

Exponent Rules Review Worksheet

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: $\frac{36m^3n^5}{-9mn^4} = \frac{36}{-9} \cdot \frac{m^3}{m} \cdot \frac{n^5}{n^4} = -4m^2n$

Simplify each of the following.

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) 7^0

20) $8x^0$

21) $\frac{2x^3}{-8x^4}$

22) $\frac{xy^7}{x^3y^4}$

23) $6x^5 \cdot 3x^5 \cdot x^0$

24) $(3st^{12})^3$

25) $\left(\frac{3m^2n^7}{m}\right)^5$