6-1 Exponent Rules

Alg 2 std. 7.0

* $a^m \cdot a^n = a^{m+n}$
* $(a^m)^n = a^{mn}$
* $(ab)^m = a^m b^m$
* $\frac{a^m}{a^n} = \begin{cases} a^{m-n}, \text{ if } m>n \text{ and } a \neq 0 \\ \frac{1}{a^{n-m}}, \text{ if } n>m \text{ and } a \neq 0 \end{cases}$
* $\left(\frac{a}{b}\right)^m = \frac{a^m}{b^m}$, if $b \neq 0$
* $a^{-m} = \frac{1}{a^m}$ and $\frac{1}{a^{-m}} = a^m$, if $a \neq 0$
* $a^0 = 1$; $a \neq 0$

Simplify (do not leave zero or negative exponents in answers).

ex. 1 $(x^n)^2 (x^{n+1})^3 = x^{2n} \cdot x^{3n+3} = x^{5n+3}$

ex. 2 $\frac{x^{2n} y^{n-1}}{x^n y^n} = \frac{x^{2n-n}}{y^{n-(n-1)}} = \frac{x^n}{y}$ $n>1$

ex. 3 $\frac{(3x^{-2}y)^{-1}}{(xy^2)^{-2}} = \frac{3^{-1} x^2 y^{-1}}{x^{-2} y^{-4}} = \frac{x^2 \cdot x^2 y^{-1-(-4)}}{3} = \frac{x^4 y^3}{3}$

$\frac{(xy^2)^2}{(3x^{-2}y)^1}$

ex. 4 $\dfrac{5x^{-2}}{y^3} \cdot \left(\dfrac{y^2}{10x}\right)^{-2} = \dfrac{5}{x^2 y^3} \cdot \dfrac{y^{-4}}{10^{-2} x^{-2}}$

$= \dfrac{5 \cdot 10^2}{y^3 y^4} = \dfrac{500}{y^7}$

Scientific Notation

$a \times 10^n$ where $1 < a < 10$ and n is an integer

ex. 5

scientific notation	decimal notation
9.3×10^7	93,000,000.
4.1×10^{-5}	0.000041
2.7×10^4	27,000.
3.5×10^{-3}	0.0035