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: $\left(2x^2y\right)\left(-3x^3y^4\right) = 2 \cdot (-3) \cdot x^2 \cdot x^3 \cdot y \cdot y^4 = -6x^5y^5$

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

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

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

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

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

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

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

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

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

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