y = -1x^2y$ 2. Subtract $6w$ from $8w = 2w$
PRODUCT RULE	$x^a \cdot x^b = x^{a+b}$ add exp.	1. $h^2 \cdot h^6 = h^{2+6} = h^8$ 2. $(-2a^2b) \cdot (7a^3b) = -14a^5b^2$
POWER RULE	$(x^a)^b = x^{ab}$ multiply Exp.	1. $(x^2)^3 = x^6$ 2. $(-2m^5)^2 \cdot m^3 = 4m^{10} \cdot m^3 = 4m^{13}$
QUOTIENT RULE	$\frac{x^a}{x^b} = x^{a-b}$ subtract exp.	1. $\frac{27x^5}{42x^1} = \frac{9x^{5-1}}{14} = \frac{9x^4}{14}$ 2. $\frac{(y^2)^2}{y^4} = \frac{y^4}{y^4} = y^{4-4} = y^0 = 1$
NEGATIVE EXPONENT RULE	$x^{-a} = \frac{1}{x^a}$ move to different location	1. $-5x^{-2} = \frac{-5}{x^2}$ 2. $\frac{4k^2}{8k^5} = \frac{1k^{-3}}{2} = \frac{1}{2k^3}$
ZERO EXPONENT RULE	$x^0 = 1$	1. $7x^0 = 7(1) = 7$ 2. $\frac{(w^4)^2}{w^8} = \frac{w^8}{w^8} = w^{8-8} = w^0 = 1$

Properties of Exponents

Date _____ Period _____

Simplify. Your answer should contain only positive exponents.

1) $3k^{-2} \cdot k^2$

2) $3x^{-3} \cdot x^3$

$$3x^{-3+3} = 3x^0 = 3(1) = 3$$

3) $p^2 \cdot p \cdot 4p^2$

4) $2x^{-1} \cdot 3x^{-4} \cdot 2x^1$

$$12x^{-1-4+1} = 12x^{-4} = \frac{12}{x^4}$$

5) $x^4y^{-2} \cdot x^2$

6) $m^3n^3 \cdot 3m^{-3}n^0 \cdot 4m^{-1}n^{-3}$

$$12m^{3-3-1}n^{3+0-3}$$

$$\frac{12m^{-1}n^0}{m} \rightarrow \frac{12m^{-1}(1)}{m} \rightarrow \frac{12}{m}$$

7) $b^0 \cdot ab$

8) $3a^{-3}b^0 \cdot 3a^4 \cdot 2b^1$

$$18a^{-3+4}b^{0+1}$$

$$18ab$$

9) $(2x^2)^{-3}$

10) $(3n)^3$

$$3^3n^3$$

$$27n^3$$

11) $(v^4)^2$

12) $(a^{-3})^{-2}$

$$a^6$$

$$13) \frac{4a^{-3}}{2a} = \frac{2a^{-3}}{a^1} = 2a^{-3-1}$$

$$= \frac{2a^{-4}}{1}$$

$$= \frac{2}{a^4}$$

$$15) \frac{3n^{-1}}{4n^2}$$

$$17) yx^2 \cdot 4yx^3$$

$$19) (4y^3)^{-1}$$

$$21) \frac{2x^{-4}}{4x^4y^4}$$

$$23) 4x^2z^2 \cdot 2xy^{-3}z^4$$

$$25) \frac{2h^4j^{-3}k^2}{4hj^2k^0}$$

$$14) \frac{3p}{3p^{-3}} = p^{(1+3)}$$

$$|p^{1-(-3)}$$

$$|p^4$$

$$16) \frac{v^4}{4v^{-3}}$$

$$\frac{|v^{4-(-3)}}{4}$$

$$\frac{v^7}{4}$$

$$18) x^4 \cdot 2y^4$$

$$2x^4y^4$$

$$20) (3uv^4)^5$$

$$3^3u^3v^{4(5)}$$

$$27u^3v^{20}$$

$$22) \frac{y^{-3}}{x^{-1}y^{-2}}$$

$$\frac{y^{-3-(-2)}}{x^{-1}}$$

$$\frac{y^{-1}}{x^{-1}} = \frac{x}{y}$$

$$24) (2hj^{-1}k^3)^{-3}$$

$$\frac{1}{(2h^{-1}j^{-3}k^9)} = \frac{1}{2^3h^{3 \cdot (-1)}k^{9 \cdot (3)}} = \frac{1}{8h^3j^{-3}k^9} = \frac{j^3}{8h^3k^9}$$

$$26) \frac{m^{-1}n^{-4}}{2m^0n^4p^{-4}}$$

$$\frac{m^{-1-0}n^{-4-4}}{p^{-4}} = \frac{m^{-1}n^{-8}}{p^{-4}} = \frac{p}{mn^8}$$