

EXPONENT RULES & PRACTICE

1. **PRODUCT RULE:** To multiply when two bases are the same, write the base and ADD the exponents.

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

Examples:

A. $x^3 \cdot x^8 = x^{11}$

B. $2^4 \cdot 2^2 = 2^6$

C. $(x^2y)(x^3y^4) = x^5y^5$

2. **QUOTIENT RULE:** To divide when two bases are the same, write the base and SUBTRACT the exponents.

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

Examples:

A. $\frac{x^5}{x^2} = x^3$

B. $\frac{3^5}{3^3} = 3^2$

C. $\frac{x^2y^5}{xy^3} = xy^2$

3. **ZERO EXPONENT RULE:** Any base (except 0) raised to the zero power is equal to one.

$$x^0 = 1$$

Examples:

A. $y^0 = 1$

B. $6^0 = 1$

C. $(7a^3b^{-1})^0 = 1$

1) $2m^2 \cdot 2m^3$

2) $m^4 \cdot 2m^{-3}$

3) $4r^{-3} \cdot 2r^2$

4) $4n^4 \cdot 2n^{-3}$

5) $2k^4 \cdot 4k$

6) $2x^3y^{-3} \cdot 2x^{-1}y^3$

7) $2y^2 \cdot 3x$

8) $4v^3 \cdot vu^2$

9) $4a^3b^2 \cdot 3a^{-4}b^{-3}$

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

$$11) \frac{r^2}{2r^3}$$

$$12) \frac{x^{-1}}{4x^4}$$

$$13) \frac{3n^4}{3n^3}$$

$$14) \frac{m^4}{2m^4}$$

$$15) \frac{3m^{-4}}{m^3}$$

$$16) \frac{2x^4 y^{-4} z^{-3}}{3x^2 y^{-3} z^4}$$

$$17) \frac{4x^0 y^{-2} z^3}{4x}$$

$$18) \frac{2h^3 j^{-3} k^4}{3jk}$$

$$19) \frac{4m^4 n^3 p^3}{3m^2 n^2 p^4}$$

$$20) \frac{3x^3 y^{-1} z^{-1}}{x^{-4} y^0 z^0}$$

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) $\frac{x^3}{x}$

7) $\frac{18c^3}{-3c^2}$

8) $\frac{9a^3b^5}{-3ab^2}$

9) $\frac{-48c^2d^4}{-8cd}$

10) $\frac{22y^6z^8}{2yz^{-7}}$

11) $x^2 \cdot x^7$

12) $2x^3 + 7x^3$

13) 7^0

14) $8x^0$

15) -3^4

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

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

18) $6x^5 \cdot 3x^5 \cdot x^0$