

Laws of Exponents

Write the following problems out completely using only the definition of exponents and multiplication or division.

Example: $x^3 \cdot x^2 = (x \cdot x \cdot x) \cdot (x \cdot x) = x^5$

1. $a^4 \cdot a^3$

2. $n^5 \cdot n^4$

3. $x^2 \cdot x^9$

4. $y \cdot y^6 \cdot y^2$

In the above cases, the *base* number is the same in each problem. What is the relationship between the exponents in the problem and the exponent in the final, simplified answer? _____

Example: $\frac{x^5}{x^2} = \frac{x \cdot x \cdot x \cdot x \cdot x}{x \cdot x} = \frac{\cancel{x} \cdot \cancel{x} \cdot x \cdot x \cdot x}{\cancel{x} \cdot \cancel{x}} = \frac{x^3}{1} = x^3$ ← Notice how anything divided by itself = 1.

5. $\frac{y^3}{y^2}$

6. $\frac{a^7}{a^3}$

7. $\frac{m^6}{m^8}$

8. $\frac{x^5}{x^6}$

Again, in the above cases, the *base* number is the same in each problem. What is the relationship between the exponents in the problem and the exponent in the final, simplified answer? _____

In the following problems, you may use the shortcuts you discovered, or work them completely out.

9. $\frac{x^2 y^4}{y^6}$

10. $\frac{a^3 b}{a^8 b^3}$

11. $\frac{2x^5}{6x^6}$

12. $\frac{x^{11}}{x^{18} y^{11}}$

13. $\frac{12y^5}{18y^5}$

14. $-\frac{15a^{17}}{25a^{14}}$

15. $\frac{3b^{22}}{9b^{26}}$

16. $\frac{10x^5 y^7}{35x^{12} y^5}$