

## Exponent Rules Review Worksheet

NOTE: Anything to the zero power equals 1!

Product Rule: When multiplying monomials that have the same base, add the exponents.

$$x^m \cdot x^n = x^{m+n}$$

Example 1:  $x \cdot x^3 \cdot x^4 = x^{1+3+4} = x^8$       Example 2:  $(2x^2y)(-3x^3y^4) = 2 \cdot (-3) \cdot x^2 \cdot x^3 \cdot y \cdot y^4 = -6x^5y^5$

Power Rule: When raising monomials to powers, multiply the exponents.

$$(x^m)^n = x^{m \cdot n}$$

Example 3:  $(x^2y^3)^4 = x^{2 \cdot 4} y^{3 \cdot 4} = x^8y^{12}$       Example 4:  $(2x^3yz^2)^3 = 2^3 x^{3 \cdot 3} y^3 z^{2 \cdot 3} = 8x^9y^3z^6$

Quotient Rule: When dividing monomials that have the same base, subtract the exponents.

$$\frac{x^m}{x^n} = x^{m-n}$$

Example 5:  $\frac{x^3}{x^{-2}} = x^{3-(-2)} = x^5$       Example 6:  $\frac{5^6}{5^2} = 5^{6-2} = 5^4$       Example 7:  $\frac{36m^3n^5}{-9mn^4} = \frac{36}{-9} \cdot \frac{m^3}{m} \cdot \frac{n^5}{n^4} = -4m^2n$

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**Simplify each of the following. Copy the problem. Work on your own paper.**

1)  $a \cdot a^2 \cdot a^3$       2)  $(2a^2b)(4ab^2)$       3)  $(6x^2)(-3x^5)$       4)  $b^3 \cdot b^4 \cdot b^7 \cdot b$       5)  $(3x^3)(3x^4)(-3x^2)$

6)  $(2x^2y^3)^2$       7)  $(5x^2y^4)^3$       8)  $(6x^4y^6)^3$       9)  $(4x^3y^3)^3$       10)  $(7xy)^2$

11)  $\frac{x^3}{x}$       12)  $\frac{18c^3}{-3c^2}$       13)  $\frac{9a^3b^5}{-3ab^2}$       14)  $\frac{-48c^2d^4}{-8cd}$       15)  $\frac{22y^6z^8}{2yz^{-7}}$

16)  $x^2 \cdot x^7$       17)  $(x^2)^7$       18)  $(-2x^4)^5$       19)  $2x^3 + 7x^3$       20)  $7^0$

21)  $8x^0$       22)  $-3^4$       23)  $(-3)^4$       24)  $6x^0y^8 - (2y^2)^4$       25)  $(x+2y)(x-2y)$

26)  $\frac{2x^3}{-8x^4}$       27)  $\frac{xy^7}{x^3y^4}$       28)  $6x^5 \cdot 3x^5 \cdot x^0$       29)  $(3st^{12})^3$       30)  $\left(\frac{3m^2n^7}{m}\right)^5$

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