

















Big Numbers, Little Numbers: The Double Standard



Part 1:

Write out each example WITHOUT using exponents.	Count up the variables and write WITH exponents	Little Number Laws (exponent) 
a. $(p^4q^2)(p^3q^5)$ _____  b. $(m^2n^6)(m^3n)$ _____ 		When _____ w/same _____, _____ the exponents.
c. $\frac{a^4b^7}{a^2b^3}$ _____  d. $\frac{x^4y^5}{x^9y^2}$ _____ 		When _____ w/same _____ the exponents.
e. $(r^3s^4)^3$ _____  f. $(c^2d^2)^4$ _____ 		When a _____ is raised to a _____, _____ the exponents.

Part 2:

Write WITHOUT exponents.	Write WITH exponents	Big Numbers, Little Numbers Combined (co-efficient) (exponent) 
a. $(4x^2y^3)(7xy)$ _____  b. $(u^4w^2)(5u^3w^2)$ _____ 		When multiplying, _____ numbers always _____. Little numbers still follow rule above.
c. $\frac{3f^5g^3}{15f^2g}$ _____  d. $\frac{-8a^2b^6}{2a^4b^3}$ _____ 		When dividing, _____ numbers always _____. Little numbers still follow rule above.
e. $(-5x^2y^1)^2$ _____  f. $(4pq^3)^3$ _____ 		When _____ numbers are raised to a _____, perform repeated _____. Little numbers still follow rule above.

Laws of Exponents Lesson Notes

Product of Powers
Example: $a^2 \cdot a^3 = aa \cdot aaa = a^5$
Rule: $x^m \cdot x^n = x^{m+n}$
*bases must be the same to use the product of powers rule

Simplify.

1. $x^7 \cdot x^2$

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

3. $4x^9 (x^3)$

4. $(x^2y)(xy^7)$

5. $2(-3e)e^2$

6. $-3(2d^3)d^4$

Solve.

7. In little league, Mary throws a softball $(4b^2)$ times every day. How many times does she throw the ball in $(2b^3)$ days?

8. Find the area of a rectangle that has a length of $5(x^2y)$ and a width of (x^3y^3) .

Power of a Power	Power of a Product
Example: $(a^2)^3 = (aa)(aa)(aa) = a^6$	Example: $(x^m y^n)^p = x^{m \cdot p} y^{n \cdot p}$
Rule: $(x^m)^n = x^{m \cdot n}$	Rule: $(xy)^m = x^m y^m$
Power of a Monomial	
Example: $(a^2 b^3)^2 = (a^2 b^3)(a^2 b^3) = (aabb)(aabb) = a^4 b^6$	
Rule: $(x^m y^n)^p = x^{m \cdot p} y^{n \cdot p}$	

Simplify.

9. $(-3m)^3$

10. $-4(3x^4)^2$

11. $3(-5x^7)^2$

12. $(x^2y^4)^3(x^6y^5z)$

13. $-2(-6x^6y^3)^2$

14. $5x(2x^2)^3$

Solve.

15. Eric studies $(2xy^3)^2$ hours for $(-2x^2y^4)^2$ days. How many hours did Eric study?

16. Find the volume of a cube whose side measures $(-9kx^3)$.

Quotient of Powers
Examples: $\frac{a^5}{a^3} = \frac{aaaaa}{aaa} = a^2$
Rule: $\frac{x^m}{x^n} = x^{m-n}$
*bases must be the same to use the Quotient of Powers rule

Simplify.

17. $\frac{x^6}{x^3}$

18. $\frac{-x^5y^2}{x^3y^2}$

19. $\frac{(-x)^3y^5}{xy}$

20. $\frac{-x^7y^8}{-x^2y}$

21. $\frac{3x^{10}y^{11}}{x^{10}y}$

22. $\frac{x^3y^6}{x^5y}$

Solve.

23. The area of a rectangle is $(64x^4y^{10})$. If the length of the rectangle is $(2xy^3)$, find the width.
24. The area of a rectangle is $63x^5y^9$. Find the width of the rectangle if its length is $9x^4y^6$.
25. The volume of a rectangular prism is $(36x^5y^9)$. Find the length of the prism if its width is $(3x^2y)$ and its height is $(4xy^3)$.